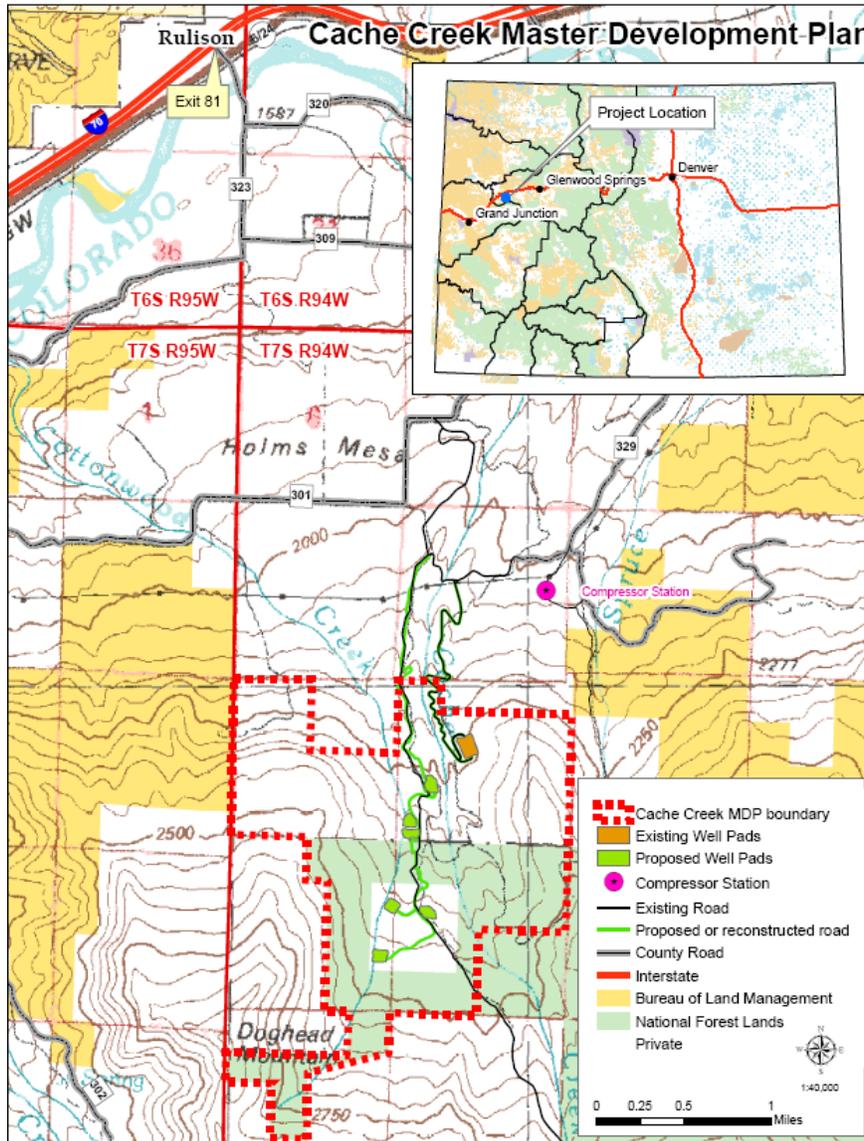




# ENVIRONMENTAL ASSESSMENT DOI-BLM-CO-N040-2009-0088-EA

## Cache Creek Master Development Plan for Oil and Gas Exploration and Development

Garfield County, Colorado  
November 2009



Lead Agency:

USDI Bureau of Land Management  
Glenwood Springs Resource Area  
2300 River Frontage Road  
Silt, CO 81652

Cooperating Agency:

USDA Forest Service  
White River National Forest  
220 Grand Avenue  
Glenwood Springs, CO 81601



## EXECUTIVE SUMMARY

Noble Energy, Inc. (Noble) has proposed a 3- to 5-year oil and gas development approximately 5 miles south of the I-70 Rulison exit and approximately 8 miles east of Parachute in Garfield County, Colorado. The proposal, known as the Cache Creek Master Development Plan (CCMDP), covers an area of 1,820 acres in all or part of Sections 17, 18, 19, 20, and 30, Township 7 South, Range 94 West, of the Sixth Principal Meridian. Surface ownership within the CCMDP area consists of 724 acres of split-estate land (private surface, Federal minerals), 360 acres of Fee lands (private surface, private minerals), and 736 acres of National Forest System (NFS) land administered by the Rifle Ranger District of the White River National Forest. The private lands are owned by the Savage Family, who use the area for ranching.

Mineral ownership within the CCMDP area consists of 1,460 acres of Federal oil and gas leases, including 724 acres in Federal lease COC66921 underlying the split-estate land and 736 acres in Federal lease COC67544 underlying the NFS lands. The remaining 360 acres within the CCMDP area is underlain by private minerals.

The Proposed Action consists of constructing, drilling, completing, and operating up to 79 new wells (39 Federal, 40 Fee) from five new well pads located on private surface. No well pads would be located on NFS lands, but an access road and pipelines would be constructed across NFS lands to connect the two development areas. Length of road and pipelines across the Forest would be 0.3 mile. Two pads on split-estate land in Section 17 would access Federal lease COC66921. Three pads on Fee lands in Sections 19 and 20 would access Federal lease COC67544. All five pads would also be used to access private mineral leases. The proposed new wells would be in addition to 11 Federal and 7 Fee wells on an existing pad in Section 17, which is not part of the Proposed Action.

The CCMDP includes the following planned components:

- Partially realigning and reconstructing 3.3 miles of existing road (0.3 miles on NFS lands) to access proposed pads.
- Installing 2.89 miles of buried natural gas and water pipelines (0.3 miles on NFS lands) adjacent to existing and proposed roads, to be closed to motorized use except related to oil and gas activities.
- Clearing and leveling up to five well pads and drilling up to 79 Federal and private wells:
  - Two split-estate pads (17L and 17M) with 17 Federal wells and 16 private wells.
  - Three Fee pads (19H, 19I, and 20F) with 22 Federal wells and 24 private wells.
- Conducting drilling and completion operations for approximately 45 to 60 days on each well.
- Installing production equipment, primarily consisting of gas meters, storage tanks, and multi-well separator units.
- Reclaiming all of each pad not needed for ongoing production activities once drilling and completion operations have ceased (“interim reclamation”).
- Maintaining the access road and operating the wells and ancillary production facilities for an average of 30-years for each well.
- Completing final reclamation of the well pads, roads, and pipelines, consistent with requirement of BLM, WRNF, and wishes of the surface landowner when the wells are taken out of production at the end of their lives (“plugging and abandonment”).

The access road used to serve the proposed pads would generally follow an existing ranch road used by the private landowner to access a private hunting lodge. Reconstruction of the access road would meet the standards of both BLM and the private landowner on split-estate and Fee lands and of the WRNF in the 0.3-mile segment across NFS lands in Section 17. Minor spur roads to the pads in Sections 17 and 19 would require new construction. The proposed road construction would result in 3.29 miles of new or improved access roads with a 26-foot running surface to safely accommodate traffic in both directions. The pipelines serving the new pads would be buried within the existing ranch road in Sections 17 and 20, where possible, and otherwise adjacent to the new or reconstructed road segments. The total length of proposed pipeline construction would be 2.89 miles.

All wells on the proposed pads would be located in what is known as the Project Rulison Three-Mile Area. This area is a 3-mile buffer zone surrounding the site of an underground nuclear explosion conducted by the U.S. Department of Energy (DOE) in 1969 to investigate its potential for liberating natural gas from the tight formation within which it occurs. Noble would comply with all Colorado Oil and Gas Conservation Commission (COGCC) Rules, Orders, and Conditions of Approval associated with the Project Rulison Three-Mile Area. The Federal wells proposed in the CCMDP would be subject to meeting the requirements set forth in the COGCC policy statement issued by David Neslin, at that time the Acting Director, on December 21, 2007. This policy statement can be viewed on the COGCC website at [www.cogcc.state.co.us](http://www.cogcc.state.co.us).

Because the Proposed Action includes activities on both BLM and NFS lands, this project has two responsible officials. Upon completion of the EA, including a 30-day public review and comment period on the Proposed Action during scoping, the responsible officials will issue a joint decision documenting the selected alternative and the basis for that selection.

The BLM Field Manager is responsible for:

- Decisions affecting Federal wells on proposed pads 17L and 17M and the associated pad layout, surface facilities, access road, and pipelines.
- Decisions affecting Federal wells on proposed pads 19H, 19I, and 20F and the associated surface facilities, access road and pipelines.
- Enforcement of lease stipulations for Federal lease COC66921 and surface use and downhole Conditions of Approval (COAs) for Federal wells.

The WRNF Forest Supervisor and Rifle District Ranger are responsible for:

- Forest Supervisor – Decisions affecting the proposed access road and pipelines across a 0.3-mile road segment of NFS lands to access serve pads 19H, 19I, and 20F.
- Rifle District Ranger – Enforcement of any special terms and conditions to for the issuance of road and pipeline Special Use Permits to allow access across NFS lands.

All aspects of the Proposed Action would be subject to the application and enforcement of best management practices (BMPs) and mitigation measures specified by BLM and WRNF under their regulatory authority. These protections, in the form of COAs, would be attached by BLM to individual Applications Permit to Drill (APD) for Federal wells and associated facilities (Appendix B) and attached by WRNF to the Road Use Permit and Special Use Permit required for Noble to construct an access road and pipelines, respectively, across 0.3 mile of NFS lands (Appendix C). The Master Drilling Plan (Appendix D) and Master Surface Plan of Operations (Appendix E) submitted by Noble incorporate the surface use and downhole COAs normally required by BLM for the exploration and development of Federal wells.

**FONSI**  
**DOI-BLM-CO-N040-2009-0088-EA**

The USDI Bureau of Land Management (BLM) and the USDA Forest Service, White River National Forest (WRNF), have reviewed the attached Environmental Assessment of the Cache Creek Master Development Plan for oil and gas exploration and development proposed by Noble Energy, Inc. The project design and approved mitigation measures result in a Finding of No Significant Impact on the human environment for the Proposed Action. Therefore, an Environmental Impact Statement under the National Environmental Policy Act (NEPA) is not necessary to analyze the impacts further.

**DECISION RECORD**

DECISION: It is my decision to approve portions of the Proposed Action of the Cache Creek Master Development Plan involving three proposed split-estate pads in Sections 19 and 20 and Federal wells on two proposed Fee pads in Section 17. The WRNF will issue a separate Decision Document for the access road and pipeline on National Forest System (NFS) lands and surface-use aspects of the Fee pads.

RATIONALE:

1. This decision will provide for the orderly, economical, and environmentally sound exploration and development of oil and gas resources on valid Federal oil and gas leases.
2. This decision does not authorize the initiation of drilling of Federal wells or the construction of associated well pads, roads, pipelines, or other facilities on public lands. Drilling of Federal wells will occur only upon approval by BLM of Applications for Permits to Drill submitted by Noble Energy. Construction of an access road and pipeline on NFS lands will occur only upon issuance by the WRNF of a Special Use Permit and Road Use Permit.

MITIGATION: Environmental impacts will be avoided, minimized, or mitigated by the following:

- Project design and implementation measures incorporated into the Proposed Action.
- A Timing Limitation (TL) stipulation attached to Federal Lease COC66921 limiting oil and gas activities on split-estate land (private surface, Federal minerals) from December 1 through April 30 of each year to protect winter use by big game.
- No Surface Occupancy (NSO) stipulations on portions of the split-estate lands with slopes steeper than 50% or on slopes that are visible from I-70 and steeper than 30%.
- Controlled Surface Use (CSU) stipulations specifying that special design and mitigation may be required on portions of the split-estate lands with unstable soils on slopes steeper than 30% or within 500 feet of a riparian corridor.
- A variety of surface use and downhole Conditions of Approval (COAs) attached by BLM and WRNF to activities associated with portions of the project under their respective jurisdictions.

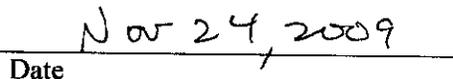
Copies of the CCMDP are available for review at the BLM office located at 2300 River Frontage Road, Silt, Colorado 81652.

NAME OF PREPARER: Jim Byers, Natural Resource Specialist, Project Lead

SIGNATURE OF AUTHORIZED OFFICIAL:



Authorized Officer

  
Date

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## 1. INTRODUCTION

Noble Energy, Inc. (Noble) has proposed a 3- to 5-year oil and gas development approximately 5 miles south of the I-70 Rulison exit and approximately 8 miles east of Parachute in Garfield County, Colorado. The proposal, known as the Cache Creek Master Development Plan (CCMDP), covers an area of 1,820 acres in all or part of Sections 17, 18, 19, 20, and 30, Township 7 South, Range 94 West, of the Sixth Principal Meridian. The CCMDP area comprises 724 acres of split-estate land (private surface, Federal minerals), 360 acres of Fee lands (private surface, private minerals), and 736 acres of National Forest System (NFS) land administered by the Rifle Ranger District of the White River National Forest. The private lands are owned by the Savage Family, who use the area for ranching.

The Proposed Action consists of constructing, drilling, completing, and operating up to 79 new wells (39 Federal, 40 Fee) from five new well pads located on private surface. No well pads would be located on NFS lands, but an access road and pipelines would be constructed across NFS lands to connect the two development areas. Length of road and pipelines across the Forest would be 0.3 mile. Two pads on split-estate land in Section 17 would access Federal lease COC66921 underlying this land. Three pads on Fee lands in Sections 19 and 20 would access Federal lease COC67544, which underlies the NFS lands surrounding this private parcel. All five pads would also be used to access private mineral leases. The proposed new wells would be in addition to 11 Federal and 7 Fee wells on an existing pad in Section 17. Figure 1 shows the location of the proposed and existing pads in relation to surface ownership. Figure 2 shows surface locations and bottomhole targets in relation to fluid minerals ownership.

The BLM Glenwood Springs Field Office (GSFO) administers the Federal mineral estate underlying Federal and private lands within its boundaries, including the CCMDP area. The U.S. Forest Service (USFS), White River National Forest (WRNF), Rifle Ranger District administers surface use of NFS lands within the CCMDP area. Personnel from the GSFO, WRNF, and U.S. Fish and Wildlife Service (USFWS) collaborated in the evaluation of Noble's proposal and preparation of this Environmental Assessment (EA) pursuant to the National Environmental Policy Act (NEPA). The purpose of the EA is to analyze and disclose the direct, indirect, and cumulative impacts of the Proposed Action and No Action alternatives. The EA also provides a basis for determining whether the Proposed Action, including associated mitigation measures, would result in impacts of sufficient scale to necessitate preparation of an Environmental Impact Statement (EIS) or would support a Finding of No Significant Impact (FONSI).

### 1.1 Purpose and Need

The purpose of the Proposed Action is to develop oil and gas resources within Federal lease COC66921 (underlying private lands) and COC67544 (underlying NFS lands), consistent with existing Federal mineral lease rights. The proposed wells, pads, roads, and pipelines are needed to develop the Federal as well as private mineral leases. The portion on NFS lands is needed to provide access to the three pads and associated wells proposed on a private inholding. Some of the wells drilled from the pads in this inholding would be drilled directionally into a Federal lease underlying the NFS lands.

Leaseholders retain rights to drill, extract, remove, and market gas products. National mineral leasing policies and the regulations that enforce them recognize the statutory right of lessees to develop Federal mineral resources to meet continuing national needs and economic demands so long as undue and unnecessary environmental degradation does not occur. Also included is the right of the lessee to build and maintain necessary improvements, subject to renewal or extension of the lease in accordance with the appropriate authority. The proposed project would allow the Federal leaseholder, Noble, to determine through oil and gas exploration if and where additional development and production is feasible.

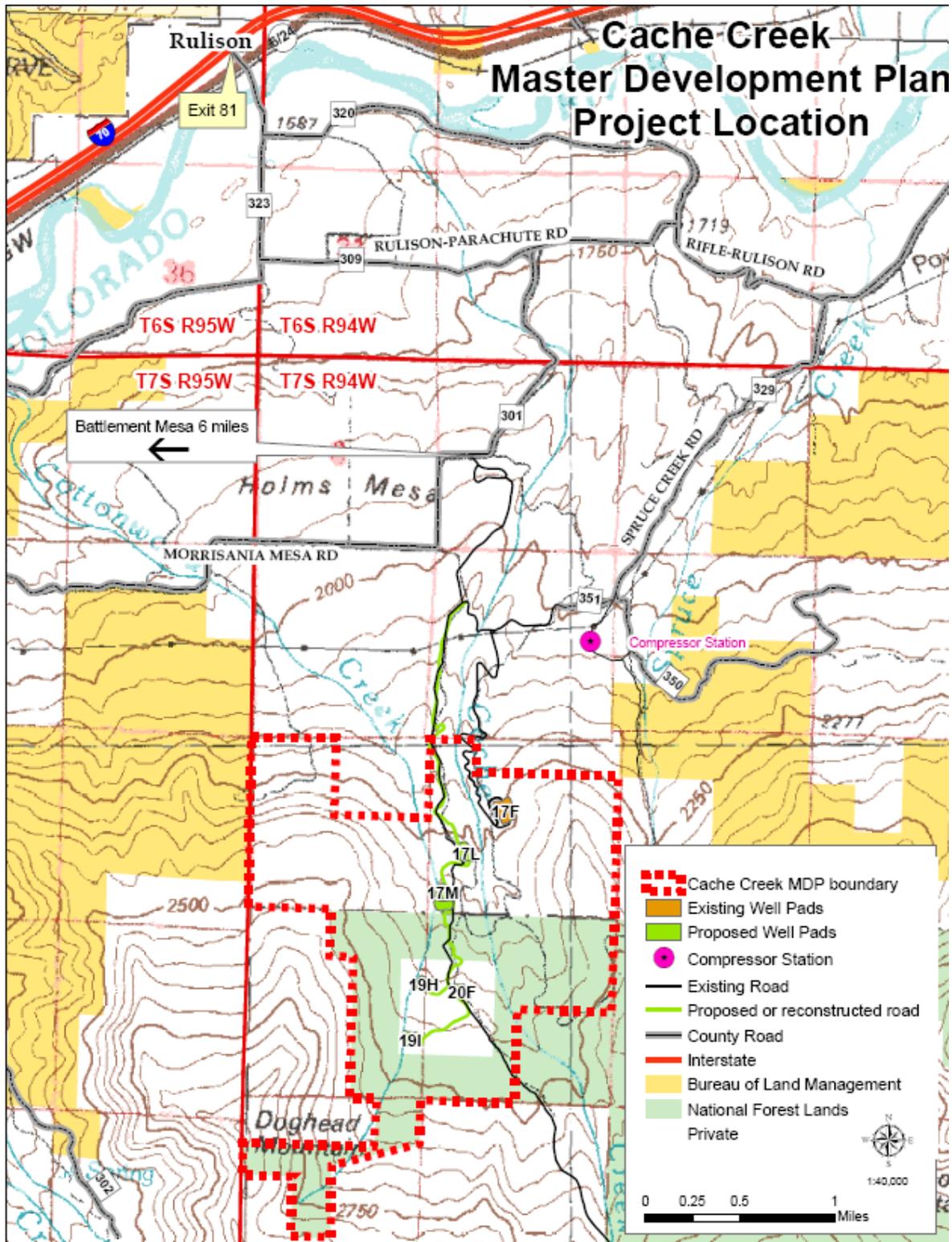


Figure 1. CCMDP Location in Relation to Surface Ownership

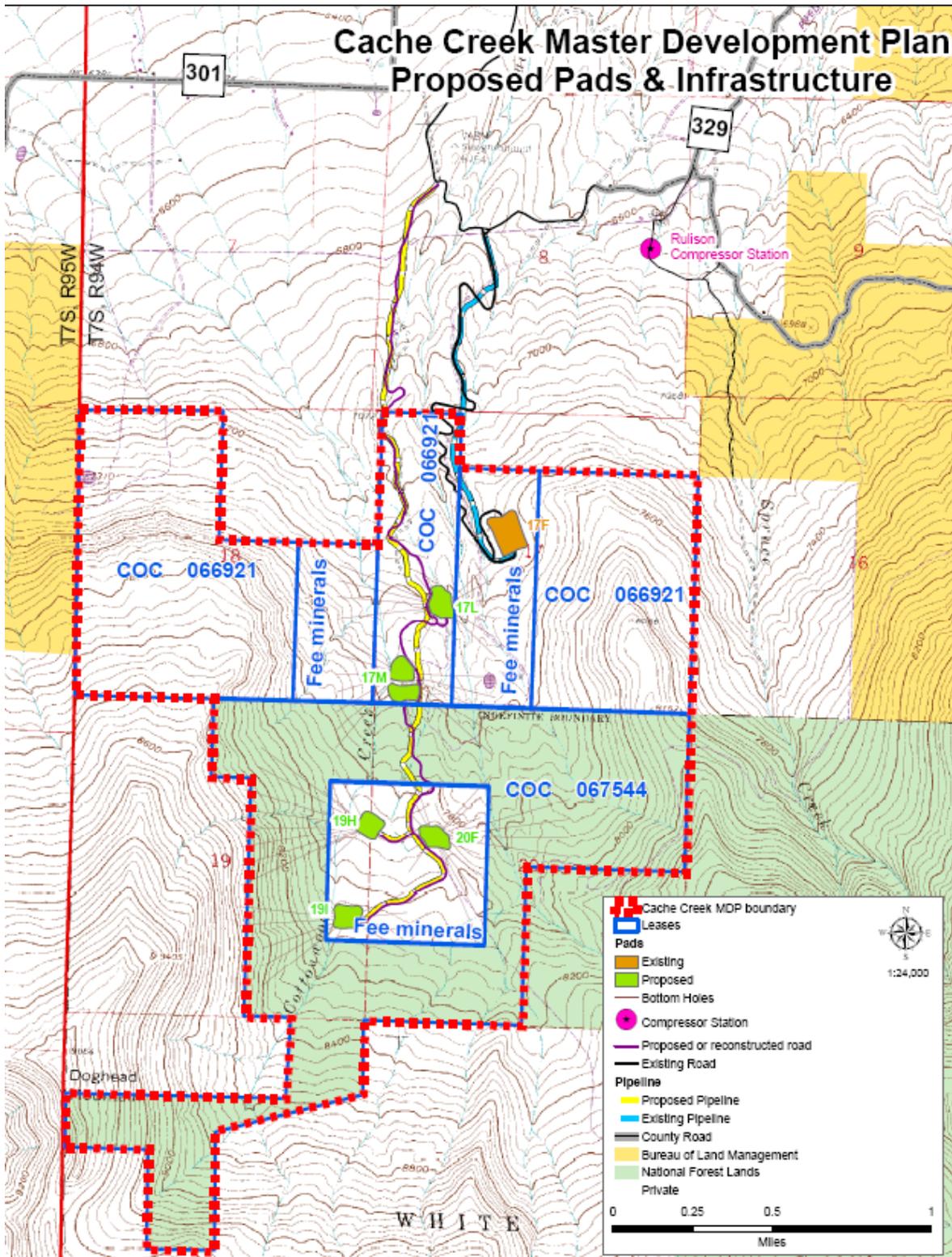


Figure 2. CCMDP Components in Relation to Fluid Minerals Ownership

## 1.2 Decision Framework

Because the Proposed Action includes activities on both BLM and NFS lands, this project has two responsible officials. Upon completion of the EA, including a 30-day public review and comment period on the Proposed Action during scoping, the responsible officials will issue separate decision records documenting the selected alternative and the basis for that selection.

The BLM Field Manager is responsible for:

- Decisions affecting Federal wells on proposed pads 17L and 17M and the associated pad layout, surface facilities, access road, and pipelines.
- Decisions affecting Federal wells on proposed pads 19H, 19I, and 20F and the associated surface facilities, access road and pipelines.
- Enforcement of lease stipulations for Federal lease COC66921 and surface use and downhole Conditions of Approval (COAs) for Federal wells.

The WRNF Forest Supervisor and the Rifle District Ranger are responsible for:

- Forest Supervisor – Decisions affecting the proposed access road and pipelines across a 0.3-mile road segment of NFS lands to access serve pads 19H, 19I, and 20F.
- Rifle District Ranger – Enforcement of any special terms and conditions to for the issuance of road and pipeline Special Use Permits to allow access across NFS lands.

Major element of the Proposed Action are described under the headings Best Management Practices and Mitigation Measures, Development (Construction, Drilling, and Completion), Production (Operation and Maintenance), and Abandonment and Reclamation.

## 1.3 Scoping

The Proposed Action was made available for public review and comment on May 8, 2009, including placement on the BLM website and publication in two area newspapers, the *Glenwood Springs Post Independent* and the *Rifle Citizen Telegram*. Public comments, along with BLM and WRNF responses, are provided in Appendix A of this EA. USFS asks what issues were raised from public comment and how were these tracked thru the analysis.

## 1.4 Land Use Plan and Conformance Review

### 1.4.1 Glenwood Springs Field Office Land Use Plan

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

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

Decision Language: The 1991 Oil and Gas Plan Amendment (BLM 1991) included the following at page 3: “697,720 acres of BLM-administered mineral estate within the Glenwood Springs Resource Area are

open to oil and gas leasing and development, subject to lease terms and (as applicable) lease stipulations” (BLM 1991, page 3). This decision was carried forward unchanged in the 1999 ROD and RMP amendment at page 15 (BLM 1999b): “In areas being actively developed, the operator must submit a Geographic Area Proposal (GAP) [currently referred to as a Master Development Plan, MDP] that describes a minimum of two to three years activity for operator controlled leases within a reasonable geographic area.”

Discussion: The Proposed Action is in conformance with the 1991 and 1999 RMP amendments cited above because the Federal mineral estate proposed for development is open to oil and gas leasing and development. In addition, the Proposed Action describes a multi-year development plan over a large geographic area and, as such, is in conformance with decision to require operators to submit Master Development Plans (MDPs), referred to at that time as Geographic Area Plans (GAPs).

#### **1.4.2 White River National Forest Land Use Plan**

The 2002 Revised White River National Forest Land and Resource Management Plan (Forest Plan) (USFS 2002) provides specific direction on how the USFS manages different land areas. As part of the analysis process, the CCMDP was reviewed to determine consistency with forest-wide goals and objectives as well as specific management area (MA) standards and guidelines. The Purpose and Need and the Proposed Action meet Forest-wide objective 2c.5: “...respond to requests for leasing, exploration, and development of mineral and energy resources in accordance with regulations and Forest Plan availability and specific lands decisions” (p. 1-12).

The portion of the CCMDP on NFS lands is within Elk Habitat MA 5.43, which contains important elk habitat and is managed for elk. “Low road densities and optimum forage and cover ratios” characterize this MA (USFS 2002: p. 3-61). Elk have been found to use this particular area of the forest for both calving and winter range; therefore, human activities may be restricted during these seasonal periods to minimize disturbance to elk (ibid., p. 3-62) (Appendix C).

### **1.5 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 analyses of proposed projects on BLM lands 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)—in this case, the Rifle West LHA (BLM 2005). However, because no component of the Proposed Action would involve BLM surface lands, the Rifle West LHA does not apply, and conformance with the standards for individual resources is not evaluated in this EA.

## **2. PROPOSED ACTION AND ALTERNATIVES**

### **2.1 Proposed Action**

#### **2.1.1 Project Summary**

The CCMDP is intended to describe a future development strategy given current market conditions and company constraints. If fully implemented, this proposal would result in up to 79 bottomhole locations drilled over the course of 3-5 years (2010 through 2014) at five new well pads (Figure 1 and Table 1).

| Table 1. Surface Disturbance Associated with Proposed Well Pads, Access Roads, and Pipelines.   |              |  |  |          |                                       |                                       |      |  |            |
|---|--------------|--|--|----------|---------------------------------------|---------------------------------------|------|--|------------|
| Well Pad  | Land Status  | Short-term Pad Disturbance (acres)<br><i>All Private</i> | Short-term Road and Pipeline Disturbance (acres) |          | Total Short-term Disturbance (acres)  | Total Long-term Disturbance (acres)   |      | Length of Roads and Pipelines (miles)<br><i>0.3 miles on NFS</i> |            |
|   |              |  | Road   | Pipeline |                                       | Pad                                   | Road | Road   | Pipeline   |
| 17L   | Split Estate | 4.2  | 12.3   | 1.8      | 21.4                                  | 1.8                                   | 7.2  | 1.69   | 1.52       |
| 17M   | Split Estate | 6.8  | 2.9  | 1.9      | 11.4                                  | 1.9                                   | 1.7  | 0.40   | 0.28       |
| 19H   | Fee          | 3.7  | 1.1  | 1.7      | 5.2                                   | 1.7                                   | 0.6  | 0.15   | 0.15       |
| 19I   | Fee          | 4.9  | 3.2  | 2.5      | 9.2                                   | 2.5                                   | 1.9  | 0.44   | 0.44       |
| 20F   | Fee          | 3.4  | 4.4  | 1.5      | 10.0                                  | 1.5                                   | 2.6  | 0.61   | 0.55       |
| Subtotals   |              |  | 23.9   | 10.3     |                                       | 14.0                                  | 9.4  |  |            |
| Totals  |              | <b>23.0 acres</b>  | <b>34.2 acres<br/>[3.2 acres NFS]</b>            |          | <b>57.2 acres<br/>[3.2 acres NFS]</b> | <b>23.4 acres<br/>[1.3 acres NFS]</b> |      | 3.29 miles   | 2.89 miles |
| <p><u>Short-term Disturbance Assumptions (during the construction, drilling, and completion phase):</u><br/>           WELL PAD – The perimeter of the total pad disturbance was calculated on survey plats.<br/>           ROAD – The average road-disturbance corridor is 60 feet in width.<br/>           PIPELINE – A pipeline buried in its own corridor would have an estimated disturbance width of 50 feet. In situations where pipelines would be buried alongside a road, the short-term disturbance width of the road and pipeline corridor would be 80 feet, except for the 350-foot segment on NFS lands where it would be restricted to 50 feet.</p> <p><u>Long-term Disturbance Assumptions (during the production phase):</u><br/>           WELL PAD – The long-term disturbance of the “working” area of each pad is based on survey plats.<br/>           ROAD – Long-term disturbance width for the proposed roads is estimated at 35 feet.<br/>           PIPELINE – The entire pipeline disturbance area would be reclaimed and therefore is not listed as a long-term disturbance.</p> <p><i>The disturbance areas for proposed pads were provided by D.R. Griffin &amp; Assocs. Inc., Rock Springs, WY. Disturbance areas for proposed roads and pipelines were calculated from engineering drawings provided by URS, Glenwood Springs, CO.</i></p> |              |  |  |          |                                       |                                       |      |  |            |

The total number of wells drilled would depend on geologic success of initial drilling, engineering technologies, economic factors, and availability of commodity markets.

Full development of the Proposed Action would not preclude additional future developments on the associated Federal leases. These potential future developments could result from changes in downhole spacing orders or in environmental, economic, or technological conditions. However, potential future developments are speculative and hence beyond the scope of the current EA. Therefore, the CCMDP includes the following planned components (Figure 2):

- Partially realigning and reconstructing 3.3 miles of an existing road (including 0.3 miles on NFS lands) to access proposed pads. Except for the 0.3 mile on NFS lands, this road is located entirely on private land and currently closed to public use. With implementation of the Proposed Action, the road would remain closed to public use but would be open to use by Noble and its contractors and to BLM and WRNF personnel for administrative use (monitoring and inspection).
- Installing 2.89 miles of buried natural gas and water pipelines (0.3 miles on NFS lands) adjacent to existing and proposed roads.
- Clearing and leveling up to five well pads and drilling up to 79 Federal and private wells:
  - Two split-estate pads (17L and 17M) with 17 Federal wells (Federal lease COC66921) and 16 private wells.

- Three Fee pads (19H, 19I, and 20F) with 22 Federal wells (Federal lease COC67544) and 24 private wells.

While the BLM and USFS do not have authority over drilling of wells from private surface into private minerals, the three Fee pads and associated 24 private wells to be drilled from those pads are included in the CCMDP and this EA as “connected actions” because their development would require approval by the USFS to cross NFS lands.

- Conducting drilling and completion operations simultaneously for approximately 7 to 10 days on each well.
- Installing production equipment, primarily consisting of gas meters, storage tanks, and multi-well separator units.
- Reclaiming all of each pad not needed for ongoing production activities once drilling and completion operations have ceased (“interim reclamation”).
- Maintaining the access road and operating the wells and ancillary production facilities for an average of 30-years for each well.
- Completing final reclamation of the well pads, roads, and pipelines, consistent with requirement of BLM, WRNF, and wishes of the surface landowner when the wells are taken out of production at the end of their lives (“plugging and abandonment”).

The access road used to serve the proposed pads would generally follow an existing ranch road used by the private landowner to access a private hunting lodge. Reconstruction of the access road would meet the standards of both BLM and the private landowner on split-estate and Fee lands and of the WRNF in the 0.3-mile segment across NFS lands in Section 17. Minor spur roads to the pads in Sections 17 and 19 would require new construction. The proposed road construction would result in 3.29 miles of new or improved access roads with a 26-foot running surface to safely accommodate traffic in both directions. The pipelines serving the new pads would be buried within the existing ranch road in Sections 17 and 20, where possible, and otherwise adjacent to the new or reconstructed road segments. The total length of proposed pipeline construction would be 2.89 miles.

Within the CCMDP boundary are 1,460 acres of Federal mineral leases, including 736 acres of NFS lands and 724 acres of split-estate land. The remaining 360 acres within the CCMDP area is Fee.

All wells on the proposed pads would be located in what is known as the Project Rulison Three-Mile Area. This area is a 3-mile buffer zone surrounding the site of an underground nuclear explosion conducted by the Department of Energy (DOE) in 1969 to investigate its potential for liberating natural gas from the tight formation within which it occurs. Noble would comply with all Colorado Oil and Gas Conservation Commission (COGCC) Rules, Orders, and Conditions of Approval associated with the Project Rulison Three-Mile Area. The Federal wells proposed in the CCMDP would be subject to meeting the requirements set forth in the COGCC policy statement issued on December 21, 2007, by David Neslin, at that time the Acting Director. This policy statement can be viewed on the COGCC website at [www.cogcc.state.co.us](http://www.cogcc.state.co.us).

Although not a component of the Proposed Action, an existing well pad (17F) was approved and constructed under COGCC authority. This pad is located on private land (Hilltop Ranch LLC) with underlying Fee minerals (Figure 1). Noble is presently drilling seven Fee wells and eleven Federal wells from this 7.1-acre pad; conductor holes for these wells were set beginning in late November 2008. Approximately 2.1 miles of access road and 1.2 miles of pipeline (12.75-inch diameter) were constructed to support the wells on the 17F pad. The pipeline length differs from the road length since the pipeline

alignment was located in an existing ranch road that was not suitable for gas development traffic. Impacts associated with the existing 17F pad are included in the cumulative impact analysis of this EA.

## **2.1.2 Detailed Description**

### **2.1.2.1 Development Phase**

During the course of project development, numerous construction activities would be completed. All of these activities could occur simultaneously. The following is a description of construction methods proposed for well pads, access roads, and gas gathering and produced water pipelines. The locations of the various developments reflect the results of onsite exams conducted by the BLM, NFS, private landowner, the operator, and subcontractors to assess proposed pad and pit layout, proposed access routes, pipeline routes, cuts and fills, topsoil stockpiling, erosion control, wildlife mitigation, and reclamation potential. The primary purpose of the onsite inspections was to assess potential resource impacts associated with their construction. In most cases, revisions to the original proposal were made to minimize potential impacts.

#### Construction of Proposed Well Pads

The proposed well pads would be constructed from the native soil and rock materials present using a bulldozer, grader, front-end loader, and trackhoe. Prior to commencing the earthwork operations, the pad would be cleared of vegetation, including trees, with a hydro-axe or tree chipper. A fence capable of excluding grazing livestock would be installed around the pad's disturbance perimeter; a cattleguard would be installed at the road entrance to the pad. Earthmoving equipment would strip, segregate, and stockpile the available topsoil in a windrow around the pad perimeter, and level the pad area to the specifications listed in the survey plats using cut-and-fill techniques. Cut slopes associated with pad construction would be "step cut" as necessary and left rough to provide a seed catchment surface. The tops of the cut banks and pad corners may be rounded to improve their appearance.

Initially, the size of the newly constructed pads would range from 3.4 to 6.8 acres (Table 1). The variation in the size of the pads is a function of topography and the number of bottomhole locations targeted. The 17M pad has been designed as a split-level pad with the wellbores and drilling occurring on the lower level and the well completion equipment staged on the upper level. The upper level of the 17M pad is designed to serve as a satellite location to support well completion (hydraulic fracturing, or "frac") operations on the other pads proposed in the CCMDP area. Construction of the five pads would result in 23.0 acres of short-term surface disturbance.

Dewatering systems would be used during the well drilling, and drill cuttings would be buried on location in cuttings pits. The cuttings pits would vary in size, depending on the size and configuration of the proposed well pads and the number of proposed wells that may be drilled at that location.

If problems arise from the use of this "closed loop" drilling system in order to safely contain cuttings and drilling fluids, the reserve pits would be constructed to allow for a minimum of 2 feet of freeboard between the maximum fluid level and the top of the berm around the pit. In addition to the berm, catchments would be excavated around the pits to prevent the infiltration of stormwater. The fluids contained in the pits would be allowed to evaporate unless an alternative method of disposal is approved.

A fence would be constructed around each pit. The fence would remain until all wells have been drilled and completed and the pits backfilled and recontoured. The sides of the well pads would be bermed to prevent stormwater from flowing off the pad and into nearby drainages. Stormwater would be directed to an opening in the berm that leads to a sediment trap. The channel from the opening to the sediment trap,

and the overflow from the trap would be lined with riprap to dissipate energy and control erosion. Noble's stormwater management efforts may include additional engineering measures such as the installation of culverts to divert water flow away from surface locations as needed.

After the wells are drilled and completed and production facilities installed at each pad, interim reclamation activities on that pad would. Interim reclamation would reduce the size of the pad to the minimum "working area" necessary for long-term production and maintenance of the wells. The working area of each pad, including the wellheads, separators, and storage tanks would remain unreclaimed throughout the 30-year production phase of the wells. Generally, cuts and fills would be recontoured to blend with adjacent natural slopes and seeded to reestablish vegetative cover within the fenced pad perimeter. These interim reclamation techniques would result in approximately a 60% reduction in surface disturbance of the well pads; the working area of the pad would comprise 40% of the initial pad disturbance area. Long-term disturbance associated with the five proposed well pads is estimated at 9.4 acres after interim reclamation is conducted (Table 1).

#### Construction of Proposed Access Roads

The CCMDP area would be accessed by vehicles serving the oil and gas development, including traffic related to construction, drilling, completion, and well production. The CCMDP area could be reached from two distinct directions:

- (1) Leave I-70 at Exit 81 (Rulison), then proceed south onto Garfield County Road 320 (CR320), west on CR309, and south on CR301 to the private access road near the existing 5L pad in the NESW of Section 5 (T7S, R94W).
- (2) Leave I-70 at Exit 75 (Parachute), then proceed east across the Colorado River on CR 300A and CR301 for approximately 6 miles to the private access road near the existing 5L pad.

The proposed roads, totaling 3.29 miles, would be constructed to meet standards for the anticipated traffic flow and all-weather requirements. The upgraded road would cross 0.3 mile of NFS lands in the NWNW of Section 20 (T7S, R94W).

Proposed roads would be constructed within a 60-foot average disturbance corridor, which would be reduced to a 26-foot finished road surface (including bar ditches) after interim reclamation (see Table 1). A track-mounted hydro-axe or tree chipper would be used to clear vegetation, including trees, within the proposed limits of disturbance for the planned roads. Earth-moving equipment would be used to segregate and windrow the topsoil along the edge of the proposed road corridor. The road would then be constructed using standard equipment and techniques as described in the *Surface Operating Standards for Oil and Gas Exploration & Development – The Gold Book* (USDI and USDA 2007) and *Forest Service Design Criteria on Forest Lands* (USFS 1987). Such measures would include ditching, draining, crowning, surfacing, sloping, and dipping the roadbed as necessary. A minimum 4-inch layer of gravel would be applied to the road surface to provide an all-weather travelway.

The average road grade would be 10% or less, wherever possible. The 10% grade would only be exceeded in areas where physical terrain or unusual circumstances require it. Minimum horizontal curve radii would be 100 feet. Where terrain would not allow a 100-foot curve radius, the curve would be widened. Road construction would result in approximately 23.9 acres of short-term surface disturbance. Following interim reclamation, the long-term surface disturbance associated with roads would be approximately 14 acres (Table 1). The 3.2 acres of short-term disturbance occurring on NFS lands would be diminished to 1.3 acres of long-term surface disturbance after the pipeline corridor and road cuts and fills were satisfactorily reclaimed.

Crossings would be designed to minimize siltation and the accumulation of debris in the drainage crossing. Water diversions including cutouts would be placed at frequent intervals along access roads to prevent the erosion of drainage ditches.

#### Construction of Proposed Gas Gathering and Water Pipelines

A pipeline network totaling 2.89 miles would be needed to gather and deliver the natural gas offsite to existing trunk pipelines and transport the produced water to centralized tank batteries within and outside the project area. The new pipelines would cross 0.3 mile of NFS lands in the NWNW Section 20 (T7S, R94W).

The buried gathering system for the five proposed well pads would be comprised of maximum 20-inch-diameter steel gas pipeline running north from 20F pad past the 17M and 17L pads and into the existing Noble trunkline in Section 8. This pipeline would generally follow the existing ranch road alignment that runs through Sections 8, 17, and 20 for an approximate length of 2.4 miles. An additional 8.625-inch-diameter steel gas pipeline serving the 19H and 19I pads would branch into two segments totaling 0.6 mile from the 20-inch pipeline to complete the gas gathering system for the project area. A 4-inch waterline to move fresh water and produced water in the system would be buried in the same trench as the gas gathering lines to help reduce water-hauling truck traffic. An existing compressor facility located in the SENE Section 8 (T7S, R94W) would serve to regulate pressures in the gas gathering system and move gas to market from the project area.

Segments of the proposed pipelines installed along the access roads would have an expanded 80-foot disturbance corridor on private land but be limited to a 50-foot disturbance corridor on NFS lands. In either case, the pipeline-road corridor would be reclaimed and reduced to the 26-foot finished road surface. In instances when the pipeline alignment deviates from the proposed road (generally following the existing ranch road alignment to be closed to motorized vehicles), the disturbance corridor would be limited to a 50-foot width regardless of land ownership. Pipeline short-term disturbance would total 10.3 acres (Table 1). With the implementation of proper reclamation techniques, the entire pipeline disturbance corridor would be reclaimed and no further assessment is made for long-term disturbance.

All pipelines would be buried to a minimum depth of 4 feet from ground surface to top of pipe. The pipeline trench would be excavated mechanically; pipe segments would then be welded together and tested, lowered into the trench, and covered with excavated material. Generally, a mile of pipeline could be constructed in four to seven days.

Each pipeline would be pressure tested with fresh water and/or nitrogen gas to locate any leaks. Fresh water or nitrogen used for testing would be obtained offsite and transported to the testing location by truck. After testing, water used in pressure testing of lines would be disposed at a State-approved facility or reused for drilling and/or completion operations. Nitrogen, if used instead of water, would be vented to the atmosphere.

#### Construction Specific to National Forest System Land

This environmental assessment is intended to satisfy the NEPA analysis for permit authorizations and an amendment of the existing road easement. Presently, a reciprocal nonexclusive road easement exists, allowing NFS administrative use of private road segments in Sections 8, 17, and 20 and the Savage Family (private landowner and mineral owner) use of the existing road across NFS lands in Section 20. Since the existing road segment across NFS lands would be relocated and reconstructed in the MDP, a road use permit is the document authorizing the commercial use of the road as discussed and construction on NFS lands in the Proposed Action. A special use permit would authorize the installation of buried gas

and water pipelines within the existing road corridor. Noble would submit an as-built survey of the reconstructed road and buried pipeline, in its request package to the WRNF for the easement amendment (Figure 3).

The proposed construction work on NFS lands would total 1,570 feet (0.3 mile) of new road and 1,500 feet (0.3 mile) of buried pipeline. The disturbance area attributed to the proposed improvements amounts to 3.2 acres using a maximum disturbance width of 50 feet for the new road segment, the pipeline corridor, or the 350 feet of combined road-pipeline corridor crossing NFS lands. Noble would be required to obtain a Road Use Permit from the WRNF Supervisor's Office and a Special Use Permit from the Rifle Ranger District prior to construction and use of the 0.3 mile of road realignment planned in Section 20.

#### Mitigation Common to All Construction Operations

As part of the CCMDP, Noble is submitting a Master Application for Permit to Drill (MAPD) that includes a 10-point drilling plan and 13-point surface plan that incorporates the drilling and mitigation measures that are common to all the Federal well pads and to a certain extent some of the split estate and private well pads within the CCMDP area. Mitigation for site-specific pads not incorporated by Noble in the MAPD would be attached as Conditions of Approval (COAs) for Applications for Permits to Drill (APDs) filed with the Glenwood Springs Field Office once the APDs are approved.

The disturbance limits of all proposed roads, pipelines, and well pads would be staked and/or flagged prior to any commencement of operations. Straw wattles would be staked along the outer edge of the proposed disturbance limits of new roads, pipelines, or pads. A range fence would be installed around the disturbance perimeter of each pad and a cattleguard would be installed at each pad entrance prior to construction startup to reduce conflicts with livestock grazing. All trees and brush within the disturbance corridors of proposed roads, pipelines, and pads would be hydro-axed or chipped prior to beginning excavation work. On pads, roads, or pipelines where boulder fields exist, reclamation would include the salvage and re-placement of boulders to aid in restoring a natural appearance.

#### **2.1.2.2 Drilling and Completion Phase**

Up to 79 directionally drilled wells would be developed as part of the Proposed Action. Table 2 provides surface and bottomhole locations for the proposed well pads and wells.

Noble's drilling operations would be conducted in compliance with all Federal Onshore Oil and Gas Orders, all applicable rules and regulations, and Notices to Lessees (NTLs). Drilling rigs in the CCMDP area would be targeting oil and gas producing horizons in the Cameo Coal, Rollins, Cozzette, Corcoran, and Mancos formations at depths of 7,200 to 10,000 feet. Wells would require approximately 7 to 10 days to drill, with a similar timeframe for hydrofracturing ("frac") completion activities.

Simultaneous operations would take place allowing the operator to conduct drilling and completion operations at the same time. Pads with multiple wellbores would be occupied for a more extended period of time, depending on the number of wellbores. When possible, all wellbores planned on individual pads would be drilled and completed within one drilling season and the pad reclaimed. Because of geologic and market uncertainties, Noble may drill fewer wells than those described in this MDP. Production results for wells drilled during the first year would be used to plan and design the drilling program for subsequent years.

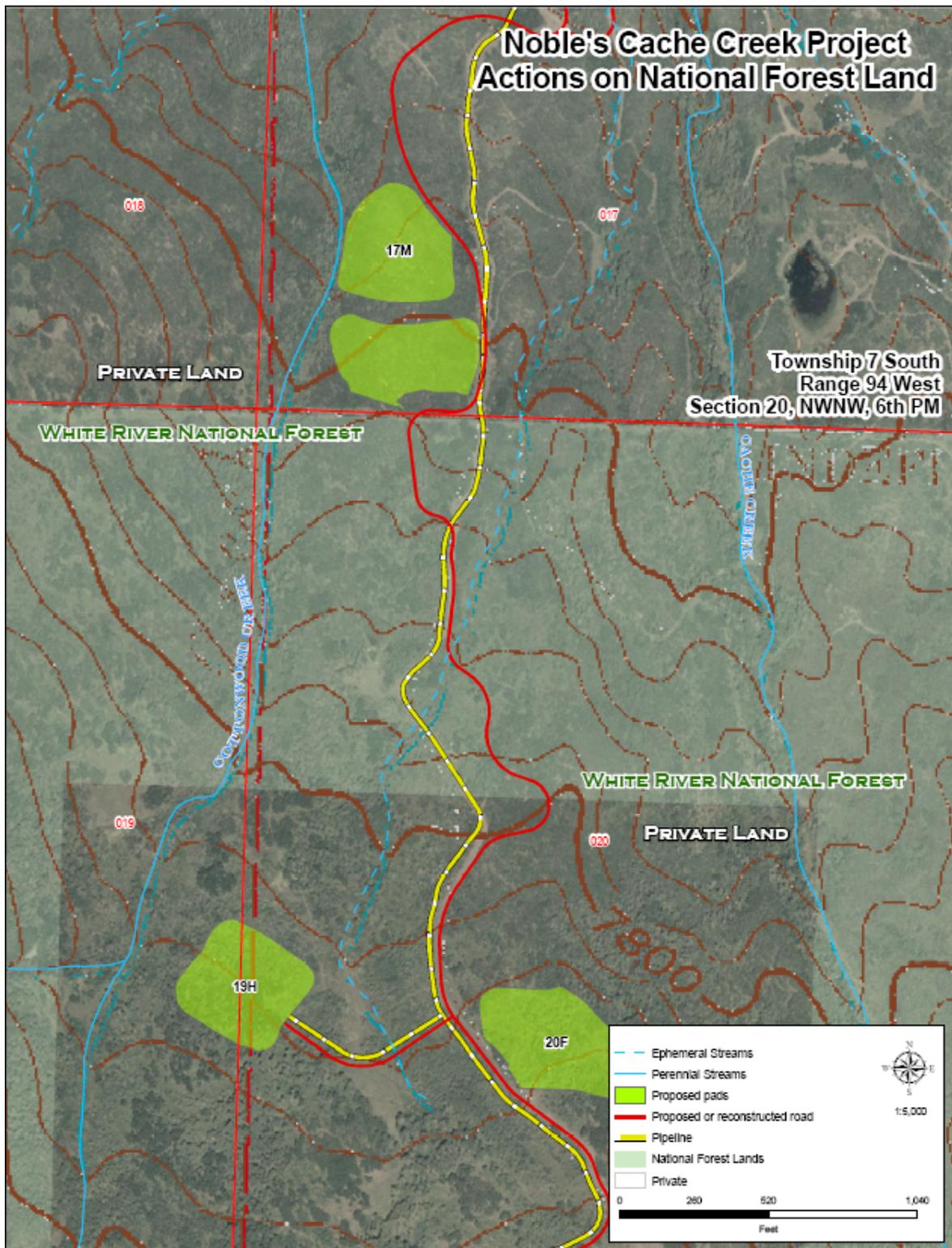


Figure 3. Proposed Actions on National Forest System Land

| Table 2. Surface and Bottomhole Locations of Proposed CCMDP Wells |                        |                        |  |  |
|---|------------------------|------------------------|--|--|
| Proposed Pad  | Lease                  | Proposed Wells         | Surface Location   | Bottomhole Location                          |
| 17L<br>(16 wells)   | COC66921<br>(6 wells)  | Rulison Federal 17-13A | NWSW,<br>Section 17,<br>T7S, R94W                                | Sec. 17, T7S, R94W, 628 ft FWL, 2489 ft FSL  |
|   |                        | Rulison Federal 17-13B |  | Sec. 17, T7S, R94W, 630 ft FWL, 2178 ft FSL  |
|   |                        | Rulison Federal 17-13C |  | Sec. 17, T7S, R94W, 638 ft FWL, 1850 ft FSL  |
|   |                        | Rulison Federal 17-13D |  | Sec. 17, T7S, R94W, 640 ft FWL, 1533 ft FSL  |
|   |                        | Rulison Federal 17-14A |  | Sec. 17, T7S, R94W, 662 ft FWL, 1164 ft FSL  |
|   |                        | Rulison Federal 17-14B |  | Sec. 17, T7S, R94W, 674 ft FWL, 847 ft FSL   |
|   | Fee<br>(10 wells)      | Jones 17-23A           |  | Sec. 17, T7S, R94W, 1950 ft FWL, 2470 ft FSL |
|   |                        | Jones 17-23B           |  | Sec. 17, T7S, R94W, 1957 ft FWL, 2159 ft FSL |
|   |                        | Jones 17-23C           |  | Sec. 17, T7S, R94W, 1984 ft FWL, 1813 ft FSL |
|   |                        | Jones 17-23D           |  | Sec. 17, T7S, R94W, 1979 ft FWL, 1502 ft FSL |
|   |                        | Jones 17-24A           |  | Sec. 17, T7S, R94W, 1994 ft FWL, 1162 ft FSL |
|   |                        | Jones 17-24B           |  | Sec. 17, T7S, R94W, 2020 ft FWL, 840 ft FSL  |
|   |                        | Double B Ranch 18-43A  |  | Sec. 18, T7S, R94W, 628 ft FEL, 2298 ft FSL  |
|   |                        | Double B Ranch 18-43B  |  | Sec. 18, T7S, R94W, 632 ft FEL, 2042 ft FSL  |
|   |                        | Double B Ranch 18-43C  |  | Sec. 18, T7S, R94W, 636 ft FEL, 1779 ft FSL  |
|   |                        | Double B Ranch 18-43D  |  | Sec. 18, T7S, R94W, 612 ft FEL, 1413 ft FSL  |
| 17M<br>(17 wells)   | COC66921<br>(11 wells) | Rulison Federal 17-14C | SWSW,<br>Section 17,<br>T7S, R94W                                | Sec. 17, T7S, R94W, 524 ft FSL, 682 ft FWL   |
|   |                        | Rulison Federal 17-14D |  | Sec. 17, T7S, R94W, 184 ft FSL, 694 ft FWL   |
|   |                        | Rulison Federal 20-21B |  | Sec. 20, T7S, R94W, 445 ft FNL, 2004 ft FWL  |
|   |                        | Rulison Federal 20-21C |  | Sec. 20, T7S, R94W, 792 ft FNL, 2010 ft FWL  |
|   |                        | Rulison Federal 19-41A |  | Sec. 19, T7S, R94W, 586 ft FEL, 137 ft FNL   |
|   |                        | Rulison Federal 19-41B |  | Sec. 19, T7S, R94W, 584 ft FEL, 462 ft FNL   |
|   |                        | Rulison Federal 19-41C |  | Sec. 19, T7S, R94W, 591 ft FEL, 756 ft FNL   |
|   |                        | Rulison Federal 20-11A |  | Sec. 20, T7S, R94W, 128 ft FNL, 685 ft FWL   |
|   |                        | Rulison Federal 20-11B |  | Sec. 20, T7S, R94W, 473 ft FNL, 686 ft FWL   |
|   |                        | Rulison Federal 20-11C |  | Sec. 20, T7S, R94W, 804 ft FNL, 688 ft FWL   |
|   |                        | Rulison Federal 20-21A |  | Sec. 20, T7S, R94W, 2007 ft FWL, 123 ft FNL  |
|   | Fee<br>(6 wells)       | Jones 17-24C           |  | Sec. 17, T7S, R94W, 2022 ft FWL, 511 ft FSL  |
|   |                        | Jones 17-24D           |  | Sec. 17, T7S, R94W, 2024 ft FWL, 176 ft FSL  |
|   |                        | Double B Ranch 18-44A  |  | Sec. 18, T7S, R94W, 624 ft FEL, 1126 ft FSL  |
|   |                        | Double B Ranch 18-44B  |  | Sec. 18, T7S, R94W, 613 ft FEL, 850 ft FSL   |
|   |                        | Double B Ranch 18-44C  |  | Sec. 18, T7S, R94W, 594 ft FEL, 480 ft FSL   |
|   |                        | Double B Ranch 18-44D  |  | Sec. 18, T7S, R94W, 595 ft FEL, 193 ft FSL   |
| 19H<br>(14 wells)   | COC67544<br>(8 wells)  | Rulison Federal 19-31C | SE NE,<br>Section 19,<br>T7S, R94W<br>&<br>SW NW,<br>Section 20, | Sec. 19, T7S, R94W, 784 ft FNL, 1825 ft FEL  |
|   |                        | Rulison Federal 19-31D |  | Sec. 19, T7S, R94W, 1114 ft FNL, 1832 ft FEL |
|   |                        | Rulison Federal 19-41D |  | Sec. 19, T7S, R94W, 1114 ft FNL, 585 ft FEL  |
|   |                        | Rulison Federal 19-42A |  | Sec. 19, T7S, R94W, 1466 ft FNL, 719 ft FEL  |

| Table 2. Surface and Bottomhole Locations of Proposed CCMDP Wells |   |                        |  |  |                        |                                  |  |
|---|---|------------------------|--|--|------------------------|----------------------------------|--|
| Proposed Pad  | Lease                                       | Proposed Wells         | Surface Location                             | Bottomhole Location                          |                        |                                  |  |
|   |   | Rulison Federal 19-42B | T7S, R94W                                    | Sec. 19, T7S, R94W, 1793 ft FNL, 771 ft FEL  |                        |                                  |  |
|   |   | Rulison Federal 19-42C |  | Sec. 19, T7S, R94W, 2115 ft FNL, 771 ft FEL  |                        |                                  |  |
|   |   | Rulison Federal 19-42D |  | Sec. 19, T7S, R94W, 2451 ft FNL, 771 ft FEL  |                        |                                  |  |
|   |   | Rulison Federal 19-43A |  | Sec. 19, T7S, R94W, 2504 ft FSL, 771 ft FEL  |                        |                                  |  |
|   | Fee<br>(6 wells)                            | Doghead 19-32A         |  | Sec. 19, T7S, R94W, 1485 ft FNL, 2094 ft FEL |                        |                                  |  |
|   |   | Doghead 19-32B         |  | Sec. 19, T7S, R94W, 1807 ft FNL, 2094 ft FEL |                        |                                  |  |
|   |   | Doghead 19-32C         |  | Sec. 19, T7S, R94W, 2134 ft FNL, 2094 ft FEL |                        |                                  |  |
|   |   | Doghead 19-32D         |  | Sec. 19, T7S, R94W, 2447 ft FNL, 2094 ft FEL |                        |                                  |  |
|   |   | Doghead 19-33A         |  | Sec. 19, T7S, R94W, 2516 ft FSL, 2001 ft FEL |                        |                                  |  |
|   |   | Doghead 19-33B         |  | Sec. 19, T7S, R94W, 2184 ft FSL, 2094 ft FEL |                        |                                  |  |
|   |   | 19I<br>(13 wells)      |  | COC67544<br>(8 wells)                        | Rulison Federal 19-34A | NESE,<br>Section 19<br>T7S, R94W | Sec. 19, T7S, R94W, 1173 ft FSL, 1623 ft FEL |
|   |   |                        |  |  | Rulison Federal 19-34B |                                  | Sec. 19, T7S, R94W, 866 ft FSL, 1700 ft FEL  |
|   |   |                        |  |  | Rulison Federal 19-34C |                                  | Sec. 19, T7S, R94W, 535 ft FSL, 1801 ft FEL  |
| Rulison Federal 19-43B  | Sec. 19, T7S, R94W, 2167 ft FSL, 771 ft FEL |                        |  |  |                        |                                  |  |
| Rulison Federal 19-43C  | Sec. 19, T7S, R94W, 1851 ft FSL, 771 ft FEL |                        |  |  |                        |                                  |  |
| Rulison Federal 19-43D  | Sec. 19, T7S, R94W, 1529 ft FSL, 771 ft FEL |                        |  |  |                        |                                  |  |
| Rulison Federal 19-44A  | Sec. 19, T7S, R94W, 1170 ft FSL, 587 ft FEL |                        |  |  |                        |                                  |  |
| Rulison Federal 20-14A  | Sec. 20, T7S, R94W, 1199 ft FSL, 690 ft FWL |                        |  |  |                        |                                  |  |
| Fee<br>(5 wells)  | Doghead 19-33C                              |                        | Sec. 19, T7S, R94W, 1842 ft FSL, 2093 ft FEL |  |                        |                                  |  |
|   | Doghead 19-33D                              |                        | Sec. 19, T7S, R94W, 1539 ft FSL, 2093 ft FEL |  |                        |                                  |  |
|   | Long 20-13B                                 |                        | Sec. 20, T7S, R94W, 2190 ft FSL, 680 ft FWL  |  |                        |                                  |  |
|   | Long 20-13C                                 |                        | Sec. 20, T7S, R94W, 1861 ft FSL, 682 ft FWL  |  |                        |                                  |  |
|   | Long 20-13D                                 |                        | Sec. 20, T7S, R94W, 1528 ft FSL, 692 ft FWL  |  |                        |                                  |  |
| 20F<br>(19 wells)   | COC67544<br>(6 wells)                       | Rulison Federal 20-11D | SWNW,<br>Section 20,<br>T7S, R94W            | Sec. 20, T7S, R94W, 1112 ft FNL, 688 ft FWL  |                        |                                  |  |
|   |   | Rulison Federal 20-21D |  | Sec. 20, T7S, R94W, 1117 ft FNL, 2007 ft FWL |                        |                                  |  |
|   |   | Rulison Federal 20-32A |  | Sec. 20, T7S, R94W, 1477 ft FNL, 1938 ft FEL |                        |                                  |  |
|   |   | Rulison Federal 20-32B |  | Sec. 20, T7S, R94W, 1799 ft FNL, 1943 ft FEL |                        |                                  |  |
|   |   | Rulison Federal 20-32C |  | Sec. 20, T7S, R94W, 2113 ft FNL, 1941 ft FEL |                        |                                  |  |
|   |   | Rulison Federal 20-32D |  | Sec. 20, T7S, R94W, 2435 ft FNL, 1932 ft FEL |                        |                                  |  |
|   | Fee<br>(13 wells)                           | Long 20-22C            |  | Sec. 20, T7S, R94W, 2123 ft FNL, 1836 ft FWL |                        |                                  |  |
|   |   | Long 20-22D            |  | Sec. 20, T7S, R94W, 2455 ft FNL, 1848 ft FWL |                        |                                  |  |
|   |   | Long 20-23A            |  | Sec. 20, T7S, R94W, 2504 ft FSL, 1829 ft FWL |                        |                                  |  |
|   |   | Long 20-23B            |  | Sec. 20, T7S, R94W, 2184 ft FSL, 1832 ft FWL |                        |                                  |  |
|   |   | Long 20-23C            |  | Sec. 20, T7S, R94W, 1840 ft FSL, 1845 ft FWL |                        |                                  |  |
|   |   | Long 20-23D            |  | Sec. 20, T7S, R94W, 1511 ft FSL, 1844 ft FWL |                        |                                  |  |
|   |   | Long 20-13A            |  | Sec. 20, T7S, R94W, 2504 ft FSL, 683 ft FWL  |                        |                                  |  |
|   |   | Long 20-12A            |  | Sec. 20, T7S, R94W, 1474 ft FNL, 684 ft FWL  |                        |                                  |  |

| Table 2. Surface and Bottomhole Locations of Proposed CCMDP Wells |       |                |                  |  |
|---|-------|----------------|------------------|--|
| Proposed Pad  | Lease | Proposed Wells | Surface Location | Bottomhole Location                          |
|   |       | Long 20-12B    |                  | Sec. 20, T7S, R94W, 1788 ft FNL, 688 ft FWL  |
|   |       | Long 20-12C    |                  | Sec. 20, T7S, R94W, 2106 ft FNL, 694 ft FWL  |
|   |       | Long 20-12D    |                  | Sec. 20, T7S, R94W, 2428 ft FNL, 689 ft FWL  |
|   |       | Long 20-22A    |                  | Sec. 20, T7S, R94W, 1483 ft FNL, 1849 ft FWL |
|   |       | Long 20-22B    |                  | Sec. 20, T7S, R94W, 1814 ft FNL, 1853 ft FWL |

Prior to drilling below the surface casing, well control equipment (Blowout Preventer and Choke Manifold) would be installed on the surface casing, and both the well control equipment and surface casing would be tested to insure adequate well control. The well control equipment would meet the minimum standards of Onshore Oil and Gas Order Number 2 (Drilling Operations). Noble would use a small truck-mounted drilling rig to drill the conductor pipe and rat holes. Once the conductor pipe is set and cemented in place to the surface, a conventional drilling rig would be moved in and rigged up to spud (begin drilling) the surface hole and production holes to total depth.

A downhole motor is used to directionally drill the well and increase penetration rate. The motor is powered by drilling fluids that are used to drive the motor, cool the bit, and carry drill cuttings to the surface. Various chemicals and additives may need to be added to the mud system to maintain borehole stability, minimize possible damage to the formation, provide adequate carrying viscosity (thickness) to carry the drill cuttings out of the wellbore and reduce downhole fluid losses. Any additives to the mud system are required to conform to Subtitle C of the Resource Conservation and Recovery Act (RCRA) of 1976 as amended in 1996. Material Safety and Data Sheets (MSDSs) are required to be readily available.

For the directional wells, an S-shaped directional design would be used to reach the targeted bottomhole locations. In general, a target radius of 200 x 100 feet would be used. Specific directional plans for each well would be included with the APDs. Downhole operations would be done with directional tools to facilitate proper direction and path of the well.

Depending on rig availability, Noble intends to implement a closed-loop drilling system in the CCMDP using a drill rig outfitted with special equipment designed to recycle drilling fluids and deposit the cuttings on location without the use of a conventional reserve pit. Cuttings are moved through a shaker system on the drill rig that captures drilling fluids from the cuttings.

Noble estimates 300 yards of cuttings per wellbore, using a 50% expansion. However, since the cuttings would vary between wellbores, the volumes are estimates only. If the drill cutting volumes increase more than anticipated due to expansion, Noble would pile the cuttings at the base of the cut slope (this process would only occur for the last few wells on the pad, and Noble would consult with the BLM prior to conducting this operation). Noble would then cover the cuttings with dirt from the excess piles, recontour, cover with topsoil, and seed. No hazardous substances would be placed in any pits.

After drilling a bore to its total depth, logging tools would be run into the well to evaluate the potential hydrocarbon resource. If the evaluation indicates that adequate hydrocarbon resources are present and recoverable, steel production casing would be run and cemented in place in accordance with the well design, as approved by the BLM and any applicable Conditions of Approval. The proposed casing and cementing program would be designed to protect and/or isolate all usable water zones, potentially productive zones, lost circulation zones, abnormally pressured zones, and any prospectively valuable deposits of minerals. BLM approval is necessary prior to the use of any isolating medium other than cement.

After production casing has been cemented in place, completion equipment is moved onto the location. Well completion consists of running a cement bond log to evaluate the cement integrity and to correlate the cased hole logs to the open hole logs, perforating the casing across the hydrocarbon producing zones, and stimulating the formation to enhance the production of oil and gas. The typical method used for stimulation consists of hydraulic fracture treatment of the reservoir, in which sand is pumped along with non-toxic fluids into the producing formation with sufficient hydraulic pressure to fracture the rock formation. The sand serves as a prop to keep the created fracture open, thereby allowing reservoir fluids to move more efficiently into the wellbore.

All “frac” flowback water would be contained in temporary tanks during completion operations and recycled for re-use or trucked offsite to an approved commercial disposal facility.

The drilling plan and survey plats included in the APDs submitted to the BLM would specify the planned wellbore pattern. A lined trench to receive drill cuttings from the wellbore (i.e., rock fragments) and minimal amounts of drilling fluids carried with the cuttings would be excavated on the pad. No hazardous substances would be placed in the cuttings trench.

To comply with the COGCC policy for wells within the Project Rulison Three-Mile Area, drill cuttings (primarily rock fragments) and fluids from specified depths within the wellbores would be tested for tritium (hydrogen-3). Tritium is a radioisotope of hydrogen that is used in monitoring by DOE as a surrogate for other radionuclides potentially associated with the nuclear test. If the tested media are negative for tritium, the cuttings would be placed in a polyethylene-lined trench excavated on the pad location. Initially, Noble would excavate the pit for the first drilling season and store the spoils as identified on the plats. The lined cuttings pit would be only as large as necessary to accommodate the wells planned for that drilling season. Once the drilling season is over, and if the cuttings are dry enough, Noble may reclaim that section of the pit. The next drilling season, spoils excavated from the pit would be stockpiled on top of the reclaimed pit from the year before. This procedure would be carried forward from year to year until all wells are drilled. Any spoils remaining on top of the covered pit could then be stacked against the cut slope to help recontour and reshape the slope. It might be possible to recontour the cut slopes to some extent each year as the pits are moved down the line identified in the plats.

### **2.1.2.3 Production Phase**

#### Operation and Maintenance of Surface Facilities

Surface facilities at each well pad location would consist of wellheads, separation/dehydration units, and aboveground condensate and produced water tanks with approximately 300- to 400-barrel capacities. Multi-well locations would share production equipment, whenever feasible, to minimize surface occupancy/disturbance. All production equipment would be painted to match the surrounding terrain and located to reasonably minimize visual impact. BLM would select the color for all facilities, including containment rings, at sites associated with Federal surface or with the development of Federal minerals.

The production equipment would be fenced to prevent contact with grazing livestock. Telemetry equipment would be used to remotely monitor well conditions after a reasonable level of development. The use of telemetry would minimize traffic to and from the well locations. A pumper truck would be required to periodically visit the pads for tank gauging.

Tank batteries would be placed within secondary containment to prevent the offsite migration of accidentally spilled condensate or produced water. Secondary containment would consist of corrugated steel containment berms or earthen berms. Compaction and construction of earthen berms surrounding the tank batteries would be performed to prevent lateral movement of fluids through the utilized materials.

Secondary containment would be sized to contain a minimum of 110% of the storage capacity of the largest tank within the berm. All loading lines would be placed inside the containment berm.

All produced gas will be piped to the existing compressor station located on private property located in the SENE of Section 8, T7S, R94W. No additional compression capacity would be needed to implement the Proposed Action. Should unforeseen production requirements make onsite compression necessary, a Sundry Notice (BLM Form 3160) would be submitted to the BLM Authorized Officer detailing specifications and mitigation measures.

#### Management of Produced Water

Steel storage tanks (300- to 400-barrel capacity) would be installed on the well pad or, in the case of 17L and 17M pads, staged in proximity to the well pad to contain produced water generated from the gas wells. These tanks would remain onsite for the life of the wells. Produced water would be transferred from one pad to another for use in drilling or completion work by one of two methods: (1) the primary method is by buried 4-inch water line utilizing gravity flow and assisted by natural gas powered diaphragm pumps if required; (2) the secondary method is by trucking when the pipeline system is not operational. The produced water would be recycled for use in drilling and completion operations or trucked offsite to approved commercial disposal facilities. Prior to any discharges, all required permits from the State of Colorado as well as approval from the BLM (if discharges are proposed on BLM lands) would be acquired. Condensate would be captured at the well site in steel storage tank(s) and transported to market by tanker trucks.

#### Maintenance of Roads

Aside from the road segment on NFS lands, the CCMDP access roads would be inspected by the BLM and maintained by Noble on an as-needed or quarterly basis (at a minimum) to include such items as described below. Forest Service personnel would be responsible for inspecting all construction and maintenance work on NFS lands.

- Road surface grading and surface replacement (graveling)
- Relief ditch, culvert and cattle guard cleaning, and gate and sign maintenance
- Erosion control measures for cut and fill slopes and other disturbed areas
- Road closures in periods of excessive soil moisture to prevent rutting caused by traffic
- Road and slope stabilization measures as required until final abandonment and reclamation
- Weed control
- Dust abatement, using techniques and frequencies determined by BLM, NFS and Noble
- Maintenance activities on Forest Service lands will be stipulated in the road use permit.

#### Interim Reclamation

Topsoil storage piles, stormwater control features, and cut-and-fill slopes will undergo temporary seeding to stabilize the material and minimize weed infestations within 30 days following completion of pad construction. Interim reclamation to reduce a well pad to the minimum size needed for production will be completed within 6 months following completion of the last well planned for the pad. After completion activities for the last well planned on location, Noble would reduce the size of the well pad to the minimum surface area needed for production facilities and future workovers, while providing for reshaping and stabilization of cut and fill slopes. Interim reclamation would be accomplished by grading, leveling, and

seeding, as specified by the BLM. Interim reclamation would reduce the disturbed area at each pad to the acreage estimates (9.4 acres total) developed in the pad survey plats (Table 1).

The following is a summary of interim reclamation activities that would take place immediately after well completion:

- The well location and surrounding areas(s) would be cleared of all debris, materials, and trash not required for production. Waste and spoil materials would be disposed of at a local state approved landfill facility.
- All pits, cellars, rat holes, and other boreholes not necessary for further lease operations, excluding the reserve pit, would be back-filled immediately to conform to surrounding terrain. Pits, cellars, and/or boreholes required for further lease operations would be fenced.
- Areas not necessary for production and future workovers would be reshaped to resemble the original landscape contour. Compacted area would be ripped. Areas to be seeded would then have the seedbed prepared by disking, spreading the salvaged topsoil to a uniform thickness, seeding with a native mix approved by the BLM (or a mix specified by the private landowner on private land), and mulched.
- Non-producing well locations would be plugged, abandoned, and reclaimed within 90 days of well completion, weather permitting. Some locations would require special reclamation practices, such as application of straw mats to reduce erosion potential. Pads would be fenced for the first two growing seasons or until the seeded species have established to prevent grazing by livestock.

Some locations would require special reclamation practices. These practices could include hydromulching, straw mat application, fertilizing, seedbed preparation, contour furrowing, watering, terracing, water barring, and topsoil replacement. In order to prevent grazing pressure, all well pads would remain fenced for the first two growing seasons or until the seeded species have established.

#### Workovers or Recompletions

Periodically, the workover or recompletion of a well may be required to ensure that efficient production is maintained. Workovers can include repairs to the wellbore equipment (casing, tubing, rods, or pump) the wellhead, or the production facilities. These repairs would usually be completed during daylight hours, for a period of seven to 10 days; however, at times it may be necessary because of restrictions to complete repairs during the night. The frequency of this type of work cannot be accurately projected because workovers vary well by well. In the case of multi-well pads, space for equipment would usually be limited to the “working” (i.e., disturbed) area of the surface location, although it is possible that interim reclamation could be delayed by workover operations.

#### **2.1.2.4 Abandonment and Final Reclamation Phase**

##### Well and Pipeline Plugging and Abandonment

Upon abandonment, each borehole would be plugged, capped, and its related surface equipment removed. Subsurface pipelines would be plugged at specific intervals. A Sundry Notice would be submitted by the operator to the BLM that describes the engineering, technical, or environmental aspects of final plugging and abandonment. This notice would describe final reclamation procedures and any mitigation measures associated with the final reclamation performed by the operator. The BLM and Colorado Oil & Gas Conservation Commission standards for plugging would be followed. A configuration diagram, a summary

of plugging procedures, and a job summary with techniques used to plug the wellbore (e.g., cementation) would be included in the Sundry Notice.

### Final Reclamation

All surface disturbances would be recontoured and revegetated according to an approved reclamation plan. Final well site reclamation would be performed and monitored in accordance with the 1998 GSRA reclamation policy or other policies then in effect, including control of noxious weeds. Further information on reclamation standards is available in Appendix I of the 1999 Oil & Gas Leasing & Development FSEIS (BLM 1999a). One of the basic goals of the policy is to “establish desirable native vegetation to set the stage for the natural process to restore the site.” Consequently, one of the goals in this proposal is to accomplish as much reclamation on each well pad during the life of the well as possible, even on pads with a large “in use” during production. Unreclaimed areas, and reclaimed areas that do not meet the objective of 3 to 4 years of sustained reclamation (known as “operator complete”), would undergo the reclamation retreatment measures described in the 13-Point Surface Use Plan submitted as part of the CCMDP and referenced with each APD. Noble would also meet the BLM bonding requirements. Additional bonding would be provided for sites with extremely difficult reclamation conditions, if repeated reclamation attempts have been unsuccessful, or final reclamation cannot be completed with standard reclamation measures.

Noble or its successors would restore the well locations and access roads radiating from the main road to approximately their original contours. The main access road serving the Savage parcel would not be reclaimed. During reclamation of these sites, fill material would be pushed into cuts and up over the back slope. No depressions would be left that would trap water or form ponds. Upon completion of backfilling, leveling, and recontouring of the disturbed surfaces, the stockpiled topsoil would be spread evenly. The seedbed would then be prepared by disking and roller packing following the natural contours. Seed would be drilled on contours at a depth no greater than 0.25 inch. In areas that cannot be drilled, seed would be broadcast at double the drill-seeding rate and harrowed into the soil. Certified weed-free seed would be used per BLM policy. All disturbed BLM surfaces would be reseeded with a native grass seed mixture consistent with BLM specifications. For private surfaces, seed mixes are recommended by the BLM, but the surface landowner has ultimate authority over the seed mix to be used. Seeding would be implemented within 24 hours following completion of final seedbed preparation to reduce the potential for establishment of weeds and before crusting of the soil, which can impede germination and established of seeded species. All disturbed lands would be seeded with a native grass mix approved by the BLM, or a mix specified by the private landowner on private land. If the seeding is unsuccessful, Noble would be required to make subsequent seedings.

Reclamation would be considered successful when the objectives described in the GSRA Reclamation Policy are achieved. Revegetation would be considered successful if it meets the objectives set forth in the Conditions of Approval identified in Appendix E of the GSRA Oil & Gas Leasing & Development Draft Supplemental Environmental Impact Statement (DSEIS) (BLM 1998). As described in Appendix E of the DSEIS, revegetation would be considered successful when the following objectives are met:

- *Immediate short term:* Germination and early establishment of desirable vegetation by the end of the second growing season, capable of sustaining itself.
- *Acceptable establishment:* Continued establishment of desirable vegetation, including cover and species richness at a level indicating that success is likely to be achieved.
- *Long-term establishment:* Revegetated areas approximate the original pre-disturbance condition in terms of cover and species composition.

**2.1.3 Summary of Lease Stipulations**

Protective stipulations attached to Federal lease COC66921, which underlies proposed pads 17L and 17M, would apply to oil and gas activities associated with those pads. Relevant stipulations are listed in Table 3. In contrast, the proposed 19H, 19I, and 20F pads would be located on Fee lands (private surface, private minerals), with the Federal lease COC67544 accessed by directional drilling. Therefore, stipulations attached to that lease for the protection of surface resources would not apply. However, COAs for the pads, roads, and pipelines on split-estate or Fee lands and terms and conditions related to the WRNF permits for roads and pipelines on NFS lands would be applied, consistent with the GSFO and WRNF land use plans (see Land Use Conformance Review, below).

| <b>Table 3. Stipulations of Federal Lease COC66921 Applicable to the CCM DP</b>          |  |
|--|--|
| <b>Description of Lands</b>  | <b>Stipulations</b>  |
| <p>T7S, R94W<br/>Section 17: S2NE, SE<br/>Section 18: Lots 3-6,<br/>SENW, E2SW, W2SE</p> | <p><b>Controlled Surface Use:</b> Erosive Soils and Slopes Greater than 30% -- Special design, construction, and 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. Areas identified in the RMP as Erosion Hazard Areas and Water Quality Management Areas are also included in this stipulation. Implementation may include relocation of operations beyond 200 meters.</p> <p>The surface use plan of the APD submitted for wells on erosive soils or slopes greater than 30% must include specific measures to comply with the GSRA Reclamation Policy, such as stabilizing the site to prevent settling, land sliding, slumping, and highwall degradation, and controlling erosion to prevent the site and adjacent areas from accelerated erosion and sedimentation and siltation of nearby water sources.</p> <p>Specific performance objectives for the plan include: limitation of total disturbance to 3.0 acres for the wellpad; limitation of the interim “in use” area to 0.5 acres; and maximizing the area of interim reclamation that is shaped to a grade of 3:1 or less; any planned highwall must be demonstrated to be safe and stable and include enhanced reclamation and erosion prevention measures as needed.</p> <p>The operator must also provide an evaluation of the site’s reclamation potential based on problematic characteristics of the site (slope, aspect, vegetation, depth of soils, and soil salinity/alkalinity) and a comparison of the site with comparable sites already constructed. When the proposed site is comparable to sites where reclamation has not been successful, the operator will be required to make adjustments to reclamation techniques. Special measures could include locating production facilities offsite, building roads to higher standards, including surfacing; constructing sediment catchments; reclaiming the reserve pit immediately after use; and applying fertilizers, mulches, soil additives, and geotextile fabrics. The AO will evaluate plans submitted by the operator and approve a design and any special measures that best accomplish the performance objectives, achieving a reasonable balance of site stability and revegetation potential and minimizing overall disturbance.</p> |

| <b>Table 3. Stipulations of Federal Lease COC66921 Applicable to the CCMDP</b> |   |
|--|---|
| <b>Description of Lands</b>  | <b>Stipulations</b>   |
| T7S, R94W<br>Section 17: SWSW<br>Section 18: Lots 4-5                          | <b>Controlled Surface Use:</b> 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 vegetation. Areas most important to the function of the riparian zone will be avoided.   |
| T7S, R94W<br>Section 17: E2SE<br>Section 18: Lots 5-6,<br>SENW, NESW, W2SE     | <b>No Surface Occupancy:</b> No surface occupancy/or use is allowed for the purpose of protecting Steep Slopes: to maintain site stability and site productivity, on slopes greater than 50 %. This NSO does not apply to pipelines. Exception Criteria: 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, an exception may be approved by the Authorized Officer. A request for an exception must include an engineering and reclamation plan that provides a high level of certainty that such operations can be conducted consistent with the objectives of the GSRA Reclamation Policy. All elements of the Erosive Soils and Steep Slope CSU would apply (Exhibit GS-CSU-04). In addition, the operator must provide sufficient onsite analysis of soil types, vegetation types, aspect, depth to bedrock, nature of subsurface materials and potential for below ground seeps or springs. The lessee must also provide an evaluation of past practices on similar terrain and be able to demonstrate success under similar conditions. Previous success under similar conditions would be a critical element in the Authorized Officer’s determination. |
| T7S, R94W<br>Section 17: S2NE<br>Section 18: Lots 3-7,<br>SENW, E2SW, W2SE     | <b>No Surface Occupancy:</b> No surface occupancy/or use is allowed for the purpose of protecting the I-70 viewshed: To protect slopes over 30 % with high visual sensitivity in the I-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 the Interstate. Exception Criteria: 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. BLM acknowledges that activities on private lands alter the landscape character and affect the visual quality of the overall landscape. Such modifications to the overall landscape character will be considered when evaluating mitigation proposals.  |
| T7S, R94W<br>Section 18: Lot 5   | <b>No Surface Occupancy:</b> No surface occupancy/or use is allowed for the purpose of protecting Riparian and Wetland Zone: to maintain the proper function of riparian zones, activities associated with oil and gas exploration and development, including roads, transmission lines and storage facilities, are restricted to an area beyond the outer edge of the riparian vegetation. Exception Criteria: a) An exception may be granted if the Authorized Officer determines that the activity will cause no loss of riparian vegetation, or that the vegetation lost can be replaced within three to five years with vegetation of like species and age class. b) Within the riparian vegetation, an exception is permitted for stream crossings, if an area analysis indicates that no suitable alternative is available.  |
| T7S, R94W<br>Section 18: SESW, SWSE  | <b>Timing Limitation:</b> Big Game Birthing Areas (April 16 to June 30) for the purpose of protecting elk calving areas. This stipulation does not apply to operation and maintenance of production facilities. Exception Criteria: When it is determined   |

| <b>Table 3. Stipulations of Federal Lease COC66921 Applicable to the CCM DP</b> |  |
|---|--|
| Description of Lands  | Stipulations   |
|   | through a site-specific environmental analysis that actions would not interfere with critical habitat function nor compromise animal condition within the project vicinity, the restriction may be altered or removed.   |
| ALL LANDS within lease  | <p><b>Timing Limitation:</b> Big Game Winter Habitat (December 1 to April 30) Exception Criteria: Under mild winter conditions, the last 60 days of the seasonal limitation period may be suspended after consultation with the CDOW. Severity of the winter will be determined on the basis of snow depth, snow crusting, daily mean temperatures, and whether animals were concentrated on the winter range during the winter months. This limitation may apply to work requiring a Sundry Notice pending environmental analysis of any operational or production aspects.</p> <p><b>Lease Notice:</b> The lease area may now or hereafter contain plants, animals, or habitats that are determined to be threatened, endangered, or other special status species. BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM-approved activity that will contribute to a need to list such a species or their habitat. BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the ESA as amended, 16 U.S.C. § 1531 et seq., including completion of any required procedure for conference or consultation.</p> <p><b>Lease Notice:</b> An inventory shall be conducted by an accredited paleontologist approved BLM prior to surface-disturbing activities in Class I and II Paleontological Areas.</p> <p><b>Lease Notice:</b> In areas of known or suspected habitat of special status species, or habitat of other species of interest, such as raptor nests or elk calving areas, or significant natural plant communities, a <u>biological inventory</u> will be required prior to approval of operations. The inventory would be used to prepare mitigating measures to reduce the impacts of surface disturbance on the affected species or their habitats. These mitigating measures may include, but are not limited to, relocation of roads, well pads, pipelines, and other facilities, and fencing operations or habitat.</p> <p><b>Lease Notice:</b> All lessees in the Glenwood Springs Resource Area are required to report to the Authorized Officer annually on the ongoing progress of reclamation at locations developed on the lease.</p> <p><b>Lease Notice:</b> Within high value or crucial big game winter range, the operator is required to implement specific measures to reduce impacts of oil and gas operations on wildlife and wildlife habitat. Such measures shall be developed in concert with BLM during the preparation of the EA. They may include completion of habitat improvement projects designed to replace habitat lost through construction activities; reduction of human disturbance in important habitat areas during critical times of the year by installing gates and closing roads; using telemetry to collect well data; and accessing well site locations during the times of the day when wildlife is not likely to be present in the area. It is recognized that other measures may be appropriate and that not all measures would be appropriate for all areas. As such, this notice is best implemented through site-specific planning addressing several years of activity in an area. Measures to reduce impacts would generally be considered when well density exceeds four wells per 640 acres, or when road density exceeds three miles of road per 640 acres.</p> |

| <b>Table 3. Stipulations of Federal Lease COC66921 Applicable to the CCMDP</b> |   |
|--|---|
| Description of Lands   | Stipulations  |
| ALL LANDS within lease<br>(continued)  | <p><b>Lease Notice:</b> The operator is required to establish a set of reasonable operating procedures for employees and contractors working in important wildlife habitats. Such procedures would be designed to inform employees and contractors of ways to minimize the effect of their presence on wildlife and wildlife habitats. Procedures might address items such as working in bear country, controlling dogs, and understanding and abiding by hunting and firearm regulations.</p> <p><b>Lease Notice:</b> The operator drilling on Federal mineral estate is required to consider the impact of operations on nearby communities and residences and will be expected to reasonably adjust operating procedures to accommodate local residential concerns. For example, the operator will be expected to try to work out reasonable compromises on issues such as noise, dust, and traffic. The operator will be expected to address such issues when raised during public comment periods associated with preparation of environmental assessments or when complaints are reported to the operator, BLM, or the Colorado Oil and Gas Conservation Commission.</p> <p><b>Lease Notice:</b> Special design and construction measures may be required in order to minimize the <u>visual impacts</u> of drilling activities within five miles of all communities or population centers throughout the GSRA, major BLM or county roads, and state or Federal highways. The overall goal of these measures would be to blend the disturbance with the natural landscape as much as possible. At a minimum, operations should be designed to insure that the disturbance does not dominate the natural landscape character (VRM Class III objective). BLM acknowledges that activities on private lands may alter the landscape character, and such alterations will be considered when evaluating mitigation proposals relative to the visual quality of the overall landscape.</p> <p><b>Lease Notice:</b> In areas being actively developed, the operator must submit a Geographic Area Proposal (GAP) that describes a minimum of two to three years activity for operator-controlled Federal leases within a reasonable geographic area (to be determined jointly with BLM). The GAP will be used to plan development of Federal leases within the area, to account for well locations, roads, and pipelines, and to identify cumulative environmental effects and appropriate mitigation. The extent of the analysis will be dependent on the extent of surface ownership, extent of lease-holding, topography, access, and resource concerns. This requirement for a GAP may be waived for individual or small groups of exploratory wells, for directional wells drilled on previously developed well pads, or for individual wells proposed along existing roads.</p> <p><b>Lease Notice:</b> Class III cultural resource inventories shall be conducted by an accredited archaeologist approved by the AO prior to surface disturbing activities. The inventory would be used to prepare mitigating measures to reduce the impacts of surface disturbances on the affected cultural properties. These mitigating measures may include, but are not limited to, relocation of roads, well pads and other facilities, evaluative testing, data recovery, and/or fencing.</p> |

**2.1.4 Best Management Practices and Mitigation Measures**

All aspects of the Proposed Action would be subject to the application and enforcement of best management practices (BMPs) and mitigation measures specified by BLM and WRNF under their regulatory authority. These protections would be attached as COAs by BLM to Applications Permit to Drill (APD) for Federal wells and associated facilities (Appendix B) and by WRNF to the Road Use

Permit and Special Use Permit for the access road and pipelines across 0.3 mile of NFS lands (Appendix C). Noble's Master Drilling Plan (Appendix D) and Master Surface Plan of Operations (Appendix E) incorporate the surface use and downhole COAs required by the GSFO for Federal wells.

## 2.2 No Action Alternative

Under the No Action alternative, the APDs for the 39 Federal wells associated with the Proposed Action would be denied. The granting of the road use permit and pipeline easement across the NFS lands would also be denied. However, the construction of the two well pads (17L and 17M) on private surface and drilling of the 16 Fee wells on those pads would continue under a State drilling permit issued by COGCC. Without a road use permit and pipeline easement across the NFS lands, Noble would be subject to using the existing road easement, which is not suitable for heavy equipment. Consequently, Noble could not feasibly construct the 19H, 19I, and 20F pads on private land or drill the 24 Fee wells from those pads.

## 3. 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, this 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 4). Only the mandatory critical elements that are present and affected are described in the following narrative. 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**.

| Table 4. Critical Elements of the Human Environment |         |    |          |    |                                       |         |    |          |    |
|---|---------|----|----------|----|---------------------------------------|---------|----|----------|----|
| Critical Element                                    | Present |    | Affected |    | Critical Element                      | Present |    | Affected |    |
|   | Yes     | No | Yes      | No |                                       | Yes     | No | Yes      | No |
| Air Quality   | X       |    | X        |    | Prime or Unique Farmlands             |         | X  |          | X  |
| Areas of Critical Environ. 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  |                                       |         |    |          |    |

\*Element is a Public Land Health Standard. However, no BLM lands would be affected, and the Land Health Standards therefore do not apply to this project. See Section 1.5.

### 3.1 Critical Elements

#### 3.1.1 Air Quality

##### Affected Environment

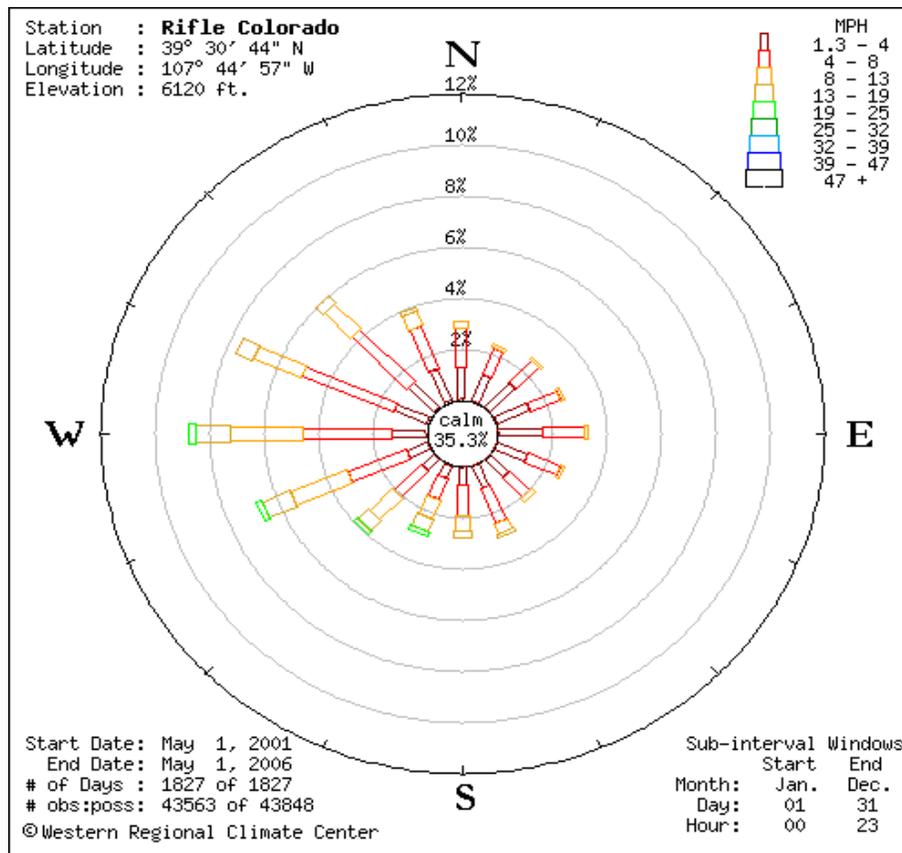
The CCMDP is located in a semi-arid (dry and cold), mid-continental climate regime. The area is typical of the western high country with abundant sunshine, low humidity, low rainfall, and cold, snowy winters. The nearest meteorological measurements were collected at Rifle, Colorado (1910 to present) (WRCC 2006), approximately 9 miles northeast of the CCMDP area. Average annual precipitation is 11.61 inches. Average snowfall is 38.6 inches, with December and January being the snowiest months. Precipitation is distributed relatively evenly throughout the year, with a slight peak during the late summer/early fall “monsoon.” The frost-free period is generally mid-May to mid-September. Table 5 shows the average monthly temperatures and precipitation, 1910-2005.

| <b>Table 5. Mean Temperature Ranges and Total Precipitation at Rifle, CO</b> |                                       |                                     |
|--|---------------------------------------|-------------------------------------|
| <b>Month</b>   | <b>Average Temperature Range (°F)</b> | <b>Total Precipitation (inches)</b> |
| January  | 9.4 – 36.8                            | 0.86                                |
| February   | 16.5 – 43.8                           | 0.77                                |
| March  | 24.2 – 53.7                           | 0.95                                |
| April  | 31.4 – 64.2                           | 1.02                                |
| May  | 38.7 – 74.0                           | 1.00                                |
| June   | 43.2 – 90.2                           | 0.73                                |
| July   | 52.0 – 90.2                           | 1.02                                |
| August   | 50.4 – 87.6                           | 1.13                                |
| September  | 41.4 – 79.4                           | 1.11                                |
| October  | 31.1 – 67.3                           | 1.2                                 |
| November   | 21.3 – 51.4                           | 0.89                                |
| December   | 12.4 – 39.4                           | 0.93                                |
| <b>ANNUAL</b>  | <b>31.2 – 64.3</b>                    | <b>11.61</b>                        |
| <i>Source:(WRCC 2006)</i>  |                                       |                                     |

Figure 4 shows the relative frequency of winds in Rifle, with radial distributions by speed class, indicating the direction of the wind source. Although winds generally originate from a westerly direction, north-south oriented drainages such as those in the CCMDP area tend to channel wind up- or down-valley. Mean annual wind speed at Rifle is approximately 4 miles per hour. The frequency and strength of winds greatly affect the dispersion and transport of air pollutants. Atmospheric dispersion in the region is generally good during the day but less so at night when cooler temperatures and calm winds reduce inhibit pollutant mixing and transport. Dispersion is also generally reduced along valley floors.

The 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 CCMDP area, regional air quality monitoring has been conducted in Rifle and elsewhere in Garfield County. Air pollutants measured in the region for which ambient air quality standards exist include: carbon monoxide

(CO), nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>), particulate matter less than 10 microns (μ) in diameter (PM<sub>10</sub>) and less than 2.5 μ in diameter (PM<sub>2.5</sub>), and sulfur dioxide (SO<sub>2</sub>).



Source: WRCC - Rifle, CO meteorological data collected 2001-2006.

**Figure 4. Wind Rose for Rifle, CO**

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 6, regional background values are well below established standards, and all areas within the cumulative study area are designated as attainment for all criteria pollutants.

Federal air quality regulations are enforced by the Colorado Department of Public Health and Environment (CDPHE). The Prevention of Significant Deterioration (PSD) Program within CDPHE is designed to limit incremental increases for specific air pollutant concentrations above a legally defined baseline level, as defined by an area's air quality classification. Incremental increases in PSD Class I areas are strictly limited, while increases allowed in Class II areas are less strict.

The CCMDP and surrounding areas are classified as PSD Class II. The PSD Class I areas within 100 miles of the project area are the Flat Tops Wilderness (35 miles NE), Maroon Bells–Snowmass Wilderness (40 miles SE), West Elk Wilderness (50 miles SE), Black Canyon of the Gunnison National Park (45 miles S), Eagles Nest Wilderness (80 miles E), and Arches National Park (75 miles SW). Dinosaur National Monument (65 miles NW) is listed as a Federal Class II area, but is regulated as a

Class I area for SO<sub>2</sub> by CDPHE. These sensitive areas have the potential to be impacted by cumulative project source emissions. Regional background pollutant concentrations and NAAQS, CAAQS, and PSD Class I and II increments are also presented in Table 6.

| <b>Table 6. Air Pollutant Background Concentrations, Colorado and National Ambient Air Quality Standards, and Prevention of Significant Deterioration (PSD) Increments (µg/m<sup>3</sup>)<sup>1</sup></b> |  |                                   |  |     |
|---|--|-----------------------------------|--|-----|
| <b>Pollutant/Averaging Time</b>   | <b>Measured Background Concentration</b> | <b>Colorado and National AAQS</b> | <b>Incremental Increase Above Legal Baseline PSD Class I/ II</b> |     |
| Carbon Monoxide (CO) <sup>2</sup><br>8-hour   | 1,145                                    | 10,000                            | n/a  | n/a |
| Nitrogen dioxide (NO <sub>2</sub> ) <sup>3</sup><br>Annual  | 9  | 100                               | 2.5  | 25  |
| Ozone (O <sub>3</sub> ) <sup>4</sup><br>8-hour  | 145                                      | 157                               | n/a  | n/a |
| Particulate Matter (PM <sub>10</sub> ) <sup>2</sup><br>24-Hour  | 41                                       | 150                               | 8  | 30  |
|   | Annual                                   | 11                                | 4  | 17  |
| Particulate Matter (PM <sub>2.5</sub> ) <sup>5</sup><br>24-Hour   | 18                                       | 65                                | n/a  | n/a |
|   | Annual                                   | 8                                 | n/a  | n/a |
| Sulfur dioxide (SO <sub>2</sub> ) <sup>6</sup><br>3-hour (NAAQS)<br>3-hour (CAAQS)<br>24-hour (NAAQS/CAAQS)<br>Annual (NAAQS/CAAQS)   | 24                                       | 1,300                             | 25   | 512 |
|   | 24                                       | 700                               | 25   | 512 |
|   | 13                                       | 260                               | 5  | 91  |
|   | 5  | 80                                | 2  | 20  |

<sup>1</sup> µg/m<sup>3</sup> = micrograms per cubic meter.  
<sup>2</sup> Background data collected at American Soda, Piceance 2003-2004 (CDPHE 2006).  
<sup>3</sup> Background data based on a rural default that is based on Southern Ute stations near Ignacio (CDPHE 2006).  
<sup>4</sup> 8-hour ozone based on CASTNET in Mesa Verde, Canyonlands, and Gothic (CDPHE 2006).  
<sup>5</sup> Background data collected at 515 Patterson, Grand Junction, CO (CDPHE 2006).  
<sup>6</sup> Background data collected at Unocal 1983-1984 (CDPHE 2006).

CDPHE, under its EPA-approved State Implementation Plan, 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.

Environmental Consequences

*Proposed Action*

The CCMDP includes constructing five well pads, 3.29 miles of new or reconstructed access roads, and 2.89 miles of buried gas and water pipelines; drilling up to 79 new wells; and installing storage tanks (300- to 400-barrel capacity) and a separator (1 unit per well). The project does not include construction of any compressor stations or installation of any generators or other treatment processes.

Air quality would decrease during construction of the CCMDP roads, pads, pipelines, and wells. Pollutants generated during these activities would include combustion emissions and fugitive dust associated with construction equipment and vehicles. Construction activities for each well pad would occur between 7:00 a.m. and 6:00 p.m. each day for a period of approximately two weeks. Construction of roads and pipelines would take approximately 5 to 10 weeks each, or 1 to 2 weeks per pad; much of this construction would occur concurrently.

Once construction activities are complete, air quality impacts associated with these activities would also cease. Assuming that one drilling rig with three 1,500-horsepower (hp) engines is used with 40% drill rig utilization, each well is expected to take 7 to 10 days to drill and complete. With the anticipated use of one drill rig working one pad in a given year, Noble expects the drilling and well completion phase to extend over a period of 3 to 5 years. This period could vary depending on the actual number of wells, number of drilling rigs, and the drilling rate, which are subject to economic and technological factors.

Table 7 provides estimated annual emission rates from CCMDP drilling and construction activities. Tier II emission factors for drill rigs were used, since the drill rig used is expected to satisfy Tier II standards.

| Source  | Pollutant              | Emission Factors (g/hp-hr) | Yearly Hours of Operation | Annual Emissions (tons/year) | Reference                       |
|---|------------------------|----------------------------|---------------------------|------------------------------|---------------------------------|
| Drilling, using one drill rig with three 1500-hp diesel engines | NMHC + NO <sub>x</sub> | 4.8                        | 8,760                     | 83.4                         | Tier II                         |
|   | CO                     | 2.6                        | 8,760                     | 45.2                         | Tier II                         |
|   | VOCs                   | 1.0                        | 8,760                     | 17.4                         | Tier I                          |
|   | PM <sub>10</sub>       | 0.15                       | 8,760                     | 2.6                          | Tier II                         |
|   | PM <sub>2.5</sub>      |                            | 8,760                     | 0.4                          | EPA PM <sub>10</sub> multiplier |
|   | Formaldehyde           | 0.0018                     | 8,760                     | 0.031                        | AP42, Table 3.3-2               |
| Construction heavy equipment                                    | PM <sub>10</sub>       | 1.2 (tons/acre/month)      | 20 acres<br>2 weeks *     | 11.1                         | AP42, Section 13.2.3.3          |
|   | PM <sub>2.5</sub>      |                            |                           | 1.7                          | EPA multiplier                  |

\*Duration: Well pad construction = 2 weeks; access road construction = 1-2 weeks; pipeline construction = 1-2 weeks).  
NMHC = non-methane hydrocarbons.

Once the wells are completed, ancillary equipment would be installed at each pad, as described above. While the plat for each pad shows nine condensate tanks per pad, four to six tanks per pad is more reasonable and is the number calculated in the table below. The pumps are anticipated to be small (10- to 25-hp) units and would be used to move water from the sites. Similarly, the separators would include small 500 BTU/hr heaters. Emissions from pumps and heaters are anticipated to be negligible.

Emissions from condensate tanks are estimated in Table 8, assuming that 15 bbl/day of water would be produced from each well and that approximately 10% of the produced water would be separated into condensate. Air-quality impacts associated with the condensate tanks at each well pad are anticipated to be minor. However, volatile organic compound (VOC) emissions are dependent on the characteristics of the condensate, tank operations, and production. If VOC emissions need to be reduced, a vapor recovery or thermal destruction system can be installed that can effectively reduce VOC emissions by 95%.

| <b>Table 8. Condensate Tank Emission Estimates Per Completed Well Pad</b>            |                                   |                                  |                              |                                      |                                    |
|--|-----------------------------------|----------------------------------|------------------------------|--------------------------------------|------------------------------------|
| <b>Source</b>  | <b>Pollutant</b>                  | <b>Emission Factors (lb/bbl)</b> | <b>Production* (bbl/day)</b> | <b>Annual Emissions* (tons/year)</b> | <b>Reference</b>                   |
| 4 to 6-400 bbl condensate tanks per well pad (Includes 6 to 12 wells)                | Volatile organic compounds (VOCs) | 10                               | 9 – 18                       | 16 – 33                              | CDPHE guidance for Garfield County |
| *Production and annual emission estimates are based on 6 and 12 wells, respectively. |                                   |                                  |                              |                                      |                                    |

The Roan Plateau RMPA/EIS describes potential effects from oil and gas development (BLM 2006:4-26 to 4-37). Analysis was completed with regard to greenhouse gas emissions, a near-field and far-field analysis for “criteria pollutants” (PM<sub>10</sub>, PM<sub>2.5</sub>, CO, SO<sub>2</sub>, and NO<sub>2</sub>), 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 would have either no or negligible long-term adverse impacts on air quality. Since the Proposed Action is within the scope of the reasonable foreseeable development scenario analyzed in that document, it is anticipated that the Proposed Action would be unlikely to have adverse effects on air quality.

Activities described in the Proposed Action would result in localized short-term increases in emissions from vehicles and drilling equipment, as well as fugitive dust from construction and use of well pads, access roads, and pipelines. While concentrations would be below applicable ambient air quality standards as analyzed in the Roan Plateau RMPA and EIS, 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 authorized officer (Appendix B).

Since the current land use plan was approved, 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 some to cause a net warming effect of the atmosphere primarily by decreasing the amount of heat energy re-radiated by the Earth 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 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 the effects of GHG emissions on 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 experts to be due to more than a century of human activities.

#### *No Action Alternative*

Under the No Action alternative, the project components included in the Proposed Action would not be approved and constructed, with the exception of the 16 Fee wells on the 17L and 17M pads. Therefore, emissions of pollutants from vehicle and equipment engines or of fugitive dust from disturbed surfaces that would accompany the Proposed Action would be reduced by approximately 75% and thus minimal.

### **3.1.2 Cultural Resources**

#### Affected Environment

Section 106 of the National Historic Preservation Act (NHPA) (P.L. 89-665; 80 Stat. 915; 16 U.S.C. 470) and its implementing regulations found at 36 CFR Part 800 requires Federal agencies to take into account the effects their actions will have on cultural resources for any endeavor that involves Federal monies, Federal permitting or certification, or Federal lands. Because of this, consideration of the environmental consequences of the Proposed Action extends to all Proposed Actions within the CCMDP, whether the surface ownership is Federal or private. The CCMDP study area covers a total of 1,820 acres. Within this area, seven cultural resource investigations have occurred covering proposed wells, access roads, pipelines, and a ski area. These studies are listed by their GSFO or WRNF project numbers, and include GSFO# 783, 870, 1108-13, 1109-4, 1109-16, and FS# R1981021508043 and R2006021508010. Four of these studies were conducted specifically for the CCMDP in areas not previously inventoried. These four Class III intensive cultural resource inventories consist of GSFO# 1108-13, 1109-4, 1109-16, and FS# R2006021508010.

The CCMDP study area includes seven recorded cultural resources. One of these cultural resources is a prehistoric "Needs Data" site that was recorded in 1981. An attempt was made to relocate this site during the latest inventory, but no evidence for it was found. This may be due to an indication in the site form that all the artifacts at the site were collected during the initial recording. Two additional sites were identified but were determined to be not eligible for inclusion on the National Register of Historic Places (NRHP) due to testing or low potential for recovery of additional scientific data as recording was deemed to fulfill the intellectual information inherent in the resource. Four isolated finds (IFs) were also identified, but by definition are not eligible for the NRHP.

#### Environmental Consequences

##### *Proposed Action*

The Proposed Action has some potential to affect cultural resources identified in the CCMDP study area. For archaeological sites, direct impacts result primarily from disturbance of surface and subsurface sediments. For historic properties with protohistoric or historic structural remains, direct impacts result from damage to or destruction of these structures. Direct impacts are generally concentrated in the development phase of the Proposed Action, though they can happen any time the ground is subject to alteration. Direct impacts to historic properties will be avoided by the Proposed Action, as currently

planned. Strict adherence to the Education/Discovery COA (Appendix B) by Noble Energy and all of their subcontractors should mitigate the potential occurrence of adverse impacts.

No formal consultation was initiated with the State Historic Preservation Officer (SHPO) for the Class III inventories, because all historic properties identified during the inventories would be avoided by various methods including rerouting and/or relocation of facilities. Although site 5GF889 was not relocated, the plotted location of this “Needs Data” site would be avoided due to project layout. Based upon the Class III inventories and the avoidance of all historic properties, the BLM made a determination of “**No Historic Properties Affected**” for Noble’s Proposed Actions within the CCMDP. This determination was made in accordance with the 2001 revised regulations [36CFR 800.4(d)(1)] for Section 106 of the NHPA (16U.S.C 470f), the BLM/SHPO Programmatic Agreement (1997), and Colorado Protocol (1998)].

#### *No Action Alternative*

Under this alternative, the Federal wells and many of the Fee wells would not be drilled. Therefore, many of the direct impacts described for the Proposed Action would be greatly reduced, but would occur but without the mitigation measures associated with the Federal wells, and cultural resources in the general area would remain vulnerable to damage from illegal activities. Additionally, the information gleaned from the Class III inventories would not have been added to the cultural resource database, thereby reducing the information from which cultural resource land managing decisions are based. The standard COA for cultural resource protection would not be attached to the permit, although Colorado Revised Statute CRS 24-80-1301 for Historic, Prehistoric, and Archaeological Resources and for Unmarked Human Graves would continue to apply.

### **3.1.3 Invasive Non-Native Plant Species**

#### Affected Environment

Invasive species are not prevalent in the project area. There is a small amount of cheatgrass (*Anisantha tectorum*), Canada thistle (*Cirsium arvense*), musk thistle (*Carduus nutans*), and houndstongue (*Cynoglossum officinale*) scattered throughout the project area. Purple mustard (*Chorispora tenella*), bulbous bluegrass (*Poa bulbosa*), redstem filaree (*Erodium cicutarium*), and field bindweed (*Convolvulus arvensis*) are found in low densities in the northern portion of the project area.

#### 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 not prevalent in the project area, the potential for invasion following construction activities is moderate. Mitigation measures to control weed infestations and minimize their spread would be attached as COAs to the APDs for individual wells (Appendix B).

##### *No Action Alternative*

Under the No Action alternative, two Fee well pads and associated roads and pipelines would still be constructed; however, none of the proposed ground disturbance on NFS lands would occur. The No Action alternative would have less potential for weed invasion, but existing infestations would spread if left untreated.

### 3.1.4 Migratory Birds

#### Affected Environment

For the purpose of this EA, the term “migratory birds” applies generally to native bird species protected by the Migratory Bird Treaty Act (MBTA). This includes native passerines (flycatchers and songbirds) as well as birds of prey, migratory waterbirds (waterfowl, wading birds, and shorebirds), and other species such as doves, hummingbirds, swifts, and woodpeckers. The term “migratory” is a misnomer and should be interpreted broadly to include native species that remain in the same area throughout the year as well as species that exhibit patterns of latitudinal or elevational migration to avoid winter conditions of cold or a shortage of food. For most migrant and native resident species, nesting habitat is of special importance because it is critical for supporting reproduction in terms of both nesting sites and food. Also, because birds are generally territorial during the nesting season, their ability to access and utilize sufficient food is limited by the quality of the territory occupied. During non-breeding seasons, birds are generally non-territorial and able to feed across a larger area and wider range of habitats.

Among the wide variety of species protected by the MBTA, special concern is usually given to the following groups:

- Species that migrate across long distances, particularly Neotropical migrant passerines that winter in tropical or Southern Hemisphere temperate zones.
- Birds of prey, which require large areas of suitable habitat for finding sufficient prey.
- Species that have narrow habitat tolerances and hence are vulnerable to extirpation from an area as a result of a relatively minor habitat loss.
- Species that nest colonially and hence are vulnerable to extirpation from an area and hence are vulnerable to extirpation from an area as a result of minor habitat loss.

Because of the many species that fall within one or more of these groups, BLM focuses on species identified by the U.S. Fish and Wildlife Service (USFWS) as Birds of Conservation Concern (BCC). The current BCC list (USFWS 2008a) for Region 16 (Southern Rockies/Colorado Plateau) includes 10 species potentially present in or near the CCMDP area: the bald eagle (*Haliaeetus leucocephalus*), flammulated owl (*Otus flammeolus*), 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*), Brewer’s sparrow (*Spizella breweri*), and Cassin’s finch (*Carpodacus cassinii*). Of these, the bald eagle, flammulated owl, yellow-billed cuckoo, and Lewis’s woodpecker, and also have special status as BLM or USFS sensitive species or candidate threatened or endangered species and hence are discussed in the section of this EA titled **Special Status Species**.

The remaining species include three pinyon-juniper obligates (pinyon jay, gray vireo, and juniper titmouse), a sagebrush obligate (Brewer’s sparrow), a near-obligate in tall-willow shrublands (willow flycatcher), and a species of montane and subalpine coniferous forests (Cassin’s finch). Pinyon-juniper and sagebrush habitats are minor components of the CCMDP area and immediate vicinity and not sufficiently extensive to support the species associated with those types. Although some riparian habitat occurs along Cache Creek and Cottonwood Creek, the habitat is not of sufficient extent or quality to support the willow flycatcher. Isolated areas of Douglas-fir may support nesting or winter use by Cassin’s finch.

Migratory birds commonly associated with the type of mountain shrub habitat that dominates the CCMDP area but are not on the BCC list or the BLM and USFS sensitive species lists include

Neotropical migrants such as the dusky flycatcher (*Empidonax oberholseri*), Virginia's warbler (*Vermivora virginiae*), MacGillivray's warbler (*Oporornis tolmiei*), lazuli bunting (*Passerina amoena*), lesser goldfinch (*Carduelis psaltria*), black-headed grosbeak (*Pheucticus melanocephalus*), and spotted towhee (*Pipilo maculatus*).

Scattered Douglas-fir in the area support limited numbers of coniferous forest species, including Neotropical migrants such as Hammond's flycatcher (*Empidonax hammondi*), western tanager (*Piranga ludoviciana*), plumbeous vireo (*Vireo plumbeus*), yellow-rumped warbler (*Dendroica coronata*), chipping sparrow (*Spizella passerina*), dark-eyed junco (*Junco hyemalis*), and pine siskin (*Carduelis pinus*) in addition to Cassin's finch.

Areas of quaking aspen or other deciduous trees (including the drainages) attract additional Neotropical migrants such as the cordilleran flycatcher (*Empidonax difficilis*), western wood-pewee (*Contopus sordidulus*), tree swallow (*Tachycineta bicolor*), violet-green swallow (*Tachycineta thalassina*), house wren (*Troglodytes aedon*), and warbling vireo (*Vireo gilvus*).

Management Indicator Species. Of the migratory birds listed above, one species, Virginia's warbler, is classified by WRNF as a Management Indicator Species. In 2006, the WRNF developed a rigorous monitoring protocol (Potter 2006) to evaluate the habitats and population trend of the Virginia's warbler, chosen as an MIS to represent species occupying the mountain shrub habitat type (USFS 2002a, USFS 2006). It is the intent of the WRNF Forest Plan that habitat quality and quantity be maintained and distributed in a manner that provides for interactive, viable populations of wildlife species.

Virginia's warbler breeds in the foothills of Colorado; overall breeding range extends from north-central New Mexico and northeastern Arizona to southwestern Wyoming and southeastern Utah and westward through Utah and into Nevada (Kingery 1998, Olson and Martin 1999). In Colorado, Virginia's warbler breeds in pinyon-juniper woodlands, ponderosa pine forests, oak-dominated shrublands, and riparian areas, generally between 5,000 and 9,000 feet in elevation. Breeding is initiated in early May and can continue through late July.

Diet of the Virginia's warbler is exclusively insects, with probing and gleaning, hovering and gleaning, and sallying for flying insects being the predominant foraging strategies employed.

Most of the population of Virginia's warbler in Colorado occurs in the western portion of the state or in the Front Range. Partners in Flight estimated that the total population of Virginia's warbler in Colorado (approximately 100,000) comprises slightly over 25% of the global population of the species (RMBO 2007). No definitive population trends for Virginia's warbler have been determined.

### Environmental Consequences

#### *Proposed Action*

The Proposed Action would result in loss of approximately 80 acres of habitat, mostly in oakbrush or mixed mountain shrublands. Much of this impact would occur along the existing ranch road, in habitat edge. This habitat loss would be expected to reduce the number of nesting pairs of the BCC or other bird species associated with this habitat type. Some loss of aspen and conifer habitat would also occur, although these losses would be much less in area, and the existing stands are small and isolated and thus unlikely to support substantial numbers of the forest birds listed above.

In general, small birds are less vulnerable to indirect habitat loss from human activity and operation of noisy equipment than are some other wildlife species. However, a zone of reduced use or avoidance by

BCC and Neotropical migrant species is likely to occur along the newly created habitat edges and extending back a distance of several tens of feet. This zone would extend farther from the habitat edges during construction, drilling, and completion operations. During periods of less intensive human activity as the project moves into the production phase, the zone of reduced use would become smaller.

To minimize impacts to migratory birds, a 60-day timing limitation (TL) would be applied as a COA (Appendices B and C) to prohibit the removal of vegetation on the split-estate lands (including pads 17L and 17M) and the 0.3 mile of road on NFS lands from May 15 through July 15. An exception to this TL may be granted by BLM or the WRNF if surveys during the breeding season by a qualified observer demonstrate that no nest of BCC or other Neotropical species would be destroyed (Appendix B).

BLM also requires measures to protect migratory birds from injury or mortality resulting from exposure to harmful fluids stored or disposed in pits on the well pads (Appendix B). This COA applies to all pads with Federal wells, regardless of surface ownership.

Management Indicator Species. The minor amount of habitat loss under the Proposed Action and the dense screening provided by the oakbrush habitat that dominates the area are such that impacts to populations of Virginia's warbler would not be affected at detectable levels, although a few individuals could be prevented from nesting or feeding in otherwise suitable habitat. The 60-day TL to prevent removal of vegetation during the period May 15 to July 15 (Appendices B and C) should further reduce the potential for direct impacts on this species. An exception to this TL would be granted only if surveys during the nesting season demonstrated no active Virginia's warbler nests in the area to be cleared.

#### *No Action Alternative*

Impacts to migratory birds under the No Action alternative would be less than those under the Proposed Action because only the two split-estate pads and associated wells, roads, and pipelines would be constructed to access private minerals. The proposed pads on Fee lands south of the NFS lands would not be built, because the WRNF would not issue permits to cross the Forest with a road or pipelines.

### **3.1.5 Native American Religious Concerns**

#### Affected Environment

The CCMDP is located within a larger area identified by the Ute Tribes as part of their ancestral homeland. Cultural resource inventories (see **Cultural Resources**) were conducted to determine if there were any areas that might be culturally sensitive to Native Americans. No areas were identified during the inventories and none are currently known by the GSFO within the CCMDP area. Additionally, the Ute Tribe (Northern Ute), Southern Ute, and Ute Mountain Ute Tribes were notified of the proposed CCMDP on June 22, 2009. No responses, questions, or requests for additional information have been received by July 24, 2009.

#### Environmental Consequences

##### *Proposed Action*

Direct impacts of construction have the potential to irreparably damage or destroy buried culturally sensitive sites. Additionally, impacts that affect the physical setting could result in a loss of what makes an area significant. Other, unidentified culturally sensitive or significant locations that have not been identified by the Ute tribes may be present in the area. Although no known Native American sites would be affected, any unauthorized modification of roads, pipelines, and well pads could lead to adverse

impacts. The total impacts associated with the No Action alternative would be approximately 50% as great as under the Proposed Action.

The proximity of Native American sites to planned development within the CCMDP area may result in indirect impacts that may adversely affect the significance of the resource by changing the setting, location, association, and Feeling. Cumulative impacts of increased development, accesses, construction, operation, and maintenance may also adversely affect these sites, possibly degrading the cultural significance by either destroying the sensitive area or its landscape setting. Impacts to the auditory and visual environment may be of importance in considering values placed on some sites by Native American tribes thus affecting them adversely. Mitigation measures to protect these resources are presented in Appendix B.

#### *No Action Alternative*

The impacts of the No Action Alternative would be greatly reduced but not totally eliminated. Indirect impacts resulting from increased access and personnel in the vicinity of the proposed project could result in impacts to unknown Native American resources ranging from illegal collection to vandalism. Additionally, the information gleaned from the Class III inventories would not have been added to the cultural resource database, thereby reducing the information from which cultural resource land managing decisions are based. The standard COA for cultural resource protection would also not be attached to the permit, although CRS 24-80-1301 for Historic, Prehistoric, and Archaeological Resources and for Unmarked Human Graves would apply.

### **3.1.6 Special Status Plant and Animal Species**

#### ***Plants***

##### Affected Environment

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

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

The biological assessment (BA) prepared by BLM and WRNF in conjunction with the CCMDP noted that the only listed, proposed, or candidate species for which potentially suitable habitat is present in the project vicinity is the Ute ladies'-tresses orchid (Federally listed as threatened). Suitable habitat for this orchid—consisting of moist, generally subirrigated meadows along drainages—is present in the GSFO and WRNF areas of Garfield County but not within the project area. Therefore, the BA did not analyze potential impacts to this species.

##### *BLM and USFS Sensitive Plant Species*

Colorado BLM sensitive plant species with suitable habitat and/or occurrence records in Garfield County include the following, listed in alphabetical order by common name: adobe thistle (*Cirsium perplexans*), DeBeque milkvetch (*Astragalus debequaeus*), Harrington's penstemon (*Penstemon harringtonii*), Naturita milkvetch (*Astragalus naturitensis*), Piceance bladderpod (*Lesquerella parviflora*), and Roan Cliffs blazing-star (*Mentzelia rhizomata*).

Region 2 USFS sensitive plants with habitat and/or occurrence records on the WRNF and with elevation ranges potentially overlapping those of the CCMDP include (in alphabetical order) autumn willow (*Salix serissima*), Baltic sphagnum (*Sphagnum balticum*), forkleaved moonwort (*Botrychium furcatum*), Colorado tansy-aster (*Machaeranthera coloradoensis*), dropleaf buckwheat (*Eriogonum exilifolium*), dwarf raspberry (*Rubus arcticus* ssp. *acaulis*), Harrington's penstemon, Kotzebue grass-of-parnassus (*Parnassia kotzebuei*), lesser bladderwort (*Utricularia minor*), lesser paniced sedge (*Carex diandra*), livid sedge (*Carex livida*), narrowleaf grapefern (*Botrychium lineare*), park milkvetch (*Astragalus leptaleus*), plains rough fescue (*Festuca hallii*), roundleaf sundew (*Drosera rotundifolia*), russet cotton-grass (*Eriophorum chamissonis*), sageleaf willow (*Salix candida*), sphagnum moss (*Sphagnum angustifolium*), sun-loving meadowrue (*Thalictrum heliophilum*), trianglelobe moonwort (*Botrychium ascendens*), Wetherill milkvetch (*Astragalus wetherillii*), and yellow lady's slipper (*Cypripedium parviflorum*).

Of these BLM and USFS sensitive species, the CCMDP area contains suitable habitat for only two—Harrington's penstemon and the park milkvetch. Project-specific surveys did not result in observations of the park milkvetch, but multiple occurrences of Harrington penstemon were found in the eastern portion of the project area on private and NFS lands during surveys in 2008.

### Environmental Consequences

#### *Proposed Action*

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

The project area contains no Federally listed, proposed, or candidate plant species or suitable habitat for these species. Therefore, the Proposed Action would have “**No Effect**” on these species.

#### *BLM and USFS Sensitive Plant Species*

No individuals of Harrington's penstemon would be impacted by the proposed action. The occurrence of Harrington's penstemon closest to existing development within the Cache Creek MDP is 350 feet from existing pad 17F. The closest occurrence to proposed development activities is more than 2,500 feet from proposed pad 17M. No direct or indirect impacts anticipated for this species as a result of the Proposed Action.

The project area also contains suitable habitat for park milkvetch, although no individuals were found in the project area. Impacts to the potential habitat could result from noxious weed invasion following soil-disturbing activities proposed for the project area. Noxious weeds are aggressive and develop dense stands that tend to outcompete native plants. Mitigation measures to address adverse impacts to sensitive plants as a result of weed infestations would be applied as COAs (Appendix B).

#### *No Action Alternative*

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

The No Action alternative would not cause impacts to any Federally listed, proposed, or candidate plants because these species do not occur in the area to be affected by the two split-estate pads 17L and 17M from which Fee wells would be drilled north of the NFS lands.

### *BLM and USFS Sensitive Plant Species*

The No Action alternative would not adversely affect Harrington's penstemon because no plants occur closer than 2,500 feet (0.47 mile) from areas of surface disturbance associated with the proposed split-estate pads 17L and 17M from which Fee wells would be drilled.

### ***Animals***

#### Affected Environment

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

According to the current species list available online from the USFWS (<http://mountain-prairie.fws.gov/endspp/CountyLists/COLORADO.pdf>), the following Federally listed, proposed, or candidate threatened or endangered animal species may occur within or be impacted by actions occurring in Garfield County: Canada lynx (*Lynx canadensis*), Mexican spotted owl (*Strix occidentalis*), western yellow-billed cuckoo (*Coccyzus americanus occidentalis*), razorback sucker (*Xyrauchen texanus*), Colorado pikeminnow (*Ptychocheilus lucius*), humpback chub (*Gila cypha*), and bonytail (*Gila elegans*). A Federally listed subspecies of cutthroat trout, the greenback cutthroat trout (*Oncorhynchus clarki stomias*), was not included on the USFWS list for Garfield County but has been found in Cache Creek in the vicinity of the CCMDP area.

Suitable habitat for the Mexican spotted owl and yellow-billed cuckoo does not occur in or near the project area, and these species were therefore not addressed in the BA prepared in conjunction with the CCMDP. The other species are addressed below.

Canada Lynx. Portions of the CCMDP lie within the area of the Battlement Lynx Analysis Unit (LAU) and contain mapped habitat for the Canada lynx, a species Federally listed as threatened. In creating the Battlement LAU, the USFS based its analysis largely on data from the e Rocky Mountain Resource Information System and followed appropriate objectives, standards, and guidelines recommended in the CLCAS (Ruediger et al. 2000). Lynx habitat types in the Battlement LAU are categorized into (1) denning habitat, (2) winter foraging habitat, (3) other lynx habitat, and (4) unsuitable lynx habitat.

The Battlement LAU provides contiguous shrub and forest cover of scattered spruce/fir and aspen on north facing slopes and at higher elevations. Canada lynx have been documented by CDOW to be using the Battlement LAU since 1999, indicating that potentially suitable habitat currently exists within the LAU (Figure 5). Canada lynx tend to travel along drainages in forests with protective cover but sometimes also travel through shrubby riparian habitat. The oak-lined drainages and uplands within the Battlement LAU support protective shrub cover, providing landscape linkages to the Grand Mesa as well as to suitable wintering and denning habitat. Existing barriers to Canada lynx movement are limited to I-70 north of the LAU. No barriers to Canada lynx movement exist between Battlement Mesa and Grand Mesa and suitable habitats to the south and east.

The USFS has analyzed the Battlement LAU and has identified it as predominantly a habitat linkage area between the Battlement and Grand Mesas, with approximately 35% of the area considered suitable foraging and denning habitat. Although the LAU is predominantly a habitat linkage area, by definition the LAU is capable of supporting Canada lynx, with all necessary habitat components to fulfill ecological and life-cycle needs. While some portions of the LAU are composed of unsuitable habitat, they can function as linkages due to their proximity to suitable habitats.

Endangered Colorado River Fishes. Four species of big-river fishes that are Federally listed as endangered occur within the Colorado River drainage basin near or downstream from the CCMDP area. These species are the razorback sucker, Colorado pikeminnow, humpback chub, and bonytail. Designated Critical Habitat for the razorback sucker and Colorado pikeminnow includes the Colorado River and its 100-year floodplain west (downstream) from the town of Rifle. This portion of the Colorado River lies approximately 3.5 miles north of the CCMDP area.

The nearest known habitat for the humpback chub and bonytail is within the Colorado River approximately 70 miles downstream from the project area. Occasionally, the bonytail is in Colorado west of Grand Junction, but its range does not extend east from that point. Only one population of humpback chub, at Black Rocks west of Grand Junction, is known to exist in Colorado.

Greenback Cutthroat Trout. The greenback cutthroat trout is a subspecies of cutthroat trout native to the Platte River drainage on the Eastern Slope of Colorado, while the Colorado River cutthroat trout (*O. c. pleuriticus*) is the subspecies native to Garfield County and throughout the Western Slope of Colorado. Although the occurrence of greenbacks in Cache Creek and potentially elsewhere in the GSFO and WRNF areas is apparently the result of human intervention (e.g., sanctioned or ad-hoc transplantation of fish from the Eastern Slope), its status as threatened applies to Western Slope populations.

#### *BLM and USFS Sensitive Animal Species*

Colorado BLM and Region 2 USFS sensitive animal species with geographic and elevational ranges and habitat requirements potentially overlapping with the CCMDP area are listed in Table 9. As shown in the table, most of the BLM or USFS sensitive animal species potentially present within the CCMDP project area are considered unlikely to occur, at least on a regular basis, due to marginal habitat conditions or geographic location. However, some of the species have a higher potential for occurrence and are listed as “possible,” while a few are “present” in nearby areas. All of these species are addressed briefly below.

Fringed Myotis (*Myotis thysanodes*) and Townsend’s Big-eared Bat (*Plecotus townsendii*). These species hunt at night for aerial insects over pinyon-juniper woodlands, montane conifer woodlands, and semi-desert shrublands. None of these habitat types or preferred roosting sites such as caves, rock crevices, mines, or buildings are present in the project area. However, these bats sometimes roost in tree cavities, and the few Douglas-fir and aspen could support minimal use.

Northern Goshawk (*Accipiter gentilis*). This raptor of subalpine coniferous forests may make occasional use of the area for hunting during winter, although the site is near the lower elevational range for this species, and conifers and aspen (the preferred habitat types) are limited in extent. The flammulated owl (*Otus flammeolus*) is the other species perhaps most likely (least unlikely) to use the CCMDP area, although the limited extent of conifers and aspen minimizes that potential as well. For both the northern goshawk and flammulated owl, the potential for use of the site is greatest in the southern (upslope) portion of the area, in closer proximity to suitable forest habitats.

Bald Eagle (*Haliaeetus leucocephalus*). Removed from the Federal list of threatened or endangered species in August 2007, the bald eagle is now considered a sensitive species. Bald eagles both nest and roost along the Colorado River a few miles north of the site, but the dense stands of shrubs and scattered trees are not the type of upland habitats used for perching or hunting by this species.

Olive-sided Flycatcher (*Contopus borealis*) and Purple Martin (*Progne subis*). These two perching birds occur in mature forests of subalpine or upper montane conifers or quaking aspen, respectively. The small amount of Douglas-fir and aspen present within the project area is only marginally suitable for these species. However, transitory use by migrants or vagrants is possible.

**Table 9. BLM and USFS Sensitive Animal Species Potentially Present in the CCM DP Area or Potentially Affected by the Proposed Action**

| Common Name                    | Agency    | Habitat  | Potential for Occurrence                                  |
|--------------------------------|-----------|--|---|
| Fringed myotis                 | BLM, USFS | Breeds and roosts in caves, trees, mines, and buildings; hunts over pinyon-juniper, montane conifer, and semi-desert shrubland habitats.                               | Unlikely – Habitat marginal                               |
| Townsend’s big-eared bat       | BLM, USFS | Breeds and roosts in caves, trees, mines, and buildings; hunts over pinyon-juniper, montane conifer, and semi-desert shrubland habitats.                               | Unlikely – Habitat marginal                               |
| Northern goshawk               | BLM, USFS | Predominantly uses ponderosa pine, but will also use Douglas-fir, various pines and aspens.  | Possible – Habitat marginal                               |
| Bald eagle                     | BLM, USFS | Nests and roosts in mature cottonwood forests along rivers, large streams, and lakes.  | Unlikely – Habitat marginal; Present along Colorado River |
| Flammulated owl                | USFS      | Depends on cavities for nesting, open forests for catching insects, and brush or dense foliage for roosting at elevations of 6,000 – 10,000 ft.                        | Possible – Habitat marginal                               |
| Olive-sided flycatcher         | USFS      | Mature subalpine spruce/fir and montane Douglas-fir forests, especially on steep slopes.   | Unlikely – Habitat marginal                               |
| Purple martin                  | USFS      | Nests at the edges of old-growth aspen stands, usually near a stream, spring, or pond.   | Unlikely – Habitat marginal                               |
| Northern leopard frog          | BLM, USFS | Wet meadows and the banks and shallows of marshes, ponds, glacial kettle ponds, beaver ponds, lakes, reservoirs, streams, and irrigation ditches.                      | Possible – Habitat marginal; not found during surveys     |
| Bluehead sucker                | BLM, USFS | Variety of areas from headwater streams to large rivers.   | Unlikely – Habitat marginal; Likely in Colorado River     |
| Flannelmouth sucker            | BLM, USFS | Generally restricted to rivers and major tributaries.  | Unlikely – Habitat marginal; Present in Colorado River    |
| Roundtail chub                 | BLM, USFS | Generally restricted to rivers and major tributaries.  | Unlikely – Habitat marginal; Present in Colorado River    |
| Colorado River cutthroat trout | BLM, USFS | Clear, cold water, naturally fluctuating flows, low levels of fine sediment in channel bottoms, well-distributed pools, stable streambanks, and abundant stream cover. | Unlikely – Habitat marginal; not found during surveys     |

Northern Leopard Frog (*Rana pipiens*). This amphibian occurs in ponds and slow-flowing streams that persist year-round—unlike toads and salamanders, which may occupy seasonal pools. Because Cache Creek is a perennial stream, the leopard frog is potentially present along that drainage. However, flow conditions that make Cache Creek suitable for the endangered greenback cutthroat trout make it generally unsuitable for the leopard frog. The presence of trout also reduces the potential for occurrence of the frog, since trout are predators on frog eggs and larvae (tadpoles).

Bluehead Sucker (*Catostomus discobolus*), Flannelmouth Sucker (*C. latipinnis*), and Roundtail Chub (*Gila robusta*). All three of these native nongame fishes are known to inhabit the Colorado River and major tributaries of extreme western Colorado. Of these, the bluehead sucker is the species most likely to

occur in small streams, but it has not been found in Cache Creek. Both the flannelmouth sucker and roundtail chub are known to occur in the Colorado River a few miles from the site; the bluehead sucker may also occur in the Colorado River but probably farther downstream.

Colorado River Cutthroat Trout (*Oncorhynchus clarki pleuriticus*). This subspecies of cutthroat trout occupies headwater lakes and streams in the region, particularly in waters that have not been subject to, and are isolated from, areas where non-native trouts have been introduced for sportfishing. Cache Creek, which supports the Federally listed greenback cutthroat trout, is potentially also suitable for the Colorado River subspecies. However, electrofishing surveys have not found it to occur in the area.

### Environmental Consequences

#### *Proposed Action*

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

Canada Lynx. Direct impacts would occur only in areas mapped as Canada lynx non-habitat or on private surface. No direct impacts would occur within mapped denning, winter or other habitat. Mapped non-habitat surrounds private land where 19H, 19I, and 20L are proposed. This private land consists mainly of oak shrublands but also contains some aspen along Cottonwood Creek. These stands of aspen are at the lower elevational range of lynx and disconnected from larger, more continuous lynx habitat. Additionally, the very dense between areas of proposed disturbance and the mapped denning, winter, and other habitats. The dense vegetation provides a visual screen from project areas and attenuates sounds associated with vehicular traffic and equipment.

Moreover, the CCMDP area contains only 31.4 acres (0.4%) of the mapped denning habitat within the Battlement LAU, and only 8.1 acres (<0.1%) of the mapped winter and other habitat in the LAU. Therefore, even if total direct or indirect loss of the marginal habitat within the CCMDP area were to result from the Proposed Action, it would have a negligible impact on potential use by lynx.

Based on these considerations, BLM and WRNF concluded that the Proposed Action would have “**No Effect**” on Canada lynx.

Greenback Cutthroat Trout. Proposed pad 17L is within the greater mapped Cache Creek watershed and adjacent to Cache Creek. To reduce the likelihood of sediment transport into Cache Creek from project components (pads, road, pipelines), Noble has agreed that the construction of this well pad and associated infrastructure will occur in early fall. Restricting construction to this season would avoid runoff associated with spring snowmelt and spring/summer rainfall events. Additionally, fall construction would avoid the spring spawning season for greenback cutthroat trout, minimizing the potential for sediment to smother egg masses.

Construction of the 17L pad would require the relocation and reconstruction of an existing irrigation ditch. This ditch diverts water from Cache Creek to the northwest. The relocated irrigation ditch would be located downslope from pad 17L, thus serving as a sediment catchment that would direct any runoff and sediment from the pad away from Cache Creek. Transport of sediment off the pads and road would be minimized by stormwater controls required by the CDPHE Water Quality Control Division. Therefore, the relocated ditch would serve as a backup measure.

Proposed pad 20F would be constructed adjacent to the Cache Creek watershed, with less than 1 acre of the pad located within that watershed. The pad would be located approximately 344 meters (1,128 feet) west of Cache Creek, with intervening vegetation consisting of dense shrubland. The combination of the

separation distance and dense vegetation greatly reduces the potential for sediment associated with pad 20F to reach Cache Creek.

During telephone conversations and emails between Mark Lacy of the USFS and John Clayton of the USFWS, it was agreed that the WRNF would incorporate the Standards and Guidelines from the WRNF2002 Forest Plan as an interim measure to protect greenback cutthroat trout. Standards relevant to populations of native cutthroat trout subspecies include the following:

1. For management activities that have the potential to impact occupied cutthroat trout habitat, tributaries of occupied cutthroat trout habitat, or identified reintroduction areas, maintain or enhance existing cutthroat trout habitat. At minimum and where necessary:
  - Reduce sediment from existing roads and trails.
  - Maintain pool depths.
  - Maintain riparian vegetation.
  - Retain large woody debris in streams.
2. When implementing management activities in 6<sup>th</sup> field Hydrologic Unit Codes (subwatersheds) containing cutthroat trout identified as recovery populations in the Colorado River Cutthroat Trout Recovery Plan, maintain or reduce existing net density of roads (open or closed) to restore or prevent alteration of the hydrologic function of the subwatershed. Temporary roads must be decommissioned upon project completion.

The Proposed Action would result in a potential net increase of 70 feet of road construction in the Cache Creek 6<sup>th</sup> field HUC subwatershed. However, this would not violate Standard 2, because CDOW has not identified Cache Creek as a core population of either the Colorado River or greenback subspecies. Additionally, a 70-foot increase in road length would represent a negligible increase in road density. Furthermore, because no stream crossings are associated with the new road or pipeline, the minor increase in road density would not translate into increased fragmentation of the Cache Creek habitat, and current conditions would be maintained.

Design of the well pads and road/pipeline corridor under the Proposed Action, and specifically the measures prevent or minimize potential inflow of sediments and chemical pollutants, the aquatic habitat in Cache Creek should continue to support Standard 1, which is the ultimate goal of the 2002 Forest Plan.

Based on the above and the mitigation measures included in Appendix B, the effects determination of the Proposed Action on the greenback cutthroat trout is “**May Affect, Not Likely to Adversely Affect.**”

Colorado River Endangered 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 endangered fish species associated the Colorado River are adapted to naturally high sediment loads and would not be affected.

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

As part of a Programmatic Biological Opinion (PBO) issued in 1994, the USFWS determined that any depletion of flows in the Colorado River Basin represent a “**May Affect, Likely to Adversely Affect**” determination for the razorback sucker, Colorado pikeminnow, humpback chub, and bonytail as a result of individual projects resulting in a depletion. Under the 1994 PBO and an amendment in the year 2000, BLM was allowed to authorize projects with water depletions of less than 125 acre-feet per year until a total depletion threshold of 3,000 acre-feet per year was reached. In May 2008, BLM prepared a Programmatic Biological Assessment (PBA) addressing water depleting activities associated with oil and gas activities in the Colorado River Basin in Colorado. On December 19, 2008, the USFWS issued a PBO (USFWS 2008b), which determined that BLM water depletions from the Colorado River Basin are not likely to jeopardize the continued existence of the four endangered fishes or to destroy or adversely modify designated critical habitat.

The CCMDP project will be entered into the GSFO Fluid Minerals Water Depletion Log, which is submitted to the Colorado State Office, and thence to the USFWS, at the end of the Fiscal Year.

#### *BLM and USFS Sensitive Animal Species*

Fringed Myotis and Townsend’s Big-eared Bat. No caves or other suitable roosting sites occur in the project vicinity, although small areas of Douglas-fir and aspen could receive minimal use. Loss of suitably large trees would be negligible. Loss of habitat above which the bats could search for aerial prey would also be minimal, and disturbance due to construction activities would not occur at night when the bats are feeding.

Northern Goshawk and Flammulated Owl. As discussed previously, two USFS sensitive species—the northern goshawk and flammulated owl—are potentially present in the CCMDP area, although habitat is marginal for both. Use by these species, if it occurs at all, is expected to be transitory during hunting rather than for nesting. Use by the goshawk would be expected only during winter. For this reason, and because the same type of habitat is very extensive throughout the area, with more suitable habitat present offsite, the Proposed Action is not expected to affect either species adversely.

Bald Eagle. Because the project area does not include open habitats across which the bald eagle could hunt for prey, and because of the distance from occupied or suitable habitat along the Colorado River, the Proposed Action would not affect this species.

Olive-sided Flycatcher and Purple Martin. Because of the small amount of conifer and aspen habitat in the project area, and the fact that loss of these types would not occur or be minimal, no direct impacts to the olive-sided flycatcher and purple martin are expected. If either species were to occur, construction and drilling operations could cause them to avoid the project area, particularly during the nesting season. However, the amount of suitable habitat nearby is vast compared to the minimal amount of indirect impacts associated with the project.

Northern Leopard Frog. In the unlikely event that leopard frogs are present in the project area, the COAs to protect water quality and the greenback cutthroat trout (Appendix B) would also apply to the protection of this species.

Bluehead Sucker, Flannelmouth Sucker, and Roundtail Chub. The discussion of potential impacts described above for the four endangered Colorado River fishes is also relevant to these three sensitive fishes. Because of the mitigation measures implemented to reduce erosion and protect water quality (Appendix B), it is unlikely that the Proposed Action would cause unnatural sediment loads in nearby streams. Depletions in flow volumes would also not be of a magnitude that would affect these sensitive fish species. Therefore, no discernible impacts to these species are expected.

Colorado River Cutthroat Trout. This subspecies has not been found to be present in Cache Creek, nor does it occur in the Colorado River downstream from the project area. However, if it were to occur in Cache Creek, the same protections described for the threatened greenback cutthroat trout would also apply to the Colorado River subspecies.

#### *No Action Alternative*

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

Under the No Action alternative, proposed split-estate well pads 17L and 17M would be constructed and 16 Fee wells drilled and operated. Because this represents only about 50% of the total surface disturbance and 25% of the total wells as the Proposed Action, the potential for adverse impacts to the greenback cutthroat trout and the endangered Colorado River fishes (razorback sucker, Colorado pikeminnow, humpback chub, and bonytail) would be reduced accordingly.

#### *BLM and USFS Sensitive Animal Species*

Potential impacts under the No Action alternative to the BLM and USFS sensitive species discussed above would be qualitatively similar to those described above for the Proposed Action, but quantitatively only 50% in terms of habitat loss and 25% in terms of number of wells drilled, since only the two split-estate pads 17L and 17M and their associated infrastructure would be built and operated.

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

#### Affected Environment

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

- The Oil Pollution Act (Public Law 101-380, August 18, 1990) prohibits discharge of pollutants into waters of the U.S., which by definition includes any perennial stream (e.g., Cache Creek and the Colorado River) or any tributary stream, including any ephemeral drainage, that conveys water to a perennial stream.
- The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (Public Law 96-510 of 1980) provides for liability, compensation, cleanup, and emergency response for hazardous substances released into the environment. It also provides national, regional, and local contingency plans. Applicable emergency operations plans in place include the National Contingency Plan (40 CFR 300, required by Section 105 of CERCLA), the Region VIII Regional Contingency Plan, the Colorado River Sub-Area Contingency Plan (these three are Environmental Protection Agency-produced plans), the Garfield County Emergency Operations Plan (developed by the Garfield County Office of Emergency Management), and the BLM Grand Junction Field Office Hazardous Materials Contingency Plan.

- The Resource Conservation and Recovery Act (RCRA) (Public Law 94-580, October 21, 1976) regulates the use of hazardous substances and the disposal of hazardous wastes. 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 roads, pads, and pipelines, and for refueling and maintaining equipment and vehicles. Potentially harmful substances used in construction and operations would be kept onsite in limited quantities and trucked to and from each 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 ethylene or triethylene 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, soil, or shallow groundwater. Improper casing and cementing procedures could also 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.

The laws, regulations, contingency plans, and emergency response resources cited above, BLM's surface use and downhole COAs (Appendix B), and Noble's Master Drilling Plan and Master Surface Use Plan of Operations (Appendices D and E) are expected to adequately minimize risk and mitigate potential issues associated with hazardous or solid wastes under the Proposed Action.

#### *No Action Alternative*

Under the No Action alternative, the only project components would be construction of the 17L and 17M pads and drilling of the 16 Fee wells on those pads. Therefore, the risk of hazardous waste impacts resulting from the Proposed Action would be further reduced by approximately 75%.

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

#### *Surface Water*

##### Affected Environment

The plan area is within two sixth-order Hydrologic Unit Code (HUC) watersheds: Colorado River above Battlement Creek, and Colorado River below Cache Creek. These two HUCs are within the Lower Colorado River Basin, which is in the Colorado Headwaters-Plateau Watershed. All streams draining the

CCMDP area flow generally northward toward the Colorado River, which extends east-west approximately 3.5 miles north of the project area (Figure 1). The major perennial drainages within the CCMDP area are Cottonwood Creek and Cache Creek; the northeast corner of the CCMDP area also drains eastward toward Spruce Creek. Two additional, unnamed intermittent drainageways drain portions of the CCMDP area: one is located between the Cache Creek and Spruce Creek drainages, and empties directly into the Colorado River; the other interbraids with Cottonwood Creek at a location approximately 0.7 mile downstream from (north of) the 17M pad, before continuing within its own drainage to the Colorado River. While perhaps not technically correct, henceforth in this document the latter of these intermittent drainages will be called the intermittent tributary to Cottonwood Creek. At this time, no water quality data are available for any of these drainages.

According to the *Stream Classifications and Water Quality Standards* (CDPHE, Water Quality Control Commission [WQCC] Regulation No. 37) (CDPHE 2007), these drainages are 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 has been classified as aquatic life cold 2, recreation 2, water supply, and agriculture. Aquatic life cold 2 indicates that this watercourse 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 CCMDP 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 CCMDP 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).

Additionally, as noted previously in this document, segments of Cache Creek throughout the CCMDP area contain populations of threatened greenback cutthroat trout. According to the CCMDP Biological Assessment, CDOW conducted fish surveys in 2007 on USFS lands upstream of the CCMDP and documented a reproducing population. Because greenbacks and other subspecies of cutthroat trout are known to disperse in a downstream manner, it is assumed that this subspecies is present on both NFS and private lands within the CCMDP area.

## 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 caused by road and pipeline crossings;

and contamination by drilling fluids, produced water, or condensate. Potential impacts to stream channel morphology would occur in the following locations:

- The 17M and 19I pads would abut Cottonwood Creek and would require proper construction and monitoring of stormwater BMPs along the west sides of these pads.
- The 17L pad would be built within the drainage of the unnamed intermittent tributary to Cottonwood Creek, near a location where part of the stream's flow is currently diverted by irrigation ditches, ultimately emptying into Cottonwood Creek downslope. Construction of this pad would not appreciably change the path of stormflow running through this drainage or the irrigation ditch, and would not divert any runoff into Cache Creek.
- This same unnamed tributary would be crossed three times within the CCMDP area by new or realigned segments of access road; these would require proper sizing and alignment of culverts and drainage ditches plus effective BMPs to prevent stormwater flow from contributing project-related sediment to this drainage or to either Cache Creek or Cottonwood Creek (depending on relative timing of road and pad construction). One of these crossings would occur on Forest Service land; it was addressed in Noble's road design package and assessed at onsite visits during different seasons, including the peak of the spring runoff season.
- An approximately 150-foot reach of one of the braids of Cottonwood Creek downstream of the 17M pad would be covered by fill from the portion of rerouted access road between 66+00 and 68+00 feet. This would necessitate rerouting the stream several feet to the northwest along a ditch to be lined with riprap. An existing Parshall (venturi) flume along this creek segment would be relocated approximately 75 feet downstream.
- Finally, an unnamed ephemeral tributary to Cache Creek would be crossed by the realigned access road at two locations on private land just north of the CCMDP area.

Four irrigation ditches are also crossed by the existing access road, one of which is crossed twice; all crossings are located on private land. In two locations, the access road would be realigned to improve road gradient, necessitating alterations to the ditch crossings. Both ditch crossings would be culverted with 36-inch-diameter culverts lined with riprap at inlets and outlets; the ditches would not otherwise be diverted. At all other ditch crossings, if existing culverts appear to be inadequate, they would be replaced with new, properly aligned 36-inch culverts. Additionally, segments of two irrigation ditches up to 500 feet in length would be slightly realigned to accommodate pads 17L and 17M; both would incorporate riprap and geotextile linings, as needed.

Surface waters would be most susceptible to sedimentation during construction, drilling, and completion activities. After this period, reclamation activities would substantially reduce surface exposure, decreasing the risk to surface waters over the long term.

Although surface waters would be most susceptible to sedimentation over the short term, access roads would remain in place over the life of the well (i.e., 20 to 30 years) and would channel runoff during periods of precipitation. Sedimentation and stream channel impacts associated with roads would be reduced through the implementation of best management practices (BMPs) and other preventive measures. As proposed, these measures would include limiting cut slope steepness, step-cutting, limiting road grade to 10%, 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 cuttings trench used to contain drill

cuttings or the reserve pit used to contain drilling fluids and cuttings (depending on which method is used) would be lined to prevent infiltration into surrounding soils, and a minimum of 2 feet of freeboard would be required in each pit. 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 and would not migrate to surrounding soils or surface waters. Pipelines intended to transport of these liquids would be pressure tested prior to use to detect any leakage.

Additionally, Noble would construct two to three livestock ponds on private land along the eastern edge of the access road; one of these would be within the CCMDP area. All three would act to trap stormflow and entrained sediment diverted along the roadside relief ditch, reducing potential sediment loading to nearby streams.

The CCMDP biological assessment states that the proposed development is “not likely to adversely affect” the Cache Creek population of threatened greenback cutthroat trout mentioned above, assuming that the following proposed procedures are followed. Among other measures, Noble would construct the 17L pad and associated infrastructure (road, pipeline, and re-routed irrigation ditch) in early fall during low flow. This is the time of year when large storm events are least likely and, since greenback cutthroat trout spawn in spring, any sediment entering Cache Creek would not smother egg masses. Additionally, the relocated irrigation ditch would be located downgradient of the 17L pad, thus acting as a sediment catchment that would direct stormflow and entrained sediment exiting the pad away from Cache Creek.

Appendix B lists standard and site-specific surface-use COAs that would further mitigate impacts to surface water. With the application of these COAs, no adverse impacts to surface waters are anticipated under the Proposed Action, including both the transport of sediment and the discharge of chemical pollutants into Cache Creek.

#### *No Action Alternative*

Under the No Action alternative, the only project components that would occur would be construction of pads 17L and 17M and the drilling of 16 Fee wells on these pads. Therefore, the risk of water quality impacts resulting from the Proposed Action would be reduced. However, since pads 17L and 17M would have the greatest potential impact on Cache Creek, this alternative would not significantly change the potential for impacts to Cache Creek.

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

##### Affected Environment

Section 404 of the Clean Water Act requires a permit from the U.S. Army Corps of Engineers (USACE) prior to discharging dredged or fill material into waters of the United States as defined by 33 CFR Part 328. A USACE permit is required for both permanent and temporary discharges into waters of the United States. Stream crossings within the project area would require USACE approval prior to construction.

Within the project area, the realigned access road would twice cross the above-mentioned unnamed tributary to Cottonwood Creek, but would not cross either Cottonwood Creek or Cache Creek. The access road to the existing 17F pad similarly crosses an unnamed tributary to Cache Creek but does not cross any named drainages. As described in the “Wetlands and Riparian Zones” section below, the

streams that would be affected by the CCMDP generally lack any wetland development within the project area, although scattered hydrophytes (plants of wet places) and riparian plants (species found along stream corridors) do occur.

### Environmental Consequences

#### *Proposed Action*

Improperly designed drainage crossings, in particular undersized or poorly aligned culverts, could result in channel degradation that could include excessive bank erosion at culvert outlets, ponding of flows and excess sedimentation at culvert inlets, and channel scour at both inlets and outlets. Standard and site-specific surface-use conditions of approval listed in Appendix B would be implemented to protect waters of the U.S. The USACE also recommends designing drainage crossings for 100-year flood events due to the flashy nature of the area drainages as well as anticipated culvert maintenance.

Based on the estimated impacts to waters of the U.S., the road and pipeline crossings of drainages within the CCMDP area would be authorized by USACE under Nationwide Permit (NWP) 14 for linear transportation projects and NWP 12 for utility projects, respectively. NWP 14 allows up to 0.5 acre of surface disturbance at each crossing, including both the channel and associated wetlands. The only location where any significant amount of fill would be placed in jurisdictional waters would be the site of the 17L pad and access road, which would fill in most of a 700-foot-long segment of the unnamed intermittent tributary to Cottonwood Creek. Assuming a maximum width of 30 feet for this drainage, the area of waters of the U.S. to be filled by construction at this location would likely be less than 0.5 acre. All other locations of fill within waters of the U.S. listed in the Surface Water section above would likely cover less than 0.1 acre each.

If detailed project design indicates that an individual crossing would affect more than 0.1 acre of wetlands or other waters of the U.S., the general conditions of NWPs 12 and 14 require pre-construction notification to USACE. A condition of approval attached by BLM to any permit for road, pipeline, or pad construction strongly recommends that the operator obtain a formal jurisdictional determination by USACE and verification that the impacts are authorized by NWP 14 (Appendix B).

#### *No Action Alternative*

Under the No Action alternative, the only project components that would occur would be construction of pads 17L and 17M and drilling of the 16 Fee wells on these pads. The proposed realignment of the access road to these pads, as well as construction of 17M pad, would involve adding fill to the unnamed tributary to Cottonwood Creek. This would require authorization by USACE under a Nationwide Permit.

### ***Groundwater***

#### Affected Environment

The proposed activities are located within the Division of Water Resources (DWR) Water Division 5, the Colorado River Basin Main Stem. The groundwater in this division is generally found in both alluvial and sedimentary aquifers.

The project area is in the lower Piceance Basin aquifer system. The Piceance Basin contains both alluvial and bedrock aquifers. Unconsolidated alluvial aquifers are the most productive aquifers in the Piceance Basin. The groundwater exists in shallow, unconsolidated alluvium associated with the Colorado River (BLM 2006) and consists of unconsolidated boulders, cobbles, gravel, sand, silt, and clay. The thickness

of the alluvium is variable, but tends to be thinner at the basin margins due to increased slopes and higher flow velocities and thicker in the lower reaches where alluvium can accumulate. Generally, alluvial well depths are less than 200 feet, and typical water levels range from 50 to 100 feet. The chemical quality of groundwater is dependent on the mineral composition and hydrologic properties of the aquifer. Factors such as surface contact, porosity, and rate of water movement all influence water quality. The quality of alluvial groundwater in the Colorado River Basin can vary widely, and is affected by return flow quality, mineral weathering and dissolution, cation-anion exchange with alluvial minerals, and organic compound loading from fertilizer and pesticide leaching.

The most important bedrock aquifers are known as the upper and lower Piceance Basin aquifer systems. These consolidated bedrock aquifers occur within and above the large oil shale reserves. The upper and lower aquifers are separated by the Mahogany Zone of the Parachute Creek Member of the Green River Formation. The upper aquifer system is about 700 feet thick and consists of several permeable zones in the Uinta formation and the upper part of the Parachute Creek Member (EPA 2004). The Uinta Formation is present in the study area, but only in a very small portion of the CCMDP study area found in Section 30, T7S, R94W. Sub-aquifers in the upper zone consist of silty sandstone and siltstone, with enhanced permeability from natural fracturing. The lower aquifer system is about 900 feet thick and consists of a fractured dolomitic marlstone of the lower Parachute Creek Member (EPA 2004). It is semi-confined below the Mahogany Zone and above the Garden Gulch Member (the middle member) of the Green River Formation. Natural fracturing and dissolution of evaporite minerals has enhanced permeability in this zone. Both bedrock aquifers overlie the older Cretaceous Mesaverde Group, the target zone of the subject wells. South of the Colorado River, these upper Tertiary-age aquifers have largely been eroded off, leaving isolated remnants of these formations lacking connectivity.

Groundwater is recharged from snowmelt in upland areas that receive more precipitation than lower altitude areas. In the Piceance Basin, recharge flows from areas near the margins of the basin to discharge areas near principal stream valleys. The groundwater moves laterally and/or upward discharging directly into streams, springs, and seeps by upward movement through confining layers and into overlying aquifers or by withdrawal from wells. The natural discharge areas generally are found along the Colorado River and its tributaries (Robson and Banta, 1995).

Although the Mesaverde Group contains some water-bearing intervals (Glover, et al. 1998), the depth to the top of the Mesaverde Group aquifer beneath the project area is more than 6,000 feet below ground surface (bgs). The water quality of this aquifer is considered poor due to the natural presence of the minerals nahcolite ( $\text{NaHCO}_3$ , sodium bicarbonate), dawsonite ( $\text{NaAl}(\text{OH})_2\text{CO}_3$ ), and halite ( $\text{NaCl}$ ), with total dissolved solids (TDS) 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).

According to the Colorado Division of Water Resources (CDWR), two fresh-water wells are found within the CCMDP area boundary. Located approximately 1,875 feet east of the proposed 17M well pad is a domestic use/irrigation well with a shallow well depth of 113 feet and a water level of 77 feet. Water yield for this well is very good at 15 gallons per minute (gpm). The second of the two wells identified is located approximately 1,650 feet east, southeast of the proposed 19I well pad. With a well depth of 150 feet and a water level of 93 feet, this shallow commercial well also lists a water yield of 15 gpm. No other active water wells are located within a 1-mile radius of any of the proposed well pads, including the existing 17F pad. Numerous fresh water wells are located to the north and west of the project area in the gravels and alluvium adjacent to the Colorado River. Well depth and water level data checked from a cross-section of these wells indicates shallow completions of 200 feet or less, with water depths averaging 100 feet or less. Well yields for these wells are good, ranging between 10 and 15 gpm. The use of the wells is primarily domestic, therefore it can be assumed that the quality of the water is fit for human consumption.

All proposed gas wells would be located in what is known as the Project Rulison Three-Mile Area. Noble will comply with all COGCC Rules, Orders, and Conditions of Approval associated with the Project Rulison Three-Mile Area, where all well permits issued by COGCC are reported to and reviewed by the DOE. The Federal wells proposed in the CCMDP would be subject to meeting the requirements set forth in the COGCC policy statement issued on December 21, 2007, by David Neslin, at that time the Acting Director. This policy statement can be viewed on the COGCC website at [www.cogcc.state.co.us](http://www.cogcc.state.co.us).

### Environmental Consequences

#### *Proposed Action*

Potential impacts to groundwater resources from the Proposed Action would include contamination of the groundwater with produced water, drilling mud, and petroleum constituents. Hydraulic fracturing would be incorporated to complete the wells, which would include produced and freshwater mixed with proppants, or propping agents, to stimulate the formation to create fractures that would allow gas to travel more freely from the rock pores where the gas is trapped. Hydrofracturing would be conducted at 7,000 feet or more below ground surface, and would be unlikely to cause impacts to groundwater resources near the surface, such as springs or shallow alluvium. However, isolation of any water bearing zones during installation of the production and surface casing would minimize the effects, as well as cementing the production casing to 200 feet above the top of the Mesaverde Group. It is highly unlikely that any shallow groundwater resources would be affected (1,000 feet or less), because 6,000 feet of strata separate the gas zone from fresh-water zones.

#### *No Action Alternative*

Under the No Action alternative, the potential impacts to groundwater resources would be reduced by approximately 75%, since the Federal wells would not be drilled.

### **3.1.9 Wetlands and Riparian Zones**

#### Affected Environment

Riparian zones in the analysis area include Cottonwood Creek, Cache Creek, the two unnamed drainageways discussed in the Surface Water section above, and their tributaries. These zones support hydrophytes (plants of wet places) and riparian mesophytes (plants of moist places found along stream corridors). The unnamed drainageways have sufficiently thick stands of Gambel's oak, willow, and similar species that they typically lack any defined channel. Aspen and a dense understory of oak and other shrubs along Cache Creek also provide the thermal cover required by greenback cutthroat trout.

Within the CCMDP area, wetland vegetation also occurs in numerous seeps, wet meadows, and minor swales. Species characteristic of these areas include willows, broadleaf cattail, Baltic rush (*Juncus arcticus* spp. *ater*), beaked sedge (*Carex utriculata*), and a variety of other wetland forbs, grasses, sedges, and rushes typical of the area.

### Environmental Consequences

#### *Proposed Action*

The existing (eastern) access road to the existing 17F pad crosses the unnamed drainage just east of Cache Creek once but does not cross Cache Creek itself. The existing (western) road that would be improved for access to the proposed five new pads crosses the unnamed intermittent tributary to Cottonwood Creek

twice within the project area, but does not cross either Cottonwood Creek or Cache Creek. The access road to the 19H pad also crosses this drainage, but does not cross any perennial stream. The 19H pad access road would cross a meadow that does not contain any riparian or wetland vegetation at the crossing site. Both of the other crossings would affect some riparian vegetation. However, the combined lengths of riparian impacts would be less than 100 feet. In addition, rehabilitation of the existing road would allow the reestablishment of riparian vegetation at these locations.

Two other stream segments would experience permanent losses of riparian vegetation. First, approximately 700 feet of the unnamed intermittent tributary to Cottonwood Creek would be filled by construction of the 17L pad and its access road. Diversion of flows from this stream at the 17L pad would significantly diminish discharge in this stream, which also acts as an irrigation ditch, for at least 1,300 feet downstream until it is replenished with flow from Cottonwood Creek. The affected segment of this stream would lose most or all of its existing riparian vegetation as a result of the Proposed Action.

Second, as mentioned above in the **Water Quality, Surface and Ground** section, approximately 150 linear feet of one of the braids of Cottonwood Creek would be diverted by a portion of the access road. Realignment of this road segment would generate a small net long-term loss of riparian vegetation from the eastern bank of this drainage due to the bank armoring to be constructed at this location.

Both of the two stream segments just described presently contain only small patches of riparian vegetation. As a result, road and pad construction in the CCMDP area would cause a net loss of less than 0.5 acres of riparian vegetation.

#### *No Action Alternative*

Under the No Action alternative, the only project components that would occur would be construction of the 17L and 17M pads and drilling of the 16 Fee wells on these pads. Although the wettest portions of the CCMDP area are in areas that would not be affected under this alternative, the risk of impacts to wetlands and riparian zones resulting from the Proposed Action would not be reduced significantly. This is because construction of the two split-estate pads and adjacent access road would have a greater impact on riparian and wetland vegetation than portions of the Proposed Action not included in the No Action alternative.

### **3.2 Other Affected Resources**

In addition to the critical elements, the resources presented in Table 10 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.

#### **3.2.1 Access and Transportation**

##### Affected Environment

As stated in the Proposed Action, the CCMDP area would be accessed by vehicles serving the oil and gas development, including traffic related to construction, drilling, completion, and well production. No public access is available to the project area on the existing or proposed access roads. The CCMDP area could be reached from two distinct directions:

- (1) Depart I-70 at Exit 81 (Rulison) and proceed south onto County Road 320 (CR320), then west on CR309 and south on CR301 to the private access road near the existing 5L pad in NESW of Section 5, T7S, R94W.

- (2) Depart I-70 at Exit 75 (Parachute) and proceed east across the Colorado River on CR 300A and then on CR301 for approximately 6 miles to the private access road near the existing 5L pad.

| <b>Table 10. Other Resources Considered in the Analysis</b>  |                          |                                 |                             |
|--|--------------------------|---------------------------------|-----------------------------|
| <b>Resource</b>  | <b>NA or Not Present</b> | <b>Present and Not Affected</b> | <b>Present and Affected</b> |
| Access and Transportation  |                          |                                 | X                           |
| Cadastral Survey   | X                        |                                 |                             |
| Fire/Fuels Management  |                          |                                 | X                           |
| Forest Management  |                          |                                 | X                           |
| Geology and Minerals   |                          |                                 | X                           |
| Inventoried Roadless Area (USFS)   |                          | 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                           |
| * Element is a Public Land Health Standard. Because no BLM lands would be affected by the project, the Public Land Health Standard component of the element was not analyzed. See Section 1.5. |                          |                                 |                             |

The proposed new roads, totaling 3.29 miles, would be constructed to meet standards for the anticipated traffic flow and all-weather requirements. The upgraded road would cross 0.3 mile of NFS lands in the NWNW of Section 20, T7S, R94W (see Figure 3).

Proposed roads would be constructed within an average disturbance corridor 60 feet wide, reduced to 26 feet of finished road surface (including bar ditches) after interim reclamation (see Table 1). A track-mounted hydro-axe or tree chipper would be used to clear vegetation including trees within the proposed limits of disturbance for the planned roads. Earth-moving equipment would be used to segregate and windrow the topsoil along the edge of the proposed road corridor. The road would then be constructed using standard equipment and techniques as described in the *Surface Operating Standards for Oil and Gas Exploration & Development – The Gold Book* (USDI and USDA 2007) and *Forest Service Design Criteria on Forest Lands* (USFS 1987). Such measures would include ditching, draining, crowning, surfacing, sloping, and dipping the roadbed as necessary. A minimum four-inch layer of gravel would be applied to the road surface to provide an all-weather travelway.

The average road grade would be 10% or less, wherever possible. The 10% grade would only be exceeded in areas where physical terrain or unusual circumstances require it. Minimum horizontal curve radii would be 100 feet. Where terrain would not allow a 100-foot curve radius, the curve would be

widened. Road construction would result in approximately 23.9 acres of short-term surface disturbance. Following interim reclamation, the long-term surface disturbance associated with roads would be approximately 14 acres (see Table 1).

Crossings would be designed to minimize siltation and the accumulation of debris in the drainage crossing. Water diversions including cut-outs would be placed at frequent intervals along access roads to prevent the erosion of drainage ditches.

Traffic use counts are not available for the existing private road accessing the CCMDP area. Its present use would be classified as low with traffic related to accessing the existing Savage Family cabin and any fall big game hunting uses they might allow.

Environmental Consequences

*Proposed Action*

Garfield County’s preferred County Road haul routes would be used, and Noble would be restricted from using other County roads for heavy loads (Garfield County Road and Bridge Department 2008). The Proposed Action would result in periods of substantial increases in traffic volume on the preferred haul routes, other existing private roads, and the newly constructed roads within the CCMDP area. 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 11). Once the wells are producing, traffic would decrease to occasional visits for monitoring or maintenance activities, and hauling produced water and condensate. Each well may have to be recompleted once per year, requiring three to five truck trips per day for approximately 7 days.

| <b>Table 11. Traffic Associated with Drilling and Completion Activities</b> |                                 |                            |
|---|---------------------------------|----------------------------|
| <b>Vehicle Class</b>  | <b>Number of trips per well</b> | <b>Percentage of total</b> |
| 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.

The increased traffic on County roads may cause temporary conflicts with normal traffic, including travel delays and increased vehicle collision rates. The project traffic would also cause an increase in fugitive dust and noise and an increased risk of collision with wildlife. Degradation of County and private roads may occur from heavy equipment travel, resulting in increased maintenance and safety management requirements.

Within the project area, the existing 3.0 miles of road on private land and 0.3 mile on NFS lands would be realigned, where appropriate, and reconstructed based on the stamped engineered road design plans prepared by Noble’s engineering firm, URS (see Figure 1). Use of multi-well pads and directional drilling minimizes the need for additional access road construction. Segments of the existing ranch road

crossing NFS lands would be used as the new pipeline corridor, which would be recontoured, reclaimed, and closed to motorized vehicles after pipeline installation.

The average road grade would be 10% or less, wherever possible. The 10% grade would only be exceeded in areas where physical terrain or unusual circumstances require it. Minimum horizontal curve radii would be 100 feet. Where terrain would not allow a 100-foot curve radius, the curve would be widened. The finished travelway width would be 26 feet. Crossings would be designed to minimize siltation and the accumulation of debris in the drainage crossing. Water diversions including cutouts would be placed at frequent intervals along access roads to prevent the erosion of drainage ditches.

Realignment and reconstruction of existing road segments and/or construction of the proposed roads would create 23.9 acres of short-term disturbance, which would be reduced to 14.0 acres after the road disturbance corridor is reclaimed. The reconstruction of 0.3 mile of road and 0.3-mile pipeline installation on NFS lands would create an initial disturbance of 3.2 acres that would be reduced to 1.3 acres with implementation of the reclamation requirements identified in Appendix B.

The WRNF Land and Resource Management Plan identifies a particular Forest Guideline related to travelways within specified Elk Habitat Areas: "Travelways open to motorized travel will not exceed an average travelway density of 0.5 mile per square mile during seasonal periods when the area is designated for calving, migration, winter, or summer habitat (USFS 2002). The existing travelway density is 0.34 mile per square mile within Management Area 5.43 as calculated by Karla Mobley, USFS Civil Engineering Technician. About 0.95 miles of travelway could be constructed within MA and still satisfy the Travelway Density Requirement.

The operator would be required to obtain a Road Use permit from USFS, Rifle Ranger District prior to construction and use of the 0.3 mile of road realignment planned in Section 20. Road maintenance requirements across the NFS road segment would be stipulated in the Road Use Permit (Appendix C). The existing non-exclusive easement would be updated to reflect the changes in road alignment and use. Access by the general public would not be allowed on the proposed road serving the CCMDP area.

Roads would be constructed and maintained to an appropriate standard to accommodate their intended functions, as described in the *Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development* (USDI and USDA 2007) and BLM Handbook 9113 - *Roads Manual*, and *Forest Service Design Criteria on Forest Lands* (USFS 1987). A condition for approval by BLM of the Federal wells in Section 17 and for issuance by WRNF of Road Use and Special Use permits to access the Fee pads across NFS lands would require Noble to construct or improve the roads in conformance with engineered road design plans stamped by a registered professional engineer. Appendices B and C include this specific requirement as well as other mitigation measures to reduce the impacts associated with road construction and use for oil and gas activities.

#### *No Action Alternative*

Under the No Action alternative, two split-estate pads (17L and 17M) and the associated roads and pipelines on private lands would still be constructed. No ground disturbance or impacts to access, transportation, and travel would occur on NFS lands. Impacts on private lands would be approximately 25% of those under the Proposed Action, assuming that the impacts are proportional with the number of wells drilled and operated under the No Action alternative (16) versus the Proposed Action (63).

### 3.2.2 Geology and Minerals

#### Affected Environment

The CCMDP project area is located within the southern Piceance Basin, a broad elongate structural basin located at the eastern edge of the Colorado Plateau. The basin is highly asymmetrical and deepest along its eastern side near the White River Uplift, where more than 20,000 feet of sedimentary rocks are present. It is bounded on the north by the Uinta Mountain uplift, on the east by the Grand Hogback Monocline, which lies along the western flank of the White River Uplift, on the southeast by the Gunnison and Uncompahgre Uplifts, and separated from the Uinta Basin to the northwest by the Douglas Creek Arch. Surface exposures in the Piceance Basin are primarily sedimentary rocks of the Green River and Wasatch Formations.

The youngest rocks in the CCMDP are Quaternary in age and are distributed as unconsolidated sedimentary surface deposits. Landslide deposits (Ql) cover most of the study area and consist principally of large slump blocks of basalt irregularly veneered with young (Pinedale) glacial drift. Other areas consist of mudflows and outwash plains from receding glacial blocks that once covered the highland areas to the south, including Battlement and Grand Mesas. Well pads 17L, 17M, 20F, and 19H are underlain by these unconsolidated sediments. Well pad 19I is located on Lower Green River (Tgl) and landslide sediments, and existing well pad 17F is found on a small surface exposure of Wasatch Formation (Two). Although not found within the immediate vicinity of the proposed wellpads, the Lower Green River Formation (Tgl), is mapped extensively in the eastern and western portions of the CCMDP area.. Surface exposures of the Parachute Creek Member of the Green River Formation (Tgp) are also apparent, particularly within Section 19, T7S, R94W, as well as the Tertiary Uinta Formation (Tu). Table 12 lists these formations along with other localized mapped units most prevalent in the CCMDP area and their characteristics.

**Table 12. Geologic Formations within the CCMDP Area**

| Map Symbol | Formation Name                                | Age                    | Characteristics   | Location                                 |
|------------|---|------------------------|---|--|
| Ql         | Landslide deposits                            | Pleistocene & Holocene | Heterogeneous rapid gravity flow deposits of clay- to boulder-sized materials | mesa side slopes                         |
| Qgo        | Older gravels & alluvium                      | Pleistocene            | Terrace, outwash and pediment deposits  | mesa summits                             |
| Qbb        | Basaltic boulder gravel                       | Pleistocene            | Weathered igneous deposits of Tertiary volcanic origin                        | mesa summits                             |
| Tu         | Uinta Formation                               | Eocene                 | Siltstone, sandstone and marlstone  | side slopes and mesa summits             |
| Tgp        | Parachute Creek Member, Green River Formation | Eocene                 | Oil Shale and marlstone   | mesa side slopes                         |
| Tgl        | Lower part of Green River Formation           | Eocene                 | Shale, sandstone and marlstone  | mesa side slopes                         |
| Two        | Wasatch formation                             | Eocene & Paleocene     | Claystone, shale, siltstone, sandstone bedrock                                | outcrops on mesa sides and summits       |
| Kmv        | Mesaverde formation                           | Upper Cretaceous       | Sandstone, shale, conglomerate bedrock with some coal beds                    | below Tw and not exposed in project area |

Source: Tweto 1979, Ellis and Freeman 1984, Shroba and Scott 1997

The target zone is the Mesaverde Group, which comprises both the Williams Fork and Iles Formations. The Mesaverde can be over 7,000 feet in thickness within the Piceance Basin, but within this area is estimated to be approximately 3,200 feet thick. The Mesaverde Group is often called the Mesaverde “Formation” and includes informal subdivisions based on gas productivity characteristics. The Williams Fork is defined by stacked lenticular, fluvial sandstones, sandy shales, carbonaceous shales, and coals, while the Iles Formation is a marine deposit consisting mainly of sandstones and shales.

The proposed CCMDP drilling project would target sandstone layers within the Williams Fork (including the Cameo Coal and un-named sandstones) and Iles Formations between 8,575 and 10,100 feet MD. The sandstones of the Williams Fork Formation are considered “tight” because of their low permeability reservoir characteristics. Individual sandstones are stacked and concentrated into 400- to 500-foot-thick potentially productive sequences, and distributed throughout a vertical interval of about 2,000 feet. Sand bodies originating from a river or fluvial depositional setting typically demonstrate irregular and spatially limited reservoir distributions. Studies of the Rulison Gas Field, where the CCMDP area is located, show that these Williams Fork sandstones have limited horizontal extent, based on the lack of pressure communication between existing wells spaced less than 1,000 feet apart (Vargas 2006).

### Environmental Consequences

#### *Proposed Action*

If the proposed CCMDP project wells become productive, implementation of the Proposed Action would result in natural gas and associated water being produced from the hydrocarbon-bearing sands within the Mesaverde Group. The amount of natural gas that may be potentially produced from the proposed wells cannot be estimated accurately but in nearby fields reserves have been estimated to approach 2 billion cubic feet (bcf) per well (Vargas 2006). If the wells become productive, initial production rates would be expected to be highest during the first few years of production, then decline during the remainder of the economic lives of the wells. Natural gas production from the proposed wells would contribute to the draining of hydrocarbon-bearing reservoirs within the Mesaverde Group in this area, an action that would be consistent with BLM objectives for mineral production.

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

#### *No Action Alternative*

Under the No Action alternative, the Proposed Action for developing Federal minerals would not be approved. No new impacts to the geology and mineral resources would occur on Federal mineral estate, however Fee minerals accessed from bottomhole locations drilled from the private surface well pads would still be developed.

**3.2.3 Inventoried Roadless Area (USFS Designation)**

No Inventoried Roadless Area (IRA) would be affected by the proposed project. The proposed well development access road, including the disturbance corridor, crossing NFS lands in NWNW Section 20 passes near the edge of the mapped Mamm Peak IRA but does not traverse into any portion of the IRA.

**3.2.4 Noise**

Affected Environment

In the broad sense, the Proposed Action would lie within a rural setting characterized by fairly recent oil and gas development activities. Noise levels in the area are presently created by traffic serving existing wells and ongoing drilling and completion activities. The area is sandwiched between two other areas previously leased and approved for oil and gas development in the Doghead Mountain Geographic Area Plan (BLM 2007a) and the Rulison Geographic Area Plan (BLM 2007b). However, with the exception of the 17F pad, this would be the first oil and gas development this far up Cottonwood and Cache Creeks; the upper parts of these watersheds have previously been used primarily for recreation. Currently, the only structure within the CCMDP area is a large cabin on Savage property, approximately 600 feet south of the proposed access road to proposed pad 19I. All other residences in the area are north of the CCMDP, the closest being approximately 0.5 mile north. There are currently no residences along the existing access road for at least 1.5 miles north of the project boundary.

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 13) at a distance of 350 feet.

| <b>Table 13. Noise Standards for Light industrial, Residential/Agriculture/Rural</b> |                              |                              |
|--|------------------------------|------------------------------|
| <b>Zone</b>  | <b>7:00 A.M. to 7:00 P.M</b> | <b>7:00 P.M. to 7:00 A.M</b> |
| 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 db(A) 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 average construction site noise level of 65 dB(A) at 500 feet (Table 14), construction noise would equal approximately 59 dB(A) at 1,000 feet. At 1,000 feet, noise levels would approximate those of an active commercial area (EPA 1974). Traffic noise levels would also be elevated as a consequence of the

Proposed Action. The greatest increase would be along access roads during the drilling and completion phases. Based on the La Plata County data presented in Table 15, approximately 68 dB(A) 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.

| <b>Table 14. Noise Levels Associated with Typical Construction Equipment</b> |                            |                 |                   |
|--|----------------------------|-----------------|-------------------|
| <b>Equipment</b>   | <b>Noise Level (dB(A))</b> |                 |                   |
|  | <b>50 feet</b>             | <b>500 feet</b> | <b>1,000 feet</b> |
| Tractor  | 80                         | 60              | 54                |
| Bulldozer  | 89                         | 69              | 63                |
| Backhoe  | 85                         | 65              | 59                |
| Crane  | 88                         | 68              | 62                |
| Air Compressor   | 82                         | 62              | 56                |
| Dump Truck   | 88                         | 68              | 62                |
| <b>Average</b>   | <b>85</b>                  | <b>65</b>       | <b>59</b>         |
| Source: BLM 1999a  |                            |                 |                   |

| <b>Table 15. Noise Levels Associated with Oil and Gas Production and Development</b> |                                     |                                      |                                       |                                       |
|--|-------------------------------------|--------------------------------------|---------------------------------------|---------------------------------------|
| <b>Equipment Type</b>  | <b>Noise Level at 50 feet (dBA)</b> | <b>Noise Level at 500 feet (dBA)</b> | <b>Noise Level at 1000 feet (dBA)</b> | <b>Noise Level at 2000 feet (dBA)</b> |
| Crane  | 88                                  | 68                                   | 62                                    | 56                                    |
| Backhoe  | 85                                  | 65                                   | 59                                    | 53                                    |
| Pan Loader   | 87                                  | 67                                   | 61                                    | 55                                    |
| Bulldozer  | 89                                  | 69                                   | 63                                    | 57                                    |
| Fuel and Lubrication Truck   | 88                                  | 68                                   | 62                                    | 56                                    |
| Water Truck  | 88                                  | 68                                   | 62                                    | 56                                    |
| Motor Grader   | 85                                  | 65                                   | 59                                    | 53                                    |
| Vibrator/Roller  | 80                                  | 60                                   | 54                                    | 48                                    |
| Mechanic Truck   | 88                                  | 68                                   | 62                                    | 56                                    |
| Flat Bed Truck   | 88                                  | 68                                   | 62                                    | 56                                    |
| Dump Truck   | 88                                  | 68                                   | 62                                    | 56                                    |
| Flat Bed Trailer   | 88                                  | 68                                   | 62                                    | 56                                    |
| Tractor  | 80                                  | 60                                   | 54                                    | 48                                    |
| Concrete Truck   | 86                                  | 66                                   | 60                                    | 54                                    |
| Concrete Pump  | 82                                  | 62                                   | 56                                    | 50                                    |
| Front End Loader   | 83                                  | 63                                   | 57                                    | 51                                    |
| Road Scraper   | 87                                  | 67                                   | 61                                    | 55                                    |
| Air Compressor   | 82                                  | 62                                   | 56                                    | 50                                    |
| Average Construction Site  | 85                                  | 65                                   | 59                                    | 53                                    |
| Source: La Plata County (2002)   |                                     |                                      |                                       |                                       |

Noise impacts would decrease during the production phase. These levels would be less than during the construction phase, but greater than background noise levels. During maintenance and workovers, noise levels would temporarily increase above those associated with routine well production. Traffic noise level would impact residences located along county roads that would provide primary access into the area. While exposure to these noise levels is not likely to be harmful, it is likely to be annoying to residents.

Since no year-round residences occur within 0.5 mile of the CCMDP area or its access road, noise impacts associated with the Proposed Action would be negligible for all but short-term residents at the Savage cabin and other recreationalists accessing the area. Given that the three southernmost pads (19H, 19I, and 20F) would all be constructed on Savage property, it is up to the landowner to work out an agreement with Noble with regard to the timing of drilling operations. Appendix B includes mitigation measures to be applied as COAs to reduce noise impacts.

#### *No Action Alternative*

Under the No Action alternative, the only project components that would occur would be construction of split-estate pads 17L and 17M and drilling of the 16 Fee wells on these pads. This alternative would thus have fewer noise impacts than the Proposed Action.

### **3.2.5 Paleontology**

#### Affected Environment

The predominant surface formation found within the boundary of the CCMDP is Quaternary Landslide deposits (Ql). Existing well pad 17F, located in the SE $\frac{1}{4}$ NW $\frac{1}{4}$  of Section 17, is underlain by a small area of Wasatch Formation sediments (Two). Isolated areas of the Tertiary Parachute Creek Member of the Green River Formation (Tgp) also occur to the southwest and southeast of the study area, along with small occurrences of the Tertiary Uinta Formation (Tu). Although found in a very limited portion of the study area, additional occurrences of Wasatch Formation sediments are most likely draped by younger sediments.

Occurring in varying thicknesses, the Quaternary sediments are considered Potential Fossil Yield Classification (PFYC) Class 2, defined as having a low probability of fossil occurrence. Class 2 geologic units are not likely to contain vertebrate or scientifically significant invertebrate fossils. The Lower Green River Formation is considered PFYC Class 3, defined as moderate or unknown potential. Fossil remains in this class occur intermittently, with the predictability known to be low. Fossil remains are known to occur within the Parachute Creek Member (Tgp) of the Green River Formation, particularly fossil insects (more than 100 species) plants, gar and other fish, turtles, and crocodilians. Because of the abundance of these occurrences, the Parachute Creek Member is considered PFYC class 4/5.

The Wasatch Formation is a BLM Class 4/5 formation, defined as an area known to contain vertebrate fossils or noteworthy occurrences of invertebrate fossils. These types of fossils are known to occur and have been documented, but may vary in occurrence and predictability. The Wasatch Formation is divided into the early Eocene Shire, and the Paleocene-aged Molina and Atwell Gulch Members. All members of the Wasatch contain vertebrate fossils in varying abundances (Murphy and Daitch 2007). Rocks of the Wasatch Formation are lithologically very similar to one another throughout the Piceance Basin as heterogeneous continental fluvial deposits with interfingering channel sandstone beds and over bank deposits consisting of variegated claystone, mudstone, and siltstone beds (Franczyk et al. 1990). Eocene mammals have been found in the lower part of the Shire Member.

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

### Environmental Consequences

#### *Proposed Action*

All of the proposed and the one existing well pad(s) are located on private surface and obscured with thick scrub oak and native grasses. The thickness of the underlying alluvial sediments cannot be accurately determined, but construction activities have the potential to adversely affect important fossils that may be present in the underlying Wasatch Formation. The greatest potential for impacts is associated with excavation of shallow bedrock that may be unearthed during well pad and facilities construction. In general, alluvium and colluvium and other unconsolidated sediments are much less likely to contain well-preserved plant and animal remains than intact native sediments.

An examination of the BLM paleontology database indicates that there are no known fossil occurrences within the CCMDP boundary. The closest known site occurs in Section 36 6S95W, approximately 3 1/4 miles northwest of the existing 17F well pad. The next closest site—in Section 9, T8S, R94W, more than 3 miles southeast of the proposed 19I well pad—is the southernmost of the five newly proposed pads. Given the abundance of thick vegetation found within the study area and the lack of visible bedrock, it is unlikely any fossil discovery sites would be located without ground disturbance. In the event paleontological resources are encountered during construction, a paleontological COA would be attached to the APDs (Appendix B).

#### *No Action Alternative*

Under the No Action alternative, no new ground disturbing activities would occur which have the potential to affect paleontological resources. Given the lack of fossil localities found in this particular area, it is unlikely any new discoveries would be found without soil cover and vegetation removal during construction activities.

### **3.2.6 Range Management**

#### Affected Environment

None of the proposed well pads, roads, or pipelines lies within a BLM-administered grazing allotment. All of the proposed well pads would be located on private surface owned by the Savage Family. Livestock grazing does occur on the private lands of the Savage Family ranch. The area where the 0.3 mile of proposed road reconstruction and pipeline installation would occur on National Forest land lies within a National Forest grazing ON/OFF permit. The permittees (listed in Table 16) must consider and follow guidelines, in coordination with the USFS range specialist, as specified in the National Forest grazing permit.

| <b>Table 16. Grazing Permittees on NFS lands in the CCMDP area</b>  |                                  |                      |                         |
|---|----------------------------------|----------------------|-------------------------|
| <b>Permittee</b>  | <b>Livestock Type and Number</b> | <b>Period of Use</b> | <b>AUMs<sup>1</sup></b> |
| Joan Savage   | Cattle – 142                     | 07/01 to 09/30       | 564                     |
| Jim Lemon   | Cattle – 77                      | 06/15 to 10/15       | 408                     |
| <sup>1</sup> Animal Unit Months (AUMs) are defined as the amount of forage needed by an animal unit (AU) grazing for one month. An AU is defined as one mature 1,000-pound cow and her suckling calf. |                                  |                      |                         |

Environmental Consequences

*Proposed Action*

Oil and gas development within the proposed CCMDP would result in approximately 57.2 acres of total short-term surface disturbance and specifically 3.2 acres on NFS lands (see Table 1). This disturbance and resulting loss of vegetation would last for approximately three to five years or until grasses and forbs seeded during interim reclamation became productive. Rehabilitation of the short-term disturbance areas would replace some of the livestock forage. Long-term vegetative loss from the working areas of well pads and roadways, amounting to 23.4 acres within the MDP boundary including 1.3 acres on NFS lands, would be expected to last 20 to 30 years until the wells lost their productivity. With final reclamation of the wells sites and access roads, the productivity of the rangeland would be reestablished.

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

Additional effects from oil and gas development on livestock grazing could include increased human activity, spread of noxious weeds, and livestock mortality as a result of collisions with vehicles. Biological stress could be induced on the grazing cattle from the increased development activities and result in changes in use patterns and trailing routes.

An increase in human activity related to development and maintenance of the developments would cause cattle to avoid certain areas of the allotments. However, livestock may also benefit from improved access. New roads and pipelines would open access to areas of the allotments that are difficult for livestock to access because of thick brush cover. Improvement in livestock distribution could improve forage utilization throughout the allotment.

Effects from increased human activity also could include the introduction and spread of noxious weeds and the subsequent degradation of rangeland health. Invasive, Non-Native Species section describes in detail the effects of invasive species and lists mitigation measures related to the Proposed Action.

It is not anticipated that the impacts from implementation of the Proposed Action would require adjustment of the livestock stocking rate. The level of forage utilization would be monitored on the allotment and if necessary, adjustments in livestock use would be made to protect land health.

Range improvements (fences, gates, reservoirs, pipelines, etc.) would be avoided during development of oil and gas resources to the maximum extent possible. If range improvements are damaged during exploration and development, the operator would be responsible for repairing or replacing the damaged

range improvements. A new cattleguard with bypass gate would be installed into the existing boundary fence located at the private/USFS boundary line. The standard requirement for fencing of pits on well pads as well as the plan to initially install a perimeter fence around newly constructed well pads within the project area would mitigate concerns with livestock being injured around active well drilling activities (Appendix B).

#### *No Action Alternative*

Under the No Action alternative, the construction of the 17L and 17M pads and the drilling of the 16 Fee wells on split-estate land would occur. Therefore, impacts to ranching operations on the split-estate lands could occur to some extent—although minimized by the COAs in Appendix B. Impacts to grazing of livestock on the NFS lands and the Fee lands surrounded by WRNF would be less than under the Proposed Action because no surface disturbance or disruption by oil and gas operations would occur there. However, to the extent that grazing could be affected, those effects could extend onto the NFS and Fee land. Overall, however, impacts would be reduced proportionately by the reduced intensity of development.

### **3.2.7 Realty Authorizations**

#### Affected Environment

A reciprocal nonexclusive road easement is presently in existence, allowing WRNF personnel the administrative use of the private road segments in Sections 8, 17, and 20. The easement also provides the Savage Family (private landowner and mineral owner) use of the existing road across NFS lands in Section 20. Since the existing road segment across NFS lands would be realigned and reconstructed under the Proposed Action, a Road Use Permit is the document authorizing the commercial use of the road by Noble, including the planned construction of new access road and burial of new gas pipeline on NFS lands. A Special Use Permit would authorize the installation of buried gas and water pipelines within the existing ranch road corridor. Noble would submit an as-built survey of the reconstructed road and buried pipeline in its request package to the USFS Rifle Ranger District for the easement amendment.

#### Environmental Consequences

##### *Proposed Action*

The proposed construction work on NFS lands would total 1,570 feet (0.3 mile) of new road and 1,500 feet (0.28 mile) of buried pipeline. The disturbance area attributed to the proposed improvements amounts to 3.2 acres using a maximum disturbance width of 50 feet for the road or 50 feet for the pipelines or 50 feet for the combined road/pipeline corridor crossing National Forest land. Under the Proposed Action, the use authorizations on NFS lands would be granted subject to appropriate terms and conditions summarized in Appendix C.

##### *No Action Alternative*

No realty authorizations on NFS lands would occur with the implementation of the No Action alternative.

### **3.2.8 Recreation**

#### Affected Environment

Since the Proposed Action would occur on private land with the exception of the 0.3 mile of road and pipeline planned on NFS lands, there is very limited, if any, recreational opportunities afforded the general public within the CMAP boundary. The only access to the project area is across private roads that are not available for use by the recreating public.

One commercial big game outfitter—Cache Creek Outfitters (Jeff Miner, P.O. Box 198, Collbran, CO 81624)—has a special recreation use permit (managed by the USFS Rifle Ranger District) that includes NFS lands within the CMAP boundary. It is not specifically known how much permitted big game outfitting use occurs in the general CMAP area, although the outfitter has 200 bookings planned for the fall 2009 big game hunting seasons for his extensive permit area on White River National Forest.

#### Environmental Consequences

##### *Proposed Action*

Construction and well-drilling activities would likely displace big game to other locations outside of the Project Area. The result would be an indirect impact to big game hunters who have booked hunts with Cache Creek Outfitters on NFS lands. Such impact may result in outfitter locating to different camps during the construction, drilling and completion activities being proposed.

##### *No Action Alternative*

Under the No Action alternative, the 17L and 17M pads would be constructed on private land. With no activities proposed on NFS lands under this alternative, there would be no direct impact to big game hunters on NFS lands or the big game outfitting permittee operating on NFS lands. Hunting on private land, if allowed, would be controlled and supervised by the landowner.

### **3.2.9 Socio-Economics**

#### Affected Environment

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

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

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

Activities on public land in the vicinity of the CCMDP 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 2009a). In addition, Garfield County is experiencing the fastest oil and gas development in Colorado with 3,000 drilling permits currently approved (COGCC 2009a). While the number of workers employed in the mining and extraction industry in Garfield County has been shown to be only 1.7% , this number is considered misleading because some oil and gas employment has been incorporated as part of the construction sector statistics instead (BLM 2006). For example, in the year 2005, an estimated 4000 persons were directly employed by gas development companies and their subcontractors in Garfield County (Garfield County 2007).

The Federal government makes “Payments in Lieu of Taxes” (PILT) to County governments to help offset property tax revenue lost of nontaxable Federal lands within County boundaries (BLM 2006). Payments are based on Federal acreage in the County for all land management agencies, including BLM, USFS, USFWS, and the 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 (USDI 2008).

In addition to PILT payments, BLM shares revenue generated by commercial activities on public lands with State and County governments (BLM 2006). Federal mineral royalties are levied on oil and gas production from Federal mineral leases. Oil and gas lessees pay royalties equal to 12.5% of the wellhead value of oil and gas produced from public land. Half the royalty receipts are distributed to Colorado, and the amount distributed to Garfield County in 2002 attributable to oil and gas production was \$14.1 million. In 2001, the amount was \$5.5 million (BLM 2006). These funds are then allocated to fund County services, schools, and local communities.

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

The NEPA process requires a review of the environmental justice issues as established by Executive Order 12898 (February 11, 1994). The order established that each Federal agency identify any “disproportionately high and adverse human health or environment effects of its programs, policies, and activities on minority and low-income populations.” The Latino community is the only minority population of note in the vicinity of the CCMDP 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 negative social impacts including (1) a 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*

Under the No Action alternative, the permits for the 39 Federal wells would be denied and the proposed reconstruction of the 0.3 mile of road across the National Forest in Section 20 would be denied effectively curtailing the construction or drilling of Fee wells on the 19H, 19I, and 20F well pads. The construction of the two well pads (17L and 17M) on private surface and drilling of the 16 Fee wells on those pads would continue under COGCC authority. Therefore, the potential impact to the economy would be reduced from 79 producing wells in the Proposed Action to 16 producing Fee wells. The negative social impacts, including 1) increased dust levels, and 2) increased traffic, and (3) reduced scenic quality would be greatly reduced under this alternative.

## **3.2.10 Soils**

### Affected Environment

The area is located on generally north-facing slopes between 7000 and 9600 feet elevation, with gradients ranging from less than 1% to greater than 90%.

The proposed project is covered by two soil surveys: the northern portion by the *Soil Survey of Rifle Area, Colorado* (USDA 1985), and the southern portion by the *Soil and Ecological Land Unit Survey, Holy Cross Area, Colorado* (USDA 1995a). Unfortunately, the soil types in these two surveys do not align with each other with regard to name, spatial extent, or physical description. For example, the Rifle Area Survey describes overall erosion hazard for each soil type, while the Holy Cross Area Survey describes mass movement potential, cut-and-fill slope stability, and revegetation limitations. According to these two surveys, the CCMDP area contains the following soil types, all of which are well drained:

#### *Rifle Area Survey*

- Proposed pads 17L and 17M and the northern portion of the access road would be located on the Morvall-Tridell complex, 6 to 25% slopes. These soils are found on alluvial fans and the sides of mesas between 6,500 and 8,000 feet in elevation. The surface layer is typically loam or stony loam up to 10 inches thick. The upper part of the subsoil is clay loam to very stony loam about 12 inches thick, while the lower part is stony clay loam to very stony loam up to 60 inches thick. Permeability is moderate to moderately rapid, surface runoff is medium, and the erosion hazard is moderate. These soils are used primarily for grazing and recreation.
- The rest of the northern portion of the CCMDP area, including the existing 17F pad, would be situated on Bucklon-Inchau loams, 25 to 50% slopes. These soils are found on ridges and

mountainsides from 7,000 to 9,500 feet. The surface layer is typically loam 3 to 5 inches thick; the upper subsoil, where present, is brown clay loam about 15 inches thick. Permeability is slow to moderate, surface runoff is medium, and erosion hazard is severe. These soils are used mainly for wildlife habitat and limited grazing.

#### *Holy Cross Area Survey*

- The three southern pads and the southern portion of the access road would be located on the Fughes-Godding complex, 5 to 40% slopes. These soils are found on slumps and landslides between 7,000 and 9,000 feet. The surface layer is silt loam to cobbly silty clay up to 45 inches thick. The upper subsoil is clay to very cobbly silty clay loam up to 60 inches thick. Permeability is slow, surface runoff is moderate, mass movement potential is low, cut and fill slope stability hazard is slight to moderate, and revegetation limitations are slight. These soils are used for livestock grazing, wildlife habitat, recreation, and watershed management.
- A portion of the access road to the 19I pad would be located on the Wetopa-Doughspon-Echemoor complex, 5 to 40% slopes. These soils are found on mountain slopes in landslide areas between 8000 and 10,000 feet. The surface layer is silty clay loam to cobbly silt loam up to 45 inches thick. The upper subsoil is clay loam to very cobbly silty clay loam up to 28 inches thick. Permeability is slow to moderately slow, surface runoff is moderate, mass movement potential is low, cut and fill slope stability hazard is moderate, and revegetation limitations are slight. These soils are used for timber harvest, livestock grazing, recreation, wildlife habitat, and watershed management.
- The Herm-Kolob complex, 40 to 65% slopes, is found on collapsed basalt plateaus and landslides between 7,000 and 9,000 feet. The surface layer is silty clay loam to stony silt loam up to 20 inches thick. The upper subsoil is clay to very cobbly clay loam up to 38 inches thick. Permeability is moderately slow, surface runoff is rapid, mass movement potential is moderate, cut and fill slope stability hazard is severe, and revegetation limitations are moderate. These soils are used for livestock grazing, recreation, wildlife habitat, and watershed management.
- The Ustochrepts-Rock outcrop-Subwell complex, 50 to 150% slopes, is found on steep mountain slopes between 7,000 and 8,500 feet. The surface layer is sandy to boulder loam up to 18 inches thick. The upper subsoil, where present, is gravelly sandy loam to very cobbly loam up to 22 inches thick. Permeability is moderate to moderately rapid, surface runoff is moderate to rapid, mass movement potential is low to high, cut and fill slope stability hazard is moderate, and revegetation limitations are moderate to severe. These soils are used for wildlife habitat and watershed management.
- The Tampico-Echemoor complex, 30 to 65% slopes, is found on mountain slopes in landslide areas between 9,000 and 10,500 feet. The surface layer is clay loam to silt loam up to 38 inches thick. The subsoil is sandy clay loam up to 34 inches thick. Permeability is moderately slow to moderate, surface runoff is rapid, mass movement potential is moderate, cut and fill slope stability hazard is moderate, and revegetation limitations are moderate. These soils are used for livestock grazing, recreation, wildlife habitat, and watershed management.
- The Subwell-Duffymont complex, 40 to 65% slopes, is found on steep mountain slopes between 7,000 and 9,500 feet. The surface layer is very gravelly very fine sandy loam to bouldery loam up to 18 inches thick. The upper subsoil is very cobbly loam to extremely channery loam up to 22 inches thick. Permeability is moderate to moderately rapid, surface runoff is moderate to rapid, mass movement potential is low, cut and fill slope stability hazard is slight to moderate, and revegetation limitations are moderate to severe. These soils are used for livestock grazing, recreation, wildlife habitat, and watershed management.

- Leighcan soils, 5 to 40% slopes, are found on glacial moraines between 9,000 and 11,600 feet. The surface layer is very cobbly silt loam to very cobbly loamy coarse sand up to 20 inches thick. The upper subsoil is extremely stony sandy loam up to 24 inches thick. Permeability is moderately rapid, surface runoff is slow, mass movement potential is low, cut and fill slope stability hazard is slight, and revegetation limitations are moderate. These soils are used for timber harvest, limited livestock grazing, recreation, wildlife habitat, and watershed management.
- The Gateview-Handran-Duffymont complex, 0 to 25% slopes, is found on mesas and benches between 7,500 and 8,500 feet. The surface layer is very gravelly very fine sandy loam to very gravelly loam up to 19 inches thick. The upper subsoil is very gravelly sandy loam to extremely channery loam up to 29 inches thick. Permeability is moderate to moderately rapid, surface runoff is moderate to rapid, mass movement potential is low, cut and fill slope stability hazard is slight, and revegetation limitations are slight. These soils are used for livestock grazing, recreation, wildlife habitat, and watershed management.
- Within and adjacent to stream channels there may also be perennially saturated histosols that are definitive indicators of wetlands and springs.

### Environmental Consequences

#### *Proposed Action*

The Proposed Action would result in the short-term loss of approximately 57.2 acres of vegetation, including 3.2 acres on Forest Service land. Of this, approximately 23.4 acres would not be reclaimed during the life of the wells. In general, the portion of the CCMDP area that would be affected by the Proposed Action contains adequate vegetation buffers and moderate (8 to 30%) slopes that would minimize the potential for sediment transport. However, construction activities would cause slight to moderate increases in local soil loss, loss of soil productivity, and sediment available for transport to surface waters. Potential for such soil loss and transport would increase as a function of slope, feature (pad, road, or pipeline route) to be constructed, and proximity to streams.

With the exception of the existing 17F pad, which is located on soil with severe erosion hazard, all proposed pads, roads, and pipelines would be located on soils with slight to moderate risk of erosion or slope instability. However, some slopes in areas with seasonally saturated soils would be steepened beyond 30% (e.g., adjacent to the 17L and 17M pads prior to interim reclamation); additionally, construction of the 17L pad could divert some runoff into Cache Creek, which contains a population of threatened greenback cutthroat trout. Thus, particular care should be taken at these locations to ensure that proper BMPs, including the COAs listed in Appendices B and C, are utilized to prevent erosion and slope instability due to construction activities.

#### *No Action Alternative*

Under the No Action alternative, the only project components that would occur would be construction of the 17L and 17M pads and the drilling of 16 Fee wells on these pads. Therefore, the risk of soil impacts resulting from the Proposed Action would be reduced by at least half.

### **3.2.11 Vegetation**

#### Affected Environment

The predominant vegetation of the project area is typical of the eco-region identified as the southern Rocky Mountain Steppe—open woodland, coniferous forest, and alpine meadow province of the dry

domain (Bailey 1995). Soils within the project area are predominantly aridisols common to foothill and lower montane elevations.

Vegetation of the 1,820-acre CCMDP project area is comprised of spruce-fir forests, aspen forests, Gambel's oak shrublands, sagebrush shrublands, mixed grasslands, riparian, and wetland habitats. Approximately two-thirds of the project area supports Gambel's oak shrublands, concentrated on the lower elevations and on west-facing slopes, and the other third is comprised of aspen forests on the higher elevations north and east facing slopes. There are riparian and wetland habitats concentrated along Cottonwood and Cache Creeks as well as along most of the unnamed intermittent streams that are tributary to these two creeks. Mixed grassland habitats occur in scattered locations along main access roads.

Spruce-Fir Forests. Aerial photography reveals the presence of Spruce-Fir (*Picea engelmannii*-*Abies bifolia*) forests in the far southeast corner of the project area at the highest elevations. Although spruce-fir forests were not visited within the project area, field reconnaissance 1,500 meters (4,920 feet) to the southwest indicate that these forests likely support a sparse understory comprised of elk sedge (*Carex geyeri*), whortleberry (*Vaccinium myrtillus* ssp. *oreophilum*), Wolf currant (*Ribes wolfii*), heartleaf arnica (*Arnica cordifolia*), Rydberg violet (*Viola rydbergii*), and lanceleaf bluebells (*Mertensia ciliata*).

Aspen Forests. Forests of quaking aspen (*Populus tremuloides*) occur primarily occur in the southern and higher elevation portions of the project area on north- and east-facing slopes. In general, the aspen trees are 12 to 18 inches in diameter with an understory shrub layer dominated by roundleaf snowberry (*Symphoricarpos rotundifolia*), Saskatoon serviceberry (*Amelanchier alnifolia*), or mountain maple (*Acer glabrum*) and with a lush growth of forbs such as butterweed groundsel (*Senecio serra*), western coneflower (*Rudbeckia occidentalis*), sweet cicely (*Osmorhiza occidentalis*, *O. chilensis*, *O. depauperata*), American vetch (*Vicia americana*), Richardson geranium (*Geranium richardsonii*), Fendler meadowrue (*Thalictrum fendleri*), and western larkspur (*Delphinium occidentale*). Graminoid species are less frequent but do include fringed brome (*Bromopsis canadensis*), blue wildrye (*Elymus glaucus*), and Canada bluegrass (*Poa compressa*). A few subalpine firs are found at the highest elevation aspen forests on the project site. Proposed pads 19H and 19I and their access roads are located within aspen forests. In addition, portions of pads 17F and 20F have small stands of aspen located within them.

Gambel's Oak Shrublands. Gambel's oak (*Quercus gambelii*) shrublands predominate in the lower elevations of the project area and on west facing slopes and ridge tops. Portions of these shrublands have been burned. Serviceberry and snowberry shrubs are often found intermixed with the Gambel's oak; however, chokecherry (*Padus virginiana* ssp. *melanocarpa*) and mountain mahogany (*Cercocarpus montanus*) are also commonly found. In the understory, elk sedge is the most common herbaceous plant. Other grasses and forbs include Canada bluegrass, sticky false -starwort (*Pseudostellaria jamesiana*), Nuttall's larkspur (*Delphinium nuttallianum*), lambstongue groundsel (*Senecio integerrimus*), and northern bedstraw (*Galium septentrionale*). Proposed pads 17L and 17M and most of their access roads are dominated by Gambel's oak shrublands. Portions of pads 17F and 20F also support Gambel's oak.

Sagebrush Shrublands. Scattered small openings of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) shrublands occur intermixed in the Gambel's oak shrublands. The sagebrush is less than 2 feet tall and has a fairly open canopy structure and is intermixed with snowberry. Numerous forbs are present including Long's phlox (*Phlox longifolia*), Indian paintbrush (*Castilleja chromosa*), death camas (*Anticlea elegans*), stemless goldenweed (*Stenotus acaulis*), scarlet gilia (*Ipomopsis aggregata*), running fleabane (*Erigeron flagellaris*), looseflower milkvetch (*Astragalus tenellus*), and twinpod (*Physaria floribunda*). In addition, some of these areas support Harrington's penstemon (*Penstemon harringtonii*), which is listed as a sensitive species by BLM and the WRNF.

Mixed Grasslands. Mixed grasslands occur where oak shrubs or other shrub species have been removed to increase forage production for cattle. Pasture grasses are common in these areas including smooth brome (*Bromopsis inermis*), common timothy (*Phleum pratense*), and orchardgrass (*Dactylis glomerata*). The forbs yarrow (*Achillea lanulosa*), strawberry (*Fragaria virginiana*), and common dandelion (*Taraxacum officinale*) are also present. Weeds are also common in these areas, including the following State listed noxious weeds: musk thistle (*Carduus nutans* ssp. *macrolepis*), Canada thistle (*Cirsium arvense*), and houndstongue (*Cynoglossum officinale*).

Riparian and Wetland Habitats. Riparian habitats along Cottonwood Creek and Cache Creek are variable depending on the surrounding plant community. In the southern portion of the project area, the riparian areas occur through aspen forest and support a thick growth of shrubs such as redtwig dogwood (*Swida sericea*), thinleaf alder (*Alnus incana* spp. *tenuifolia*), serviceberry, chokecherry, river hawthorn (*Crataegus rivularis*), Woods' rose (*Rosa woodsii*), and whitestem gooseberry (*Ribes inerme*). Herbaceous plants include western coneflower, baneberry (*Actaea rubra*), stinging nettle (*Urtica dioica*), monkshood (*Aconitum columbianum*), and false hellebore (*Veratrum tenuipetalum*). In the northern portions of the project area, the riparian habitats are composed mainly of Gambel's oak with a few willows (*Salix* spp.), along with Baltic rush (*Juncus arcticus* ssp. *ater*) and smallwing sedge (*Carex microptera*) and various upland forbs and graminoids.

Wetland areas are commonly found in a narrow band along the streams and are commonly comprised of American and water speedwell (*Veronica americana*, *V. anagallis-aquatica*), shore buttercup (*Halerpestes cymbalaria*), fowl mannagrass (*Glyceria striata*), smallwing sedge (*Carex microptera*), and false hellebore (*Veratrum tenuipetalum*). At higher elevations, chiming bells (*Mertensia ciliata*), twisted stalk (*Streptopus fassettii*), monkshood (*Aconitum columbianum*), heartleaf bittercress (*Cardamine cordifolia*), yellow monkeyflower (*Mimulus guttatus*), field horsetail (*Equisetum arvense*), brook saxifrage (*Micranthes odontoloma*), and northern willowherb (*Epilobium ciliatum*) are found.

### Environmental Consequences

#### *Proposed Action:*

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

The Proposed Action would result in the short-term loss of approximately 57.2 acres of vegetation, or 3.2 acres of NFS lands. Of the 57.2 acres of physical disturbance, approximately 23.4 acres would not be reclaimed during the life of the wells. With implementation of standard conditions of approval, desirable forbs and grasses on the unused portions of the pads, roads, and pipelines could be established within 2 to 3 years. However, because of periodic workovers and the potential for additional wellbores in the future, it is likely that vegetation would remain in an early seral stage for the life of the wells.

Oakbrush/mixed montane shrublands should regenerate in 15 to 20 years. Aspen/spruce-fir forest would regenerate over time, but this process could take many decades, depending on the growth and persistence of seeded species and the intensity of grazing by livestock or wildlife. This would result in an increase in the proportion of herbaceous (i.e., non-woody) species in the areas of disturbance. The success or failure of revegetation would affect other resources including soils, surface water quality, wildlife, visual resources, and livestock grazing.

### *No Action Alternative*

Under the No Action alternative, two Fee well pads and associated roads and pipelines on Fee lands would still be constructed; however, none of the proposed ground disturbance on NFS lands would occur. Impacts to vegetation on NFS lands would not occur under the No Action alternative. Impacts to vegetation on private lands would be less than under the Proposed Action.

### **3.2.12 Visual Resources**

#### Affected Environment

Landscape character of the project area is best described as the north-facing mountain ridges of Battlement Mesa featuring various perennial and ephemeral streams flowing into the Colorado River. The dominant vegetation type throughout the proposed project is primarily mountain shrub communities below the National Forest boundary and aspen-mountain brush-conifer mix above the Forest boundary. The natural landscape has been historically altered by construction of a private road across the National Forest parcel that serves the Savage Ranch property. The Savage Ranch holds an easement on the existing road segment over the National Forest land. Garfield CR301 provides an historical access link to the private road at the lower end of the Cache Creek ranchlands. The towers of an electric transmission line are visible from the lower Cache Creek watershed in the middle ground north of the project boundary. Recent construction of private well pad access roads and associated pipelines east and north of the project area are also visible in the background from the Colorado River valley floor and as middle ground view from the nearby County Road system.

The CCMDP area is primarily located on private lands (some with underlying Fee minerals and other with underlying Federal minerals) with the exception of a 0.3 mile segment of National Forest land to be crossed with a reconstructed oil and gas development road and a new gas pipeline to serve three new well pads located on a private land parcel within the Forest boundary. There are three distinct landscape management scenarios related to the Proposed Action depending on where the project feature is located.

For the proposed reconstructed road, new pipeline and new pads (19H, 19I, and 20F) to be located on Savage property, there are no landscape constraints as visual resource management objectives do not apply to non-Federal land, although visual values can be protected by landowner discretion. Siting of pads, access roads, and pipelines underwent landowner consultation during the project's field review process and landowner concerns were directly incorporated into the overall project design.

For the 17L pad, 17M pad and the portion of the reconstructed access road located on Federal lease COC-66921, visual concerns may be addressed on split estate where Federal minerals occur, although the lease fails to identify any visual resource stipulations (see Table 3). The Federal lease falls within Class IV Visual Resource Management (VRM) Classification (BLM 1984). The objective of Class IV is to provide for management activities that require major modifications of the existing character of the landscape. Under Class IV, the level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, repeating the basic elements, and best management practices. The protection of VRM classes, landscape character, and scenic quality on private and public lands and split estate is discussed in the FSEIS (BLM 1999a:3-41 to 3-45). The impacts of development are also described (BLM 1999a:4-49-54). The Proposed Action would not directly impact any of the key viewing areas or viewsheds described in the FSEIS, although the CCMDP area lies within background viewing area of the I-70 corridor. Portions of the new access road would be seen from I-70.

The 0.3-mile segment of National Forest land impacted by the Proposed Action is designated as Management Area (MA) 5.43-Elk Habitat (USFS 2002). Scenery in MA 5.43 is managed to provide a range of scenic integrity objectives from Low to Moderate. For the parcel on NFS lands, the scenic integrity objective is Low, which would allow the valued landscape character to be “moderately altered.” The Low objective indicates that deviations from the natural landscape character would “begin to dominate the visual landscape.” In contrast, a Very Low scenic integrity objective would mean the landscape character would appear to be “heavily altered” (USDA 1975, 1995b).

### Environmental Consequences

#### *Proposed Action*

To the extent possible, the proposed pad layouts have been designed to minimize visual impacts by locating the pads in aspen or mountain brush sites that are not readily visible within the viewshed. In the case of the reconstructed access road and the new pipeline across the NFS lands, the road was designed to minimize visual impacts while providing a usable and safe road alignment. The proposed pipeline would be buried within the existing jeep road disturbance or along the new road alignment where that disturbance would be fully reclaimed to help establish desirable vegetation and blend the disturbance with the surrounding mountain brush landscape.

An engineered road design package for the reconstructed access road was prepared to minimize cut and fill heights and to focus on using the existing jeep road alignment to blend the road improvements into the landscape. Furthermore, the split-level plan for pad 17M provides a site location that can be used to conduct well fracturing to all planned pads from this location while minimizing the overall landscape impact by reducing the pad size for the other pads.

Construction of up to five well pads and access roads with collocated gathering pipelines on private land would alter the landscape by removing vegetation, exposing bare ground, and creating a distinct line within the landscape. The alteration would be most noticeable in the short term (about 3 to 5 years) until interim reclamation was in place and had reduced the contrast between the areas of disturbance and the surrounding vegetation. In the long term (30 years), the well pads would remain visible in the direct foreground from several points along the private Savage Ranch access road, because that road would pass near the well pads.

Some portions of the reconstructed Savage Ranch road as well as proposed pads 17L and 17M on split-estate land would produce the greatest visual contrasts to color, line, form, and texture from CR301 in the middle ground view and I-70 in the background view. The visual impact of pads 19H, 19I, and 20F would be obscured due to their location up Cache Creek and outside the direct view from any County Roads. Interim reclamation of the well pad as well as seeding of the cut of fill slopes along the access road with shrub and grass species would reduce some of the contrast, but would need two or three growing seasons to become established.

Overall, the project alterations diminish against the scale of the Cache Creek landscape and would be compatible with the Low scenic integrity level, which permits the natural landscape to be moderately altered and even to begin to dominate the visual landscape. Visual impacts would be diminished to the extent that reclamation was timely and successful. Additional reductions in contrast would be realized by painting production facilities the non-reflective natural color (Shadow Gray) and implementing BMPs such as roughening the slope, undulating the edge of the cut and fill slopes and maintaining upright woody vegetation along the toe of the fill slopes, where possible. With these mitigation measures, long-term visual impacts would be reduced, and the Proposed Action would meet BLM’s VRM Class IV

objectives on the split-estate land and USFS scenic quality objectives for the 0.3-mile road/pipeline corridor on NFS lands. Visual resource COAs are listed in Appendices B and C.

#### *No Action Alternative*

The No Action alternative would result in the construction of the 17L and 17M pads on split-estate land and the drilling of 16 Fee wells. The reconstruction of the existing private road and construction of two pads with associated well drilling, completion and production activities would alter the scenic qualities and landscape characteristics on private lands below the National Forest boundary. Visual impacts to NFS lands would remain unchanged or negligible.

### **3.2.13 Wildlife, Aquatic**

#### Affected Environment

Aquatic habitats within the CCMDP area consist of one perennial stream (Cache Creek) along the eastern edge and one intermittent stream (Cottonwood Creek) along the western edge. Both streams are tributaries of the Colorado River. In the center of the project area, the creeks lie within approximately 0.25 mile of each other, although separated by a ridge that represents the upper end of a broad fan-shaped feature known as Holms Mesa. As the streams continue to the north (downslope), they diverge and are separated by nearly 3 miles where they enter the Colorado River.

In terms of aquatic life, both streams are limited primarily by low flows, with Cottonwood Creek having the additional constraint of being intermittent and thus carrying no flow in some reaches during most years. The streams are sourced both directly and indirectly from snowpack at higher elevations on the flanks of Battlement Mesa. Much of the recharge from snowpack enters the streams as groundwater inflow from the thick colluvium and shallow bedrock, as well as via surface inflow in tributary channels. Substrates vary longitudinally along both streams and include reaches dominated by cobbles, finer sediments, and plant detritus.

Fish surveys by CDOW and USFS have documented the presence of greenback cutthroat trout—a Federally listed threatened species—in upper reaches of Cache Creek. This species is addressed in detail in the section on Special Status Species. Another trout species, the non-native brook trout (*Salvelinus fontinalis*), occupies lower reaches of Cache Creek. No trout were found in Cottonwood Creek, consistent with its intermittent flow regime. Although Cottonwood Creek flowed throughout 2008, occasional years of persistent flow are generally not sufficient to support colonization by fishes.

The greenback cutthroat trout is a non-native subspecies historically restricted to the Platte River drainage and possibly introduced into a few Western Slope streams, while the brook trout has been widely introduced throughout Colorado. Brook trout (actually a species of char) are native in streams that drain to the Atlantic Ocean and are well adapted to very low flows as well as to warmer temperatures than the native cutthroat subspecies.

Within Cache Creek, brooks and greenbacks feed primarily on invertebrate prey either living within the stream (autochthonous) or entering the stream from adjacent riparian and upland habitats (allochthonous). Aquatic macroinvertebrates living in streams such as Cache Creek and Cottonwood Creek during portions of their lifecycles include larvae of stoneflies, mayflies, and caddisflies in fast-flowing reaches with rocky or detrital substrates and larvae of flies, midges, and mosquitoes and possibly other insects in slow-flowing reaches with fine substrates. Both aquatic larvae and winged adults of stoneflies, mayflies, and caddisflies are probably the main prey for trout, along with terrestrial invertebrates that land or fall onto the surface or are carried into the stream in runoff from adjacent uplands.

## Environmental Consequences

### *Proposed Action*

As described at length in relation to the greenback cutthroat trout in the section on Special Status Species, the Proposed Action has been designed to prevent or minimize the potential into either Cache Creek or Cottonwood Creek of sediment or chemical pollutants from areas of surface disturbance or oil and gas activities. Appendices B and C also include COAs for the protection of these surface water resources. For the reasons that BLM and WRNF concluded that the trout would not be adversely affected by the project, the same conclusion applies to fish and aquatic invertebrates.

### *No Action Alternative*

Because the No Action alternative would not involve the three pads on Fee lands or the road and pipeline corridor on NFS lands, the potential for impacts to Cache Creek and Cottonwood Creek and their associated aquatic biota would be reduced. However, the components of the Proposed Action with the greater potential for impacts to the aquatic habitats—specifically Cache Creek—are the pads, wells, roads, and pipelines on the split-estate lands. These would be built and operated under the No Action alternative, although with fewer total wells, to develop the private mineral estate.

## **3.2.14 Wildlife, Terrestrial**

### Affected Environment

Use by terrestrial vertebrates of the CCMDP area is mostly limited to species associated with the dense oak-serviceberry habitat (including chokecherry and mountain maple) that dominates the area, with the presence of small areas of conifers, aspen, and riparian vegetation adding marginally to the overall use. Although characterized by relatively low structural and compositional diversity, oak-serviceberry is nonetheless one of the richest habitats in Colorado due to the dense cover, height sufficient to attract some arboreal species, production of abundant fruit and mast (acorns), and associated insect prey.

Prevalent terrestrial vertebrate species in the CCMPD area include the Neotropical migrant birds discussed previously in the section on Migratory Birds, a variety of resident or winter songbirds, small mammals, and carnivores, as well as two big-game ungulates.

### Mammals

Small mammals associated with habitats that dominate the CCMDP area include the rock squirrel (*Spermophilus variegatus*), golden-mantled ground squirrel (*S. lateralis*), least chipmunk (*Tamias minimus*), and Hopi chipmunk (*T. rufus*) in addition to the mountain cottontail (*Sylvilagus nuttallii*) and a variety of native mice. Scattered areas of Douglas-fir may also support small numbers of the red squirrel (*Sciurus hudsonicus*), although the site is near the lower elevational limit of their range.

Small carnivores potentially present in the area include the long-tailed weasel (*Mustela frenata*), western spotted skunk (*Spilogale gracilis*), and ringtail (*Bassariscus astutus*) in addition to the nearly ubiquitous striped skunk (*Mephitis mephitis*) and raccoon (*Procyon lotor*). These species are most likely to occur along the drainages, in areas with conifers, or along the margins of dense oakbrush instead of within the homogeneous shrublands. Larger carnivores expected to occur include the bobcat (*Lynx rufus*) in areas of dense cover and the coyote (*Canis latrans*) along edges and openings. Also present in the project area or vicinity are the black bear (*Ursus americanus*) and mountain lion (*Felis concolor*).

Black bears are attracted to stands of oak, serviceberry, and chokecherry to feed on the acorns and fruit, particularly during fall when putting on fat for the coming winter. Consequently, CDOW has mapped a black bear fall concentration area covering approximately 25 square miles in the oakbrush habitats on north-facing slopes south of I-70 in the Rulison area, including the CCMDP area. Mountain lions are found throughout the region in areas with dense cover and that support populations of deer and elk.

The mule deer (*Odocoileus hemionus*) and Rocky Mountain elk (*Cervus elaphus nelsonii*) are two recreationally important species that are common throughout suitable habitats in the region. CDOW has mapped the CCMDP area as including summer range for deer, although some animals also use the area in winter, particularly during mild winters. In general, however, the area is not suitable for mule deer winter use due to its elevation and north-facing aspect. Additionally, the extreme dominance by dense oak-serviceberry does not provide the type of browse or forage preferred by deer during winter month. The Rocky Mountain elk is classified by the WRNF as a Management Indicator Species, addressed below.

Management Indicator Species. Two terrestrial vertebrate species—the Virginia’s warbler (see section on Migratory Birds) and Rocky Mountain elk (*Cervus elaphus nelsonii*)—are classified as Management Indicator Species in the WRNF. Elk are generalist herbivores, consuming both herbaceous plants (grazing) and the tissue of woody plants (browsing). In the northern and central Rocky Mountains, grasses and shrubs compose most of their winter diet, with grasses becoming of primary importance in spring and again in fall. Forbs become increasingly important during summer, when the cool-season grasses that dominate in elk habitat grow less actively (Fitzgerald et al. 1994). Elk breed in the fall, with the peak of the rut occurring during the late September and early October (Fitzgerald et al. 1994). Most calves are born in late May or early June following a 240- to 255-day gestation period. Calving grounds are generally in areas where abundant forage, cover, and water occur in juxtaposition. In western Colorado, most females calve within 650 feet of water (Fitzgerald et al. 1994). Elk tend to inhabit higher elevations during spring and summer and migrate to lower elevations for winter range. Snow depths of about 6 inches may trigger elk movement to winter ranges (Fitzgerald et al. 1994).

While they overlap broadly with the mule deer in terms of habitat and food requirements, elk are able to use areas of deeper and more persistent snow cover and colder temperatures than deer owing to their larger bodies (which retain heat better) and longer legs (which allow easier movement through snow). Therefore, while the CCMDP area is generally not suitable winter habitat for deer, it is mapped at the upper edge of winter range along the Colorado River Valley. Overall, however, the CCMDP area is best characterized as seasonally transitional habitat used by elk as they move between winter and summer habitats. Seasonally transitional habitats are often important for elk production (calving), and CDOW has mapped the CCMDP area as supporting this type of use.

Resource map layers maintained in a Geographic Information System (GIS) database by the GSFO and WRNF reflect CDOW’s mapping of elk production habitat. The portion of the CCMDP on NFS lands lies within the 5.43 Elk Habitat Management Area, which supports elk calving and is managed for elk. The Forest Plan (USFS 2002) includes the following statements: “Low road densities and optimum forage and cover ratios characterize these areas” (p. 3-61). “Elk have been found to use this particular area of the forest for both calving and winter range; therefore, human activities may be restricted during these seasonal periods to minimize disturbance to elk” (p. 3-62). Statewide, the elk population trend was generally upward from 1997 to 2004 (26% overall increase), but decreased by 6% from 2004 to 2005. For the planning area, the population trend is relatively stable.

### Birds

Perching birds commonly associated with oak-serviceberry include migratory nesters such as the dusky flycatcher, American robin (*Turdus migratorius*), blue-gray gnatcatcher (*Polioptila caerulea*), Virginia’s

warbler, MacGillivray's warbler, lazuli bunting, lesser goldfinch, black-headed grosbeak, and spotted towhee) as well as year-round residents such as the black-billed magpie (*Pica hudsonia*), western scrub-jay (*Aphelocoma californica*), and both the black-capped chickadee (*Poecile atricapillus*) and mountain chickadee (*P. gambeli*). Areas of trees support resident woodpeckers such as the northern flicker (*Colaptes auratus*) and the hairy and downy woodpeckers (*Picoides villosus*, *P. pubescens*) as well as a variety of Neotropical migrant species that nest in abandoned woodpecker holes or in the tree canopies (see section on Migratory Birds).

Birds of prey may nest in conifers and aspen, or very tall oaks associated with the CCMDP area, although no raptor nests were found during project-specific surveys. The raptor most likely to occur in the area is a nocturnal species, the great horned owl (*Bubo virginiana*). Two woodland hawks, the Cooper's (*Accipiter cooperii*) and sharp-shinned (*A. striatus*), may also fly through the area in search of small birds or small mammals and could nest in the scattered areas of conifers and aspen. Red-tailed hawks (*Buteo jamaicensis*) are common in the region but generally are not associated with areas of dense and tall woody vegetation except for nesting in trees, such as Douglas-fir or aspen protruding above the shrubs.

One gallinaceous species, the wild turkey (*Meleagris gallopavo*), is also common in mountain shrub habitats, where the acorns, berries, and invertebrate prey in the dense leaf litter provide abundant food. CDOW has mapped the northern (downslope) portion of the CCMDP area as wild turkey winter habitat and the ridge that separates Cache Creek from Cottonwood Creek (including the split-estate, NFS, and Fee land) as a wild turkey production area. Another upland gamebird, the blue grouse (*Dendragapus obscurus*), is potentially present in aspen and conifer habitats in the southernmost portion of the CCMDP area. However, this species typically occurs in higher elevation montane or subalpine forests, and use of the project area would probably be limited to a few individuals during severe winters.

### Reptiles and Amphibians

The CCMDP area is above the elevational range of most reptile species known to occur in Garfield County. Species most likely to occur include the western fence lizard (*Sceloporus undulatus*) and gopher snake (bullsnake) (*Pituophis catenifer*) in upland shrubland or grassy clearings and the western terrestrial garter snake (*Thamnophis elegans*) along the creeks. Other reptiles potentially present along the creeks, although more commonly found at lower elevations than the site, are the milk snake (*Lampropeltis triangulum*) and smooth green snake (*Opheodrys vernalis*).

No amphibians are known or expected to occur onsite based on habitat conditions along the two drainages and the results of site surveys.

### Environmental Consequences

#### *Proposed Action*

Removal of dense oak-serviceberry habitat and a minor amount of aspen and conifers, implementation of the CCMDP as proposed would reduce somewhat the availability of breeding and feeding habitat by the songbird and small mammal species listed above. This also would reduce the amount of cover and prey for avian and mammalian predators. However, the total direct habitat loss—34.2 acres, of which 3.2 acres would be on NFS lands—is a minor portion of a very extensive habitat type throughout the CCMDP area and vicinity. Additional, indirect habitat loss would result from avoidance or reduced use of areas surrounding construction or drilling/completion activities and along the road during these periods, this impact would be lessened by the location of project components along and existing roadway. Although the existing use of the road is light, it represents some amount of disturbance and access by humans into the habitat and has created a habitat edge on both sides throughout its length.

Another factor contributing to lessen the impact from habitat loss and oil and gas activities is the relatively minor loss of trees (conifers and aspen) and riparian species, which add disproportionately to the total richness of the CCMDP area by supporting a variety of species not associated with dense oakbrush. Therefore, while both actual and effective habitat loss along the ridge that separates the Cache Creek and Cottonwood Creek drainages would result in reduced numbers of several species, these reductions would represent a minor part of the total CCMPD area, which in turn is a small part of an extensive area of the same or similar habitat along the flanks of Battlement Mesa.

Management Indicator Species. The elk mapped winter range on split-estate and NFS lands in the CCMDP area would be protected by a 5-month TL from December 1 through April 30 (Appendices B and C). This TL, attached to portions of Federal lease COC66291, applies to the area where pads 17L and 17M and associated infrastructure. The same TL period would be applied to the road and pipeline corridors across NFS lands as a discretionary action associated with issuance by the WRNF of a Road Use Permit and Special Use Permit. Applying this TL to the NFS lands would result in a *de-facto* winter TL for oil and gas activities on the Fee lands accessed across NFS lands.

Another TL attached to portions of Federal lease COC66291 precludes construction, drilling, or completion activities in mapped elk calving habitat during the elk calving season of April 16 to June 30. This TL does not include the areas where the two split-estate pads or ancillary infrastructure are proposed. However, CDOW's habitat mapping (available online at <http://ndis.nrel.colostate.edu/wildlife/asp>) shows the extreme northern (downslope) end of large area of calving habitat (5 to 6 square miles) barely extending into the CCMDP area, including the NFS lands and the Fee lands surrounded by NFS lands. This area of calving habitat is one of several large habitat areas mapped by CDOW as extending along the zone of seasonally transitional range on the flanks of Battlement Mesa south of the Colorado River.

As noted previously, the WRNF manages the NFS lands in the CCMDP area, and similar areas, for elk due in part to the presence of calving habitat. Therefore, the WRNF would also apply a discretionary TL to prohibit construction of the road and pipeline across NFS lands from April 16 through June 30. As with the winter TL, applying the elk calving TL to the NFS lands as a condition for issuance by the WRNF of a Road Use Permit and Special Use Permit would result in a *de-facto* elk calving TL on the Fee lands accessed across NFS lands.

For the CCMDP project, BLM and WRNF would apply the elk calving TL only to prevent initiation of construction and drilling activities during the calving season, and not continued use of infrastructures constructed outside that season. This decision would be based on the following:

- Allowing ongoing activities to continue into or through the TL period would enable Noble to complete the development of the wells on the Fee lands as quickly as possible. This is the desire of the private landowner and, more importantly from an ecological perspective, would benefit elk and other wildlife by avoiding an unnecessarily protracted development period.
- Although the 0.3 mile of additional road length and the three Fee pads are mapped as elk calving habitat, the affected area is on the extreme edge of the mapped habitat and represents a very minor portion of the total calving habitat in the vicinity.
- The road on NFS lands and the three Fee pads accessed by it are on a ridgetop that supports a dense stand of oakbrush bisected by an existing private road. Areas of surface water along Cache Creek and Cottonwood Creek adjacent to the NFS lands would not be directly affected by these project components and are well screened from the ridgetop. Areas of aspen in the project vicinity are also located primarily away from the ridgetop and well screened from it. These are important considerations because lactating cow elk and newborn calves require ample water and

generally prefer the palatable forage beneath aspen to the meager offerings beneath dense oakbrush.

The exception language of the BLM lease stipulation that applies to portions of the split-estate lands outside the affected area is as follows: “When it is determined through a site-specific environmental analysis that actions would not interfere with critical habitat function or compromise animal condition within the project vicinity, the restriction may be altered or removed.”

#### *No Action Alternative*

Because the No Action alternative would not include construction of the road across NFS lands or construction, drilling, or completion activities on the Fee pads accessed via this road, impacts on terrestrial wildlife would be reduced accordingly. This includes approximately a 50% reduction in habitat loss and a 75% reduction in oil and gas activity. Furthermore, the No Action would not include any surface disturbance or oil and gas activities within mapped elk winter range or calving habitat, essentially avoiding associated direct impacts and essentially all indirect impact (except for some potentially temporary reduction in use within a disturbance zone surrounding the two split-estate pads, 17L and 17M.

### **3.3 Summary of Cumulative Impacts**

The following cumulative impact assessment is for Noble’s Proposed Action for a 3- to 5-year program of oil and gas development on approximately 1,820 acres of National Forest, split estate, and private lands located in the CCMDP area of the Piceance Basin near Rulison, Garfield County, Colorado.

Generally, cumulative impacts are assessed for four areas of consideration, which include:

- Past, present, and reasonably foreseeable future actions in the project area that could affect the same resources as the project.
- Determine if the impacts of the project and the other actions would overlap in time and geographic extent.
- Determine if the impacts of the project would intensify the impacts of other actions.
- Identify any potentially significant cumulative impacts.

For the last 4 years, the Piceance Basin has experienced an increase in oil and gas development, particularly as a result of the passage of the Energy Bill of 2005, authorizing the opening of oil and gas leases throughout the west and creating a mechanism of energy offices to handle regulatory requirements. As a result, the increased availability of resources for domestic exploration increased, as did the level of activity throughout the western United States.

Garfield County has a history of sporadic market-driven energy cycles throughout the last 50 years. Currently, approximately 6,000 wells are in production within the County, most drilled within the last 5 years. Approximately 20% to 25% of these wells involve Federal mineral leases. It is projected that the number of wells to be drilled over the coming years would progress at a slower rate given the decline in rig activity. In Garfield County, approximately 2,900 wells were approved by COGCC in 2008, with an additional 1,247 wells approved as of August 18, 2009 (COGCC 2009b). These past, present, and anticipated future oil and gas activities are located in the project area and are considered within the allowable regulatory right of access.

Noble is proposing to drill a total of 79 gas wells on five pads within an area of 1,820 acres, designed and located with an effort to reduce visual and environmental impacts. Noble's Proposed Action is a small percentage of the projected activity within the County, particularly within the next several years.

Cumulative impacts would primarily be observed and measured as surface disturbance or the loss of vegetation. The removal of vegetation would affect soil erosion, visual resources, livestock, and wildlife habitat. The impacts to soil erosion would be primarily short-term during construction and drilling operations. Long-term erosion of a lesser magnitude would occur as a result of the construction of the new roads, drainage ditches, and well pads. Removal of vegetation for well pad and road construction would be a long-term visual impact for the life of the producing well. The loss of the vegetation for the anticipated life of a producing well (estimated at 20 years) would be a long-term impact to livestock and wildlife forage production.

The loss of forage production in small isolated locations or linear strips would not generally impact forage allocations in large grazing allotments. After wells are reclaimed, forage production can be restored or increased from forage production levels prior to disturbance. Loss of vegetation would be a reduction in wildlife habitat during 20 years of well production. Wildlife habitat would be restored after reclamation when well pads are abandoned. Reclamation would provide a habitat in a lower ecological stage that could add more diversity in wildlife habitat. In addition to the anticipated surface impacts, the drilling activities would be a short-term impact to recreation, visual resources, and to wildlife that would be temporarily displaced.

Cumulative impacts to special status species—including the Federally listed greenback cutthroat trout and the four Colorado River endangered fishes as well as a variety of BLM and USFS sensitive species—would also be minimal based on project location, habitat types present, the amount of direct and indirect habitat loss, project design elements, and mitigation measures applied as COAs (Appendix B). Although any impacts to special status species would be cumulative to impacts associated with other oil and gas developments and the overall human population growth and associated development in the GSFO area, the incremental additional impacts would be cumulatively negligible.

Cultural and paleontological resources have been surveyed and changes to pad locations have been made as a result. No impacts are expected to cultural resources.

BLM has been working with Noble on locating and screening the proposed developments from the Colorado River Valley Viewshed. BLM has also considered options for arranging surface production facilities in order to facilitate a phased reclamation. The use of painted facilities, low profile equipment, central tank batteries and offsite production facilities, could also be employed. The 17M pad is designed in a split-level configuration with the upper level to serve as a centralized frac pad for the 79 wells at the five planned pads.

Cumulative impacts of future oil field development beyond these projections cannot be accurately estimated at this time as activity is still in the exploratory phase and the level of long-term development is unknown. Actual surface disturbance would depend upon gas reserves and the number of wells drilled. Any additional wells would require separate NEPA analysis and approval. It is likely that a portion of the surface disturbance from future wells would be reclaimed with no long-term impacts to vegetation and that additional specific mitigation measures could be developed to minimize cumulative impacts as needed.

Although impacts to soils, vegetation, recreational use, and wildlife are expected, it can be assumed that the actions proposed would be short term and not contribute significantly to overall degradation of the area's environment. The area is experiencing a significant increase in mineral production on both private

and Federal lands. A variety of BMPs would be employed to reducing overall cumulative impacts significantly. Appendix B lists the COAs to be applied and enforced by BLM for activities related to private lands with an underlying Federal oil and gas lease. Appendix C lists the COAs to be applied and enforced by USFS personnel for activities on NFS lands.

Due to the relatively low number of wells, roads, pads and pipelines considered in this project, in comparison to the other area activities described previously, cumulative impacts to visual resources, air quality, biological and cultural resources, geology and soils, water resources, and wildlife, and are not considered significant.

### 3.4 Persons and Agencies Consulted

The following Federal, State, County, or Tribal entities were consulted during development of this EA:

- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- Northern Ute Tribe
- Southern Ute Tribe
- Ute Mountain Ute Tribe
- Colorado Division of Wildlife
- Garfield County Road and Bridget

Preparation of the EA also included input by the following private parties or contractors:

- Noble Energy, Inc.
- Wildlife Specialties, LLC
- URS (engineering)
- D.R. Griffin (surveying)
- Grand River Institute
- Members of the Savage Family

### 3.5 Interdisciplinary Agency Review

The initial Proposed Action was drafted by Jerry Powell of Wildlife Specialties, LLC, with review and revision by personnel from the BLM and WRNF personnel. The EA was prepared and reviewed by GSFO Interagency Energy Team (Table 17).

| <b>Table 17. BLM Interdisciplinary Authors and Reviewers</b> |                             |  |
|--|-----------------------------|--|
| Name   | Title                       | Responsibility   |
| Jim Byers  | Natural Resource Specialist | Team Leader, Access and Transportation, Range Management, Realty Authorizations, Recreation, Socio-Economics, Visual Resources |
| Beth Brenneman   | Ecologist                   | Invasive Non-native Species, Special Status Plants, Vegetation   |
| John Brogan  | Archaeologist               | Cultural Resources, Native American Religious Concerns   |
| Bridget Clayton  | Acting Supervisory NRS      | Technical and NEPA Review  |
| Karen Conrath  | Geologist                   | Geology and Minerals, Ground Water Quality, Paleontology   |
| Allen Crockett   | Supervisory NRS             | Migratory Birds, Special Status Wildlife, Aquatic and Terrestrial Wildlife   |
| Will Howell  | Petroleum Engineer          | Drilling Plan Review, Downhole COAs  |
| Noel Ludwig  | Hydrologist                 | Air Quality, Surface Water Quality, Waters of the U.S., Soils, Wetlands and Riparian Zones, Hazardous and Solid Wastes         |

Personnel with the WRNF Supervisor's Office and Rifle Ranger District provided additional review and input for actions on NFS lands (Table 18).

**Table 18. USFS Interdisciplinary Reviewers**

| Name                  | Title                      | Responsibility   |
|-----------------------|----------------------------|--|
| Dan Sokal             | USFS Liaison – GSFO        | Coordination with GSFO and WRNF personnel                |
| Skye Sieber           | NEPA Coordinator           | NEPA Technical Assistance                                |
| Donna Graham          | Forest Landscape Architect | Visual Resources and Scenery                             |
| Karla Mobley          | Engineering Technician     | Road Design Reviews, Access and Transportation           |
| Lydia LaBelle de Rios | Rangeland Mgmt Specialist  | Range Management   |
| Mark Lacy             | Forest Fisheries Biologist | Special Status Wildlife (fish), Aquatic Wildlife (BE/BA) |
| Natasha Goedert       | Wildlife Biologist         | Terrestrial Wildlife (BE/BA)                             |
| Kyle Grambley         | Recreation Specialist      | Recreation   |
| John Proctor          | Forest Botanist            | Special Status Plants (BE/BA)                            |
| Wendy Haskins         | Forest Planner             | Inventoried Roadless Areas                               |
| Rick Haskins          | Lands Forester             | Realty Authorizations                                    |

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**APPENDIX A**

**Public Comments on the Proposed Action  
and Agency Responses**

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## BLM RESPONSES TO PUBLIC COMMENTS Cache Creek Master Development Plan

The BLM Glenwood Springs Field Office received comments from State, County, and local government entities, environmental groups, and private citizens during the public scoping process for the Noble Energy Inc. Cache Creek Master Development Plan (CCMDP). The comments are presented below, along with BLM's responses.

### **COLORADO DIVISION OF WILDLIFE – LETTER FROM J.T. ROMATZKE, AREA WILDLIFE MANAGER (JUNE 8, 2009)**

**Comment 1:** *We request the opportunity to review the EA upon its completion and provide further comments as necessary.*

**Response:** The GSFO's approach for all MDPs and other EAs is to make the Proposed Action available for public review and comment to help guide the impact analysis and mitigation process to ensure that public issues and concerns are considered and, as appropriate, incorporated into the EA. This is intended to facilitate streamlining of the permitting process, consistent with one of the goals of the Energy Pilot Program.

**Comment 2:** *COA discussions are clearly needed to identify areas where impacts may be mitigated. The 1999 FSEIS clearly states that COAs are within the bounds of the BLM to apply to preexisting leases. Such common COAs as timing restrictions, remote sensing, and restriction of vehicular traffic are not mentioned within the document.*

**Response:** BLM does not include specific COAs in the Proposed Action made available for public review and comment because the project is typically not sufficiently fleshed out at that point to know precisely which COAs would be applied where. However, BLM does include site-specific COAs with the completed EA. In some situations, additional site-specific COAs are attached to individual APDs to reflect different conditions or circumstances than those incorporated into the MDP document.

For the CCMDP project, the two split-estate pads would have the 5-month winter TL associated with the underlying Federal lease COC66291. For the three Fee pads, lease stipulations and COAs do not apply because BLM does not apply these in situations where Federal wells are accessed by directional drilling from off the lease, and particularly when both Fee and Federal minerals are being developed from the same pad.

**Comment 3:** *Our review of the EA in the context of the January 1999 final Supplemental EIS on Oil and Gas Leasing and Development (FSEIS) reveals many inconsistencies and inaccuracies. We feel requirements and standards set forth in the DSEIS have been omitted, selectively applied, or changed in a manner that does not reflect the intent of the FSEIS. For example, the FSEIS goes to great length to describe the lease stipulation and Conditions of Approval that would be applied to offset or mitigate negative impacts to wildlife (FSEIS, Chapter 2, page 2-35, Section 2.7) The EA is not at all clear or definitive about applying stipulations or COAs to new or existing leases in the GAP area.*

**Response:** The document reviewed and commented by CDOW and the general public was not an EA. It was the Proposed Action, made available to the public as part of the scoping process to identify issues and concerns. As such, it did not include an impact analysis or a listing of protective stipulations and COAs to be applied to the project. In the future, BLM will consider summarizing lease stipulations in the Proposed Action made available for public review and comment.

**Comment 4:** *The proponent does not propose a voluntary winter timing restriction, nor is there language that would lead to offsite mitigation due to four pads per section. Further, the EA makes no mention of applying the COAs that the FSEIS states would be applied to existing leases to protect wintering big game. We feel that with the importance of this winter habitat it is paramount to, at a minimum, address this inadequacy and utilize COAs to address this unnecessary impact.*

**Response:** See previous responses. Federal lease COC66291 carries a 5-month winter timing limitation (TL) for the period December 1 through April 30.

**Comment 5:** *Minimizing human-wildlife impacts should be a clearly defined and described component of this MDP. Private and public land within the boundary of the proposed master plan is known to contain elk production areas as identified in the 2002 Land and Resource Management Plan for the White River Forest, Chapter 3, pages 3-62 through 3-66.*

**Response:** The Elk Habitat Management Area (MA) 5.43 was acknowledged in the National Forest Land Use Plan Conformance section of the Proposed Action. The section on terrestrial wildlife includes a discussion of the elk calving habitat mapped by CDOW in a portion of the CCMPD area—including the road segment across NFS lands and the three pads on Fee land—and a description of the TL from April 16 through June 30 to be applied by the WRNF during road construction and the initiation of drilling and completion activities.

**Comment 6:** *Black bear concentration areas are identified in the FSEIS, Chapter 3, pages 3-16, 3-17 and 3-18; Chapter 4, [ages 4-19 and 4-20. More recent CDOW mapping (NDIS, 2009 ongoing) identifies the MDP area as containing elk production areas and black bear concentration areas. The project area also lies within potential lynx habitat. We recommend that areas of high conifer value be limited to disturbance to minimize the potential impact to lynx.*

**Response:** Areas of high conifer value would not be affected by the project, which is located almost entirely in dense oak-serviceberry habitat.

**Comment 7:** *CDOW recommends limiting and minimizing facility development activities and production activities during the window of May 15 and June 30 to minimize disturbance of elk during calving times. CDOW also recommends that Noble and subcontractors relocate and or adjust their development and facility sites as necessary to avoid critical calving habitat patches. Project maintenance activities should include scheduling of site visits between the hours of 10:00 am and 3:00 pm and reducing the number of daily/weekly site visitations between May 15 and June 30 for the life of the project.*

**Response:** The issue of elk calving is addressed in the EA.

**Comment 8:** *If Noble conducts a biological inventory for the planning area, all findings should be incorporated into the EA.*

**Response:** Biological surveys for rare plants, noxious weeds, and raptor nests were completed by contractor personnel and are incorporated into the EA—as is always the case. Portions of the EA involving wildlife and other resources also incorporate observations by BLM and WRNF personnel during onsite surveys and multiple site visits.

**Comment 9:** *Noble and its contractor should establish an education program that focuses on reducing human-bear conflicts.*

**Response:** Noble will provide copies of the CDOW brochure “Living with Bears” to its construction, drilling, and production personnel and contractors.

**Comment 10:** *CDOW anticipates that both the BLM and the White River National Forest will provide assistance, as appropriate, to Noble and subcontractors with respect to the 2008 Southern Rockies Lynx Management Direction Record of Decision and the 2002 Land and Resource Management Plan for the White River National Forest.*

**Response:** Correct, as appropriate.

**Comment 11:** *Prior to facility development, Noble should establish baseline vegetation conditions and inventories to provide a basis for post-development habitat restoration across all plant communities throughout the project components, including rights-of-way (ROW), staging areas, and supporting facilities and well pads. When revegetation work is based on baseline inventories, seeding mimics pre-disturbance conditions and provides the best opportunity to minimize habitat fragmentation.*

**Response:** The GSFO has developed mandatory seed mixes to be used on all Federal lands within the jurisdiction of the GSFO. These seed mixes are based on habitat type and incorporate the dominant native grass and shrub species found in these community types. Revegetation success is measured by how closely the reclaimed disturbed area resembles the adjacent undisturbed vegetation community.

**Comment 12:** *We recommend that weed-free seeds be used, and that vehicles/equipment be sanitized before coming to the site. Weed management activities should be monitored along with reclamation success on a t least an annual basis.*

**Response:** A COA attached to the EA states that “...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.” Monitoring and treatment of weeds and annual monitoring of reclaimed sites are included as COAs. Heavy equipment to be used on the Forest will be washed prior to ground-disturbing activities.

**Comment 13:** *The 2002 Forest Plan, Chapter 2, Water/Riparian Resources Standards 2, 5, 7, 8, 11, 12, and 13 are applicable to this project and subsequent analysis. CDOW recommends using the minimum right-of-way width where pipelines are within riparian areas (Cottonwood and Cache Creek) and retaining as much native riparian canopy or stream bank vegetation as possible. CDOW requests notification of hazardous materials spills, especially those that occur near a riparian area.*

**Response:** In the Oil and Hazardous Materials Incident Contingency Plan (revised June 2008) used by the GSFO, CDOW is on the list of parties to be contacted in the event of a hazardous material spill.

Under the Proposed Action, new pipeline construction would generally occur within existing road corridors and outside of riparian areas. In the one location where the realigned road would cross a stream at a new location, the pipeline would also be installed within the roadway and would not cause any additional disturbance; since this stream is intermittent, it also does not host any perennial riparian vegetation.

The listed Water and Riparian Resource Standards are addressed individually below:

*Standard 2: Manage land treatments to conserve site moisture and to protect long-term stream health from damage by increased runoff.*

Site reclamation measures (e.g., mulching and seeding), stormwater control measures (e.g., berms and straw bales), and other BMPs described in the Proposed Action and in listed in Appendices C and D (Conditions of Approval) have been crafted to conserve site moisture to the degree possible, and to prevent any sediment from entering Cottonwood or Cache Creeks by diverting runoff into irrigation ditches and stormwater control structures.

*Standard 5: In the water influence zone next to perennial and intermittent streams, lakes, and wetlands, allow only those actions that maintain or improve long-term stream health and riparian ecosystem condition.*

As stated above, construction activities have been designed to cause no impact to stream health and riparian ecosystems.

*Standard 7: Conduct actions so that stream pattern, geometry, and habitats are maintained or improved toward robust stream health.*

Only one short segment of one drainage (an intermittent tributary to Cottonwood Creek) would be realigned by construction—in this case road construction—in the Proposed Action. It is very unlikely that this realignment of less than 6 feet for a distance of approximately 50 feet would have any impact on Cottonwood Creek itself.

*Standard 8: Maintain long-term ground cover, soil structure, water budgets, and flow patterns of wetlands to sustain their ecological function, per [Clean Water Act Section] 404 regulation.*

No delineated wetlands would be impacted by activities in the Proposed Action; thus, no relevant USACE permits are required.

*Standard 11: Place new sources of chemical and pathogenic pollutants where such pollutants will not reach surface or ground water.*

In the Proposed Action, portable toilets would be located within the project area to prevent human waste from entering the local environment; no other potential pathogenic pollutants would be utilized in the Proposed Action. All potential chemical pollutants brought to the project area or produced by drilling/production activities would be containerized to the degree possible, with the containers surrounded by spill containment berms or other structures. All contaminants would be kept as far as feasible from streams. In the event that a contaminant spills or escapes from a structure or pit, the Oil and Hazardous Materials Incident Contingency Plan would go into effect, with the goal of preventing any contamination of surface or ground water.

*Standard 12: Apply runoff controls to disconnect pollutant sources from surface and ground water.*

Stormwater control measures and other BMPs described in the Proposed Action and in listed in Appendices C and D (Conditions of Approval) have been crafted to prevent any sediment from entering Cottonwood or Cache Creeks, by diverting runoff into irrigation ditches and stormwater control structures.

*Standard 13: Apply chemicals using methods that minimize risk of entry to surface and groundwater.*

Application of pesticides and other chemicals would be managed and controlled according to measures outlined in the GSFO Weed Management Plan (BLM 2009), Appendix B (Conditions of Approval), and the Proposed Action itself.

**Comment 14:** *Development of a comprehensive traffic/travel management plan for the project can provide guidance for employees to avoid and minimize vehicle caused impacts. A comprehensive traffic/transportation plan should address...*

**Response:** Comment noted. Transportation issues and impacts are addressed in the Access and Transportation section of the EA.

**Comment 15:** *The planning, development, operation, and maintenance activities of the Cache Creek Master Development Plan have the potential to introduce, onto private and public land, significant human disturbance and associated impacts to wildlife and wildlife habitat. Habitat fragmentation and loss from this and other surrounding projects contribute to cumulative impacts that can affect wildlife across the region. As habitat is lost, the contiguous portions that remain become more and more important. We would like to request development progress at a rate commensurate with reclamation success. A conscientious development plan that includes project-tailored, site specific best management practices can greatly minimize the impacts.*

**Response:** BLM has no regulatory authority to control the rate of development. Moreover, we would be disinclined to do so in any event—and especially where all the development is on private surface (except for 0.3 mile of road across NFS lands)—because of the myriad benefits to wildlife of completing development of an area and moving out as promptly as practicable.

**Comment 16:** *In closing, it will be necessary for BLM to ensure that the stipulations, COAs, and mitigation measures described in FSEIS are not contradicted in the EA. For example, it seems as though biological inventories have been omitted, which the BLM can mandate through Section 6 of Standard Terms of a Lease, and the 1999 FSEIS. CDOW also recommends that interim reclamation and wildlife habitat treatments should be monitored to evaluate efficacy of the measures. If these inconsistencies are resolved, we believe development of the (CCMDP) could be accomplished in a way that minimizes adverse impacts to wildlife.*

**Response:** As stated in a previous response, CDOW reviewed the Proposed Action, not the assessment of impacts or the information pertaining to stipulations, COAs, mitigation, inventories, reclamation, and monitoring. BLM believes that these aspects of the Proposed Action and of BLM's regulatory authority will result in a project that minimized adverse impacts to wildlife.

**Comment 17:** *Attached is a list of project specific BMPs (non-inclusive), and a general list of BMPs that we believe can help minimize impacts to wildlife when selectively included and tailored to this project.*

**Response:** Comment noted.

**GARFIELD COUNTY ROAD AND BRIDGE DEPARTMENT – LETTER FROM JAKE B. MALL,  
ADMINISTRATIVE FOREMAN, DATED MAY 11, 2009**

**Comment:** *Garfield County Road and Bridge Department has no objections to this CCMDP with the exception of the following comments.*

*County Roads CR 301 and CR 320 are preferred haul route roads for the drilling industry so this is not a problem. Noble Energy has used these roads for their drilling operation in the past and has contributed to dust control and road repairs including new asphalt for some sections of these roads. Noble Energy has always had a good working relationship with Garfield County.*

*All vehicles hauling oversize/overweight loads must abide by Garfield County's oversize/overweight permit system. Noble Energy is bonded to work in Garfield County and to authorize subcontractors to acquire oversize/overweight permits under their road bond. All vehicles requiring oversize/overweight permits must apply for them at Garfield County Road and Bridge Department.*

**Response:** Comments noted.

**ROY SAVAGE, SURFACE LANDOWNER AND MINERAL RIGHTS OWNER - LETTER DATED MAY 18, 2009**

**Comment 1:** *We have entered into a Surface Use Agreement with Noble Energy, the Operator. We consult with the operator regularly and we are in full agreement with the Plan.*

*We are fee owners of 440 acres of surface within the Development Plan area including the lands upon which Pads 17L, 17M, 19H 19I and 20F will be constructed. In addition, we are the surface owners of 2,487 acres of adjacent lands that include the access corridor from County Road 301 and County Road 329.*

**Response:** The CCMDP clearly identifies the Savage Family as surface landowners of the five proposed well pads. Two of the pads, 17L and 17M, are underlain by Federal minerals (Federal lease COC66921); the 19H, 19I, and 20F pads are located on Savage surface underlain by private mineral rights.

**Comment 2:** *The plan access roads, pipelines, and pads have been designed to maximize land use efficiencies. These public and private lands are used for livestock grazing and wildlife habitat and have no useable public access. Disturbances of vegetation during the oil and gas development will result in a beneficial conversion from decadent brush to reclamation grasses. This area has been included in a ten year prescribed burn plan coordinated between BLM and USFS. We believe that the Development Plan will result in an improvement of grazing and wildlife habitat.*

**Response:** Comment noted.

**Comment 3:** *We are undertaking plans with the Operator to decrease traffic, improve reclamation, and manage weed control.*

**Response:** Comment noted.

**Comment 4:** *The plan is within the three mile radius from Project Rulison. We concur with the Dept. of Energy Legacy Management Office and the Colorado Oil and Gas Conservation Commission that no risk of contamination from the Rulison Project exists.*

*We look forward to continuing to work with the Bureau of Land Management and the Operator to develop oil and gas from these lands in an efficient and constructive partnership.*

**Response:** Comment noted.

**TRAVIS AND DIANA CASEY, NEARBY LANDOWNER – EMAIL DATED JUNE 9, 2009**

**Comment:** *We have been working with Noble Energy Inc. on our property, Hilltop 2F2 Ranch, LLC, in section 17 which is accessed by County Roads 320 and 329 (Spruce Creek Road). Some of our thoughts and complaints are:*

- Poorly engineered roads

- *Harder to keep public off of private land*
- *Finding it difficult for said company to follow through with lease agreements*
- *Very dusty roads (dust can be seen from I-70 at times)*
- *Our experience is that if it is not in writing, don't believe anything they say*
- *Trash control is difficult to maintain due to extra traffic*
- *Possible H2S questions and concerns*
- *Security of our property with drilling activity on and around area is a concern*
- *Concern about many of the springs in the area being contaminated by new development*
- *Extra traffic makes it hard to access our property at times*

*We are not against the gas companies being here, but these are some of our experiences with Noble Energy on our property.*

**Response:** URS (engineering firm from Glenwood Springs hired by Noble Energy) has prepared and submitted sets of stamped, engineered drawings of the five proposed well pads and a thorough road design package that includes the planned access roads and pipelines to be constructed on private and National Forest land. Dust abatement mitigation is required in the Conditions of Approval. BLM is not aware of any H2S problems in Cache Creek area. Site security and trash cleanup of the area is responsibility of Noble and its contractual lease agreements with the surface landowner. The downhole Conditions of Approval are specifically designed to protect the ground water quality. Increased traffic counts and periods of use related to the planned oil and gas development are recognized and analyzed in the EA.

**WILDERNESS WORKSHOP, HIGH COUNTRY CITIZEN'S ALLIANCE, ROCKY MOUNTAIN RECREATION INITIATIVE, GREAT OLD BROADS FOR WILDERNESS, COLORADO ENVIRONMENTAL COALITION, COLORADO WILD, SIERRA CLUB- LETTER FROM PETER HART, (JUNE 8, 2009)**

**Comment 1: Roadless area impacts** – *This project is adjacent to the Mamm Peak inventoried roadless area (IRA). The solitude and naturalness of the Mamm Peak IRA creates an incredibly diverse wildlife ecosystem and allows for wildlife seclusion and production. This project will convert the valley floor at the headwaters of Cottonwood Creek and areas alongside Cache Creek into industrial development zones. Impacts of this development on roadless values (including seclusion, naturalness, and wildlife) must be thoroughly analyzed and disclosed. Roadless incursions should be disallowed.*

**Response:** No portions of the Proposed Action analyzed in the CCMDP Environmental Assessment (EA) are located in the Mamm Peak IRA. Wildlife conditions, impacts, and mitigation were analyzed in the EA.

**Comment 2: Lynx** – *The proposed project area overlaps with the Battlement Lynx Analysis Unit (LAU) and potential lynx habitat as mapped by Colorado Division of Wildlife (CDOW). Due to possible impacts to lynx and lynx habitat, authorizing agencies must undertake a Section 7 consultation with the U.S. Fish and Wildlife Service (USFWS). Any lynx analysis must be broad in scope and supportable as a stand-alone document. The Bureau of Land Management (BLM) can no longer tier to the lynx analysis included in the Glenwood Springs Field Office (GSFO or Field Office) Resource Management Plan (RMP). That document, currently being revised, is no longer valid. Significant changes in circumstance*

suggest that the “no jeopardy” finding in that RMP is now moot and does not reflect contemporary conditions within the Field Office.

**Response:** Potential for impacts to the Canada lynx from implementation of the Proposed Action was analyzed in detail in the EA, developed in collaboration with the USFWS. That agency concurred with the determination by BLM and WRNF of “No Effect” on this species.

**Comment 3: Mule deer migration and habitat fragmentation** – *The proposed plan will add extensive traffic and infrastructure to a known mule deer migration corridor. Fragmentation of wildlife habitat affects the ecological composition, structure, and function of a landscape. Although fragmentation can be difficult to measure, there are a variety of metrics that can be used to assess the degree of existing habitat fragmentation and the condition of the landscape. These metrics can then be applied to available data regarding distribution of wildlife and habitat, and ultimately used to make decisions regarding appropriate locations for pipelines and roads. Authorizing agencies must complete such analysis as part of the EA. Resources that may inform such analysis include:*

- *Lehmkuhl, J.F., and L.F. Ruggiero. 1991. Forest fragmentation in the Pacific Northwest and its potential effects on wildlife. Pages 35-46 in Ruggiero, L.F., K.B. Aubry, A.B. Carey, and M.H. Huff, tech. coords. Wildlife and Vegetation of Unmanaged Douglas-fir Forests. USDA Forest Service Gen. Tech. Rep. PNW-GTR-285. Portland, OR.*
- *Rost, G.R., and J.A. Bailey. 1979. Distribution of mule deer and elk in relation to roads. Journal of Wildlife Management 43(3): 634-641.*
- *Forman, R.T. 1999. Estimate of the area affected ecologically by the road system in the United States. Conservation Biology 14: 31-35.*
- *Wyoming Game and Fish Dept., Recommendations for Development of Oil and Gas Resources within Crucial and Important Wildlife Habitat: A Strategy for Managing Energy Development Consistently with the FLPMA Principles of Multiple Use and Sustained Yield. December 6, 2006. Online at <http://gf.state.wy.us/habitat/index.asp>.*
- *Thomson, J.L., Schaub, T.S., Culver, N.W., and Aengst, P.C. 2005. Wildlife at a Crossroads: Energy Development in Western Wyoming, Effects of Roads on Habitat in the Upper Green River Valley. The Wilderness Society: Washington, DC. 40 pp.*
- *Weller, C., J. Thomson, P. Morton, and G. Aplet. 2002. “Fragmenting Our Lands: The Ecological Footprint from Oil and Gas Development – A Spatial Analysis of a Wyoming Gas Field.” The Wilderness Society. Washington, D.C. September.*

**Response:** The project area is not mapped by CDOW as a migration corridor. Nonetheless, we agree that seasonal movement of mule through the area does occur to some extent, including both movement along the existing road, which already bisects and fragments the project area to some extent, and the movement corridors likely to occur along the Cache Creek and Cottonwood Creek drainage floors.

We believe that the limited scale of this development and the high degree of screening provided by dense oakbrush will result in only minor impacts to wildlife from habitat fragmentation. Additionally, the type of habitat fragmentation typically described in the literature is associated with multiple roadways through an unfragmented habitat block rather than expansion in width and use of an existing roadway that already bisects the habitat to some extent. Further, the amount of fragmentation associated with the type of roadway proposed—a single road through a habitat—is reduced after construction is completed and use

returns to a lower level in terms of number and speed of vehicles using the road. For these reasons, we anticipate that the habitat fragmentation would be minor and temporary.

Finally, we point out that all aspects of the project except the 0.3 mile of road and pipeline across NFS lands, are located on private land that are subject to fragmentation from a variety of activities related to ranching and other allowable uses.

**Comment 4: Stipulations to protect wintering and calving elk, black bear during fall, and turkeys during production periods** – *The proposed project takes place in elk wintering and calving habitat, concentrated fall habitat for black bears, and an area known for wild turkey production. We understand the current plan incorporates some seasonal stipulations to minimize impacts on these species. We would like to see thorough justification for restrictions in any EA and detailed assurance that permitted activities will not have significant impacts on these wildlife resources. We urge agencies to impose the strictest stipulations on operations, as most developable land on the valley floor, proximate to streams is being incrementally cut-up and consumed by oil and gas development—at the expense of wildlife and native ecosystems.*

**Response:** These species and habitat uses are analyzed in the EA, including the application of stipulations and mitigation measures through conditions of approval where appropriate.

**Comment 5: Cumulative impacts and connected actions must be analyzed with appropriate scope** – *In analyzing the scope of a proposed project’s environmental impact, Council on Environmental Quality (CEQ) regulations require federal agencies to consider “connected actions,” “similar actions,” and “cumulative actions” together with “direct,” “indirect,” and “cumulative” impacts. 40 CFR § 1508.25.*

*Connected actions are those that*

- *automatically trigger other actions which may require environmental impact statements*
- *cannot or will not proceed unless other actions are taken previously or simultaneously*
- *are interdependent parts of a larger action and depend on the larger action for their justification.”*

*(40 CFR § 1508.25(a)). The CEQ regulations define similar actions as those that “have similarities that provide a basis for evaluating their environmental consequences together, such as common timing or geography.” Id. The CEQ regulations also state when agencies ought to analyze such similar actions in a single impact statement. (Agencies “should do so when the best way to assess adequately the combined impacts of similar actions or reasonable alternatives is to treat them in a single impact statement.” 40 CFR § 15.08.25.)*

*There are situations where an agency must consider several related actions in a single NEPA document. In Fritiofson v. Alexander, the Fifth Circuit held that in a cumulative impact analysis, an agency should consider “(1) past and present actions without regard to whether they themselves triggered NEPA responsibilities and (2) future actions that are ‘reasonably foreseeable,’ even if they are not yet proposals and may never trigger NEPA-review requirements. 772 F.2d 1225, 1245 (5th Cir. 1985). The court stated:*

*Sections 1508.7 and 1508.27 require an analysis, when making the NEPA-threshold decision, as opposed to the EIS-scoping decision, whether it is “reasonable to anticipate cumulatively significant impacts” from the specific impacts of the proposed project when added to the impacts from “past, present, and reasonably foreseeable future actions,” which are “related” to the*

proposed project. The regulation does not limit the inquiry to the cumulative impacts that can be expected from proposed projects; rather, the inquiry also extends to the effects that can be anticipated from “reasonably foreseeable future actions.” *Id.* at 1243; see also 42 U.S.C.S. §§ 4321-4347.

For an EA, BLM’s obligation to analyze impacts extends beyond the immediate impacts of the project at hand to include the cumulative impacts of the project, taken together with the impacts of existing, proposed, or reasonably foreseeable projects, on the environment. In order to comply with these mandates, the BLM must describe and analyze impacts beyond the borders of the GSFO and beyond the list of known gas development projects. BLM must analyze impacts of all infrastructure proposed as part of this MDP along with the impacts of facilities and actions that are connected, similar, cumulative—whether those are located on privately owned lands or federally managed by the BLM or Forest Service, and whether those exist or are reasonably foreseeable. An adequate analysis will take into account facilities that have already been analyzed in a NEPA process, as well as those that were categorically excluded and those that escaped review because they are located on private lands.

To ensure that combined impacts of separate activities do not escape consideration, NEPA requires federal land managers to consider cumulative environmental impacts in its environmental analyses. See Davis v. Mineta, 302 F.3d 1104, 1125 (10<sup>th</sup> Cir. 2002); see also Grand Canyon Trust v. Federal Aviation Admin., 290 F.3d 339, 345-47 (D.C. Cir. 2002). NEPA’s regulations provide that “effects” includes ecological, aesthetic, and historic impacts, “whether direct, indirect, or cumulative.” 40 C.F.R. § 1508.8. “Cumulative impact,” in turn, is defined as:

*the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.* *Id.* § 1508.7.

Based on these regulations, NEPA documents must provide useful analysis of past, present, and future actions. City of Carmel-by-the-Sea v. U.S. Dept. of Transp., 123 F.3d 1142, 1160 (9<sup>th</sup> Cir. 1997); Muckleshoot Indian Tribe v. U.S. Forest Serv., 177 F.3d 800, 809-810 (9<sup>th</sup> Cir. 1999). As the D.C. Circuit has held, the fact that a project may result in even a small incremental increase in the overall impacts to a resource is meaningless if “there is no way to determine . . . whether [this small increase] in addition to the other [impacts], will ‘significantly affect’ the quality of the human environment.” Grand Canyon Trust, 290 F.3d at 346.

It is established that the cumulative impacts analysis must include “some quantified or detailed information” since without such information it is not possible for the court or the public to be sure that the agency provided the hard look that is required of its review. Neighbors of Cuddy Mountain v. Forest Service, 137 F.3d 1372, 1379 (9<sup>th</sup> Cir. 1998). “The Circuit has also explained that this analysis is particularly important in an EA. That is because so many more EAs than EISs are prepared, and thus there is a higher risk of cumulative impacts resulting from the many smaller decisions.” Soda Mountain Wilderness Council v. Norton, (E.D. Cal. 2006), 2006 WL 769080; See Native Ecosystems Council v. Dombeck, 304 F.3d 886, 896 (9<sup>th</sup> Cir. 2002).

**Response:** In fact, the EA did address development on Fee lands that required access across White River National Forest lands—the only connected action as we interpret it. The EA also addressed cumulative impacts.

**Comment 6: Infrastructure must be analyzed, including existing, approved, and reasonably foreseeable** – *The BLM has a duty to analyze this project in light of other existing, approved, and reasonably foreseeable development. Such analysis must disclose information about oil and gas related infrastructure that is directly or indirectly connected to this proposed development. Information should include the location of such infrastructure, the relationship to facilities proposed in this MDP, and details about impacts that connected infrastructure has on the environment (e.g., impacts to wildlife, air quality, sensitive plants, water quality, etc.). For example, any compressor station or pipeline associated with wells in the CCMDP should be analyzed in this EA whether it lies within the project area or not and whether it exists or it is reasonably foreseeable.*

*We commend the BLM and Noble Energy for undertaking an MDP to analyze development of 79 wells and related infrastructure, rather than taking this on piece by piece. Nonetheless, NEPA requires an analysis that stretches beyond the project area of this MDP. The scoping notice makes this clear: “All wells proposed from the proposed pads would be located in what is known as the Project Rulison Three Mile Area.” Scoping Notice, at 4. This MDP is just one small segment of a much larger development plan and it should be analyzed accordingly.*

*Recommendation: We recommend that any EA include a map detailing all the roads, wells, compressors, pipelines and other related infrastructure that are part of and will connect with infrastructure in this MDP. We also recommend including citation to environmental assessments, environmental impact statements, decision notices, and/or categorical exclusions used to authorize approved and existing infrastructure that is connected to this project. If the environmental impacts associated with existing infrastructure connected to this project have not been analyzed, we recommend that the agencies undertake such analysis.*

**Response:** The EA includes a map showing all surface and components that BLM believes are reasonably included in the analysis of the Proposed Action. This CCMDP is not “one small segment of a much larger development plan.” It is a stand-alone development plan in its entirety. The 1999 FSEIS that currently serves as the GSFO’s land use plan in relation to oil and gas development specifically anticipated that existing Federal oil and gas leases, as well as new Federal leases and new and existing Fee leases, would be developed for oil and gas.

**Comment 7: Adequate air quality analysis** – *This MDP will facilitate more drilling, exploration, and production. An adequate analysis must include some estimate of emissions from related drilling operations, compressors, pipelines, and ongoing operations. A recent inventory of oil and gas emissions in the western United States by ENVIRON report showed that in 2002, emissions from drill rig engines in Colorado averaged 4.6 tons of NO<sub>x</sub> per well drilled. Russell, J. and A. Pollock, "Oil and Gas Emission Inventories for the Western States," Report Prepared by ENVIRON for Western Governors Association (December 27, 2005). The report, however, estimates that emissions could be as much as 13.5 tons of NO<sub>x</sub> per well drilled. These numbers are significant.*

*The EA must be in compliance with Prevention of Significant Deterioration regulations (PSD) requirements by aggregating interrelated and adjacent sources. PSD regulations at 40 CFR § 51.166(b)(5) define a stationary source as, "any building, structure, facility, or installation which emits or may emit a regulated NSR pollutant." See also Air Quality Control Commission (“AQCC”) Regulation No. 3, Part A, Section I.B.41. Regulations at 40 CFR § 51.166(b)(6) further define "building, structure, facility, or installation" as "all of the pollutant emitting activities which belong to the same industrial grouping, are located on one or more contiguous or adjacent properties, and are under the control of the same person (or persons under common control)[.]" The regulations further state, "Pollutant emitting activities are considered part of the same industrial grouping if they belong to the*

same 'Major Group' (i.e., which have the same first two digit code) as described in the Standard Industrial Classification Manual[.]” See also AQCC Regulation No. 3, Part A, Section I.B.41.

*In this case, BLM must ensure that emissions from proposed infrastructure (e.g., pipelines, compressor stations, and any feeder wells) are aggregated together to ensure compliance with PSD regulations and the Colorado SIP. The proposed wells, pipelines, and downstream compressor stations and/or other pollutant emitting activities are all interrelated, adjacent, and under common ownership or control. Furthermore, they are all part of the same industrial grouping. According to the Standard Industrial Classification Manual, producing natural gas wells and related facilities fall under Major Group 13, or “Oil and Gas Extraction.” See <http://www.osha.gov/oshstats/sicser.html>.*

*With regard to the adjacency of these developments, although the Environmental Protection Agency has noted that the distance associated with "adjacent" "must be considered on a case-by-case basis," the agency has noted that two pollutant emitting activities that are interdependent operations under common control can be considered adjacent when they are upwards of 20 miles apart or even greater. See May 21, 1998 Letter from Richard Long, EPA Region 8, In re: Response to Request for Guidance in Defining Adjacent with Respect to Source Aggregation. EPA noted that in relation to two interdependent facilities in Utah 21.5 miles apart, "the lengthy distance between the facilities "is not an overriding factor that would prevent them from being considered a single source."*

*The EA must explain how drill rig emissions were estimated and ensure that air quality will be adequately protected in the face of the proposed development. By doing this BLM can more accurately estimate drill rig emissions and adequately analyze impacts to Prevention of Significant Deterioration (“PSD”) increments, visibility, and other air quality related values, in violation of NEPA and the Clean Air Act*

*The EA must also analyze impacts to ambient air quality with regard to ozone standards. BLM cannot approve the proposed development without showing that the approval will not violate National Ambient Air Quality Standards (“NAAQS”) for ozone. Federal standards currently limit ozone concentrations in the ambient air to no more than 80 parts per billion over an 8 hour period. Section 110(a)(1) of the Clean Air Act requires that ambient air quality standards be maintained.*

*The failure to assess project impacts to ozone is concerning given that oil and gas development has been linked to exceedances and in some cases violations of ozone NAAQS. In the Denver metro area, oil and gas developments in Weld County have been required to control flash emissions from atmospheric condensate tanks, controls emissions from glycol dehydrators, and control emissions from compressor engines to protect ozone NAAQS. See <http://www.cdphe.state.co.us/ap/oilgas.html>. In other parts of the west, oil and gas development has been linked to exceedances of ozone NAAQS, including in southwestern Wyoming, an area of booming oil and gas drilling. The EPA and states have made clear that ozone is a concern when it comes to oil and gas drilling and production activities. See <http://www.epa.gov/unix0008/compliance/nepa/nepadocs/JonahInfillComments.pdf>.*

*Finally, any EA must clearly show that this project will not result in degradation to any Class 1 airshed. Clean Air Act regulations impose on “Federal Land Manager[s]... an affirmative responsibility to protect the air quality related values (including visibility) of any such lands and to consider, in consultation with the [EPA] Administrator, whether a proposed source or modification would have an adverse impact on such values.” 40 C.F.R. § 51.166(p)(2). Importantly, there are four Class 1 areas that may be impacted by approval of more oil and gas development, including the Maroon Bells/ Snowmass, Eagle’s Nest, Flat Tops, and West Elk Wilderness areas.*

*Recommendations: BLM must thoroughly analyze direct, indirect, and cumulative air quality impacts from this project as well as all connected actions before authorizing development. We further recommend consideration of these best management practices (BMPs):*

- *Green completions*
- *Capturing greenhouse gas emissions*
- *Capturing HAPs*
- *Utilization of solar- and wind-power wherever feasible*
- *Dust suppression*
- *Use of electric instead of diesel*

**Response:** The data sources and assumptions used for the drill rig and construction-related emissions described under the heading of “Affected Environment and Environmental Consequences” are discussed in the references listed in that section, which refer to the list of references at the end of the document.

“Criteria pollutants” (PM<sub>10</sub>, PM<sub>2.5</sub>, CO, SO<sub>2</sub>, and NO<sub>2</sub>), hazardous air pollutants (benzene, ethylbenzene, formaldehyde, hydrogen sulfide, toluene, and xylenes), sulfur and nitrogen deposition, acid neutralizing capacity, and visibility screening were all discussed (and generally aggregated) under “Affected Environment and Environmental Consequences,” where it states that the conclusions were drawn from the Roan Plateau RMPA and EIS (BLM 2006:4-26 to 4-37). Analysis was completed with regard to greenhouse gas emissions, including both near-field and far-field analyses. 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 and greenhouse gases analyzed, the implementation of oil and gas development under the Roan Plateau RMPA and EIS would have either no or negligible long-term adverse impacts on air quality or greenhouse gas concentrations. Since the Proposed Action is within the scope of the reasonable foreseeable development scenario analyzed in that document, it is anticipated that the Proposed Action would be unlikely to have adverse effects on air quality. The Roan Plateau RMPA and EIS also serves as a cumulative effects analysis with regard to air pollutant emissions.

Ozone models are designed for urban areas, are very expensive and time-consuming to implement, and are not considered applicable for use in rural areas such as Garfield County. Ozone impacts can instead be estimated via the visual screening analysis performed as part of the Roan Plateau RMPA and EIS, which used VOC and NO<sub>x</sub> screening tables developed by Scheffe (1988). These VOC/NO<sub>x</sub> screening tables have been used in other EIS analyses, and the BLM supports their use in this application. In recognition of the importance of limiting ozone concentrations, monitoring programs have been implemented throughout Garfield and surrounding counties by Garfield County administrators, the U.S. Forest Service, and at least one oil and gas operator.

Dust suppression measures are included in the Standard Conditions of Approval (Appendix C). Use of electric vehicles and solar and wind power are not feasible requirements for construction of pads, roads, and pipelines, since drilling rigs and other equipment used for these purposes does not exist that utilizes such alternative energy sources. The GSEO currently encourages operators to utilize green completions and to capture greenhouse gas emissions and hazardous air pollutants (HAPs). It is currently not possible to capture emissions from most equipment in a form that could be contained and transported offsite.

**Comment 8: Analysis of climate change impacts** – *Climate warming sources of greenhouse gas (GHG) pollution associated with natural gas exploration, production, and processing (i.e., the upstream end of*

the industry) include combustion sources, such as natural gas compressor engines, vented methane from sources such as tanks, pneumatic devices, well completions and workovers, and gas dehydration and sweetening, and vented gas. These activities additionally involve the emission of GHGs from electricity imports. To a lesser extent, N<sub>2</sub>O is released by combustion sources associated with oil and gas exploration, production, and processing.

Emissions from the proposed action will contribute to climate change in a variety of ways. Carbon dioxide and nitrous oxides will be emitted from mobile sources during exploration. Carbon dioxide, carbon monoxide, nitrous oxides, and methane will be emitted during extraction, processing, and transportation. There may be additional emissions of methane from escaped natural gas during extraction, processing, and transportation. Finally, there will be emissions of carbon dioxide, carbon monoxide, nitrous oxides, and methane during the use of extracted gas. These emissions, along with direct, indirect and cumulative impacts, and connected actions must be analyzed in the EA.

In 2007, the Intergovernmental Panel on Climate Change (IPCC) released *Climate Change 2007: The Physical Science Basis Summary for Policymakers* (Alley 2007). This report summarizes major findings in the field. Findings indicate that anthropogenic greenhouse gas emissions have altered the energy balance of our planet (Hansen et al. 2005). The current imbalance will cause further global warming, even without additional greenhouse gas emissions (Hansen et al. 2005). Scientists have established specific thresholds for additional warming and say that any exceedance of those thresholds will constitute “dangerous climate change.” Studies point out possible impacts, including species extinction (Hansen 2006; Hansen et al. 2006a,b), flooding; drought; heavier precipitation and storm events; more frequent heat waves; fires; heat stress; vegetation changes; sea level rise; rapid snow and ice melt; increased intensity of hurricanes; and retreating glaciers.<sup>1</sup>

In order to avoid triggering “dangerous climate change” scientists suggest that we must pursue an “alternative” to “business as usual” greenhouse gas emitting behavior (Hansen 2006; Hansen et al. 2006a, b; Hansen and Sato 2004). The “alternative” scenario requires immediate reduction of carbon dioxide emissions (Hansen 2006; Hansen et al. 2006a, b). Dr. James Hansen, Director of the NASA Goddard Institute for Space Studies, and NASA’s top climate scientist, has stated: “In my opinion there is no significant doubt (probability > 99%) that ... additional global warming of 2° C would push the earth beyond the tipping point and cause dramatic climate impacts including eventual sea level rise of at least several meters, extermination of a substantial fraction of the animal and plant species on the planet, and major regional climate disruptions” (Hansen 2006:30).

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<sup>1</sup> Emanuel, K., *Increasing Destructiveness of Tropical Cyclones Over the Past 30 Years* (Nature, vol. 436, August 4, 2005); P.J. Webster, et al., *Changes in Tropical Cyclone Number, Duration, and Intensity in a Warming Environment* (Science, vol. 309, September 16, 2005), NASA Earth Observatory, *Record Low for June Arctic Sea Ice* (June 2005 at [earthobservatory.nasa.gov/Newsroom/NewImages/images.php3?img\\_id=16978](http://earthobservatory.nasa.gov/Newsroom/NewImages/images.php3?img_id=16978)); A.J. Cook et al., *Retreating Glacier Fronts on the Antarctic Peninsula over the Past Half-Century* (Science, vol. 308, April 22, 2005); R.B. Alley et al., *Ice-Sheet and Sea-Level Changes* (Science, vol. 310, October 21, 2005); E.D. Domack, et al., *Stability of the Larsen B Ice Shelf on the Antarctic Peninsula During the Holocene Epoch* (Nature, vol. 436, August 4, 2005); F.S. Chapin III, et al., *Role of Land Surface Changes in Arctic Summer Warming* (Science, vol. 310, October 28, 2005); M. Hopkin, *Amazon Hit by Worst Drought for 40 Years: Warming Atlantic Linked to Both US Hurricanes and Rainforest Drought* (Nature, October 11, 2005); and I.T. Stewart, et al., *Changes Toward Earlier Streamflow Timing Across Western North America* (Journal of Climate, vol. 18, April 2005).

*It is now clear that global warming represents the most significant threat to biodiversity. Peer-reviewed studies indicate that 35% of species could be committed to extinction by 2050 if current emissions are not reduced (Thomas 2004). Equally dire are possible impacts to human health, global and local economies (Epstein and Mills 2005), and foreseeable environmental impacts. See supra note 24. Rajendra Pachauri, IPCC Chairman, says: “If there’s no action before 2012, that’s too late ... What we do in the next two to three years will determine our future. This is the defining moment.” Elisabeth Rosenthal, U.N. Chief seeks more climate change leadership, N.Y. Times, Nov. 18, 2007. Online at <http://www.nytimes.com/2007/11/18/science/earth/18climatenew.html>.*

*A 2008 report prepared by the Natural Resources Defense Council (NRDC) highlights concerns specific to the western United States:*

*Human activities are already changing the climate of the American West. This report by the Rocky Mountain Climate Organization (RMCO) and the Natural Resources Defense Council (NRDC), drawn from 50 scientific studies, 125 other government and scientific sources, and our own new analyses, documents that the West is being affected more by a changed climate than any other part of the United States outside Alaska. When compared to the 20<sup>th</sup> century average, the West has experienced an increase in average temperature during the last five years that is 70% greater than the world as a whole. Responding quickly at all levels of government by embracing the solutions that are available is critical to minimizing further disruption of this region’s climate and economy.*

*In its analysis BLM should consider this NRDC report along with the recent U.S. Climate Change Science Program and Subcommittee on Global Change Research report entitled *The Effects of Climate Change on Agriculture, Land Resources, Water Resources and Biodiversity in the United States* as well as the *Scientific Assessment of the Effects of Global Change on the United States* produced by the Committee on the Environment and Natural Resources National Science and Technology Council.*

*BLM has not analyzed the climate change impacts resulting from oil and gas development in the Resource Management Plan, during the leasing phase, or during any previous portion of the authorization process for this project. These impacts must be analyzed now as the BLM prepares to authorize the proposed Master Development Plan.*

*Through the NEPA process, BLM must address a proposal’s “environmental impact” and the “adverse environmental effects which cannot be avoided should the proposal be implemented.” 42 U.S.C. §§ 4332(2)(C)(i), (ii); 40 C.F.R. §§ 1502.16 (requiring discussion of environmental consequences), 1508.9 (stating that an Environmental Assessment must address environmental impacts and consider alternatives). These impacts fall into one of three categories: (1) direct impacts; (2) indirect impacts; and (3) cumulative impacts. 40 C.F.R. §§ 1508.7, 1508.8. Caselaw interpreting NEPA further validates the mandate that BLM must address the impacts of decisions on global warming and climate change prior to project approval. In *Ctr. for Biological Diversity v. Nat’l. Highway Traffic Safety Admin.*, for example, the 9<sup>th</sup> Circuit held that NHTSA failed to adequately evaluate global warming impacts resulting from changes to vehicle fuel efficiency standards. 508 F.3d 508, 550 (9th Cir. 2007). In *Mid States Coalition for Progress v. Surface Transp. Bd.*, the 8<sup>th</sup> Circuit held that increased coal consumption and global warming pollution was reasonably foreseeable effect of railroad expansion to transport coal. 345 F.3d 520 (8th Cir. 2003).*

*Secretarial Order 3226, *Evaluating Climate Change Impacts in Management Planning*, issued on January 19, 2001, is clear in mandating that the BLM study climate change impacts associated with management activities like authorization of gas development:*

*Each bureau and office of the Department will consider and analyze potential climate change impacts when . . . making major decisions regarding the potential utilization of resources under the Department's purview. Departmental activities covered by this Order include . . . planning and management activities associated with oil, gas, and mineral development on public lands[.]*

*In order to comply with this Order BLM must begin analyzing climate change impacts from ongoing authorization of oil and gas development. Since this analysis has not been done at a programmatic level, or at the leasing level, BLM must analyze impacts now before authorizing the proposed Master Development Plan.*

*Recommendations: BLM must analyze all life cycle emissions of the proposed development. The analysis should account for emissions from extraction, production, transportation, and end uses of natural gas. These emissions are within the ambit of BLM's obligation to analyze direct, indirect, and cumulative effects, as well as connected actions. We also recommend consideration of these BMPs:*

- *Green completions*
- *Capturing greenhouse gas emissions*
- *Capturing HAPs*
- *Utilization of solar- and wind-power wherever feasible*
- *Dust suppression*
- *Use of electric instead of diesel*

**Response:** See the response to Comment 7. The BLM recognizes and discloses the potential for climate change to have significant impacts on precipitation, snowmelt, and other aspects of the landscape in the western U.S., as well as the scientific consensus that increased levels of greenhouse gases (GHGs) are causing the current global warming trend. However, as stated in the EA's analysis of air quality impacts,

The assessment of the effects of GHG emissions on 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 experts to be due to more than a century of human activities.

**Comment 9: Burying cuttings** – *Burying cuttings in the headwaters of two creeks may not be objectionable if Noble Energy uses non-toxic water-based drilling fluids during fracking operations and there is some assurance that heavy metals will not be retained with cuttings after drilling. However, the MDP does not confirm the kind of substances Noble will use in fracturing processes. Nor does the MDP indicate that drill cuttings will be devoid of heavy metals. Because heavy metals and drilling chemicals have been known to cause detrimental impacts to the health of ecosystems, wildlife, and people, we would like to know what kind of chemicals Noble plans to use in fracturing processes. What kind of residual contaminants may be in cutting materials? And how contamination of watersheds and wildlife will be prevented? Better yet, the MDP should mandate use of water-based non-toxic drilling fluids and removal of any drill cuttings from the site that may contain heavy metals or chemical byproducts.*

**Response:** The cuttings trench on all pads will be lined, as per COGCC requirements, to further reduce the already low potential for transport of contaminants via either surface runoff or shallow groundwater seepage to area streams.

**Comment 10:** *The CCMDP notice includes several references to the fact that additional and unanticipated development may occur within the project area. Please include a list of relevant categorical exclusions that may be used to approve unanticipated future development without a full-fledged NEPA analysis. This will give interested parties a better idea what kind of development may be expected in coming years. Please also make note in the EA that this analysis cannot be used to authorize any actions outside of the scope of analysis and that, unless such activities are categorically excluded from NEPA, future development will have to be analyzed individually through a separate NEPA process.*

**Response:** The point is that future additional development, if it occurs, is currently speculative and thus beyond the scope of a NEPA analysis. The “list of relevant categorical exclusions that may be used to approve” future development includes the following:

Category 1: Less than 5 acres of disturbance, no more than 150 acres of disturbance on the lease, and covered by a previous NEPA analysis [this EA.]

Category 2: Adding another well to an existing pad if an existing well has been drilled during the 5 previous years.

Category 3: Drilling additional wells in an established field if covered by a NEPA analysis during the 5 previous years and analyzed as a reasonably foreseeable activity in the earlier NEPA document [this EA].

Category 4: Placement of an additional pipeline to an existing corridor, as long as the existing corridor was approved during the 5 previous years.

Issues that could affect potential and currently unplanned future development include changes in the downhole spacing density, which is under the purview of COGDD; changes in technology that allow more distant areas to be accessed from facilities within the CCMPD area; changes in the economic environment that make additional development more feasible; or changes in the geopolitical environment that create a greater demand for domestic oil and gas resources.

BLM will consider the request to incorporate the additional language. However, note that as applied by the GSFO, any additional future development within the CCMDP boundaries may be considered within the scope of the current analysis if it falls within one or more of the categorical exclusions cited above and if it was covered by site-specific surveys as part of the current.

**Comment 11:** *We commend federal land managers and Noble Energy for planning to utilize pad 17M as a satellite location for completion (or fracking) operations undertaken at all pads. We further commend the commitment to utilize a closed-loop drilling systems, remote telemetry, and secondary containment features to protect natural resources from spilled condensate and produced water.*

**Response:** Duly noted and appreciated.

**NOALANI TERRY – EMAIL DATED JUNE 7, 2009**

**Comment 1:** *I am writing to indicate my displeasure at yet more wells, especially near Cache Creek and Cottonwood Creek. I am not sure in which direction the “directional” drilling is proposed to take place, but I am extremely concerned about any wells in the Rulison area. It defies all logic and common sense*

*to drill anywhere near a nuclear blast site, but especially so close to the Colorado River which provides water to millions of people.*

*The risk of contamination by radioactivity is just too high. Also, until the public is provided the information on what substances are being used in “fracking” fluids, all sorts of other toxic effects, not only in water supplies, but also in air and soil, cannot be adequately monitored or inspected. Allowing companies to inject dozens of chemicals into the ground in the name of “business confidentiality” is a betrayal of the public trust when government is supposed to serve the public welfare, not just corporate welfare.*

**Response:** The BLM is aware of public concerns about oil and gas development in the vicinity of the Project Rulison nuclear test conducted in 1969. Subsequent to Project Rulison, the following “buffer” zones were established:

- a. The U.S. Department of Energy (DOE) established a restriction on drilling beyond a depth of 6,000 feet below ground surface in an area of 40 acres surrounding the blast site.
- b. The Colorado Oil and Gas Conservation Commission (COGCC) established 0.5-mile of the blast site, directing that downhole drilling is not permitted without a hearing before, and approval by, COGCC. The 0.5-mile width is an arbitrary distance not tied to any monitoring data but instead is intended be considerably more than adequate to protect human health, based on the slow migration rate of radionuclides.
- c. COGCC also established a 3-mile notification area within which all well permits issued by COGCC are reported to, and reviewed by, DOE. The permits for those wells include a stipulation that gives DOE the authority to sample any wells within the 3-mile notification area.
- d. DOE conducts annual sampling, including groundwater and some domestic wells, and has never found any contaminants outside the test site. The most recent sampling was in December 2006. A newly established sampling program would include sampling selected wells within 3 miles, unless that radius is later reduced due to consistently negative findings.
- e. The radionuclide being sampled for is tritium, which is the most mobile radionuclide associated with the blast.

None of the proposed pads or downhole locations in the CCMDP area would be within 0.5 mile of the test site. However, most or all of the pads and downhole locations would lie within the 3-mile notification area. COGCC will report these to DOE, as per their standard protocol, and DOE may select some or all of these wells for inclusion in the sampling program. DOE’s *Rulison Site Environmental Management End-State Vision*, dated January 2005, specifies long-term monitoring program of selected wells at varying distances from the test site. This program would have an anticipated duration of 100 years, beginning in 2011 with closure of the Project Rulison site.

Although the BLM believes that issues involving oil and gas development in the vicinity of the Project Rulison test site are being adequately addressed by the existing COGCC and DOE processes, the CCMDP addresses public concern further as follows: BLM will formally request that DOE include at least one of the Noble’s wells to be drilled within the Project Rulison Three-Mile Area in DOE’s long-term monitoring program.

**APPENDIX B**

**BLM Surface-Use Conditions of Approval  
and Downhole Regulatory Reminders**

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**BLM SURFACE-USE CONDITIONS OF APPROVAL (COAs)  
(See Appendix C for WRNF Site-Specific COAs for NFS lands)**

**STANDARD SURFACE-USE COAs**

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 EA. In cases of discrepancies, the following COAs supersede earlier versions.

1. Administrative Notification. The operator shall notify the BLM or Forest Service representative (whichever is applicable) at least 48 hours prior to initiation of construction or reclamation activities.
2. Road Construction Use and Maintenance. Proposed roads would be constructed within an average disturbance corridor 60 feet wide, reduced to 26 feet of finished road surface (including bar ditches) after interim reclamation (see Table 1). A track-mounted hydro-axe or tree chipper would be used to clear vegetation including trees within the proposed limits of disturbance for the planned roads. Earth-moving equipment would be used to segregate and windrow the topsoil along the edge of the proposed road corridor. Roads shall be crowned, ditched, surfaced, drained with culverts and/or water dips, and constructed to Gold Book standards (*Surface Operating Standards for Oil and Gas Exploration & Development* -USDI and USDA 2007) and/or *Forest Service Design Criteria on Forest Lands* (USDA 1987) and based on the stamped engineered road design plans prepared by Noble's engineering firm, URS. Initial gravel application shall be a minimum of 4 inches to provide an all-weather travelway. 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 six inches, blading and/or gravelling shall be conducted as approved by the authorized officer.

Sedimentation and stream channel impacts associated with roads 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, step-cutting, limiting road grade to 10%, crowning road surfaces, and installing culverts and drainage systems.

As noted in the URS road design package, Noble would construct two to three sediment ponds on private land along the eastern edge of the access road; one of these would be within the CCMDP area. All three would act to trap stormflow and entrained sediment diverted along the roadside relief ditch, reducing potential sediment loading to nearby streams., and providing a water source for grazing livestock and wildlife.

During snow removal, snow berms shall not be left on road surfaces; snow shall be deposited past the edge of the road shoulder, but not outside the road clearing limits.

On ungraveled roads, vehicle travel shall be avoided during excessively wet or muddy conditions.

3. Construction Disturbance. The disturbance limits of all proposed roads, pipelines, and well pads would be staked and/or flagged prior to any commencement of operations. Straw wattles would be staked along the outer edge of the proposed disturbance limits of new roads, pipelines, or pads. A range fence would be installed around the disturbance perimeter of each pad and a cattleguard

would be installed at each pad entrance prior to construction startup to reduce conflicts with livestock grazing. All trees and brush within the disturbance corridors of proposed roads, pipelines, and pads would be hydro-axed or chipped prior to beginning excavation work.

4. Dust Abatement. The operator shall implement dust abatement measures as needed to prevent fugitive dust from vehicular traffic, equipment operations, or wind events. The authorized officer may direct the operator to change the level and type of treatment (watering or application of various dust agents, surfactants, and road surfacing material) if dust abatement measures are observed to be insufficient to prevent fugitive dust.
5. Drainage Crossings and Culverts. Construction activities at perennial, intermittent, and ephemeral drainage crossings (e.g. burying pipelines, installing culverts) shall be timed to avoid high flow conditions. Construction that disturbs any flowing stream shall utilize either a piped stream diversion or a coffer dam 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 18 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/Gunnison Basin Regulatory Office at 970-243-1199.

6. Pipeline Construction and Use. 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 preconstruction conditions.

Pipelines intended to transport of natural gas, water or other liquids generated from natural gas production would be pressure tested prior to use to detect any leakage.

7. 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/Gunnison Basin Regulatory Office at 970-243-1199.

For the access road and all pads that impinge on streams, written documentation to the BLM authorized officer is required within 30 days of construction or APD approval to indicate that the USACE was notified prior to construction or that 404 Permits have been obtained or are not required. Documentation may be a copy of the pre-construction notification form or an official letter from the USACE.

8. Wetlands and Riparian Zones. The operator shall restore temporarily disturbed wetlands or riparian areas. The operator shall consult with the BLM Glenwood Springs Field Office to determine appropriate mitigation, including verification of native plant species to be used in restoration.

9. 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. Deadline for Temporary Seeding and Interim Reclamation. Topsoil storage piles, stormwater control features, and cut-and-fill slopes shall undergo temporary seeding to stabilize the material and minimize weed infestations within 30 days following completion of construction. Interim reclamation to reduce a well pad to the maximum size needed for production shall be completed within 6 months following completion of the last well planned for the pad.

Both of these deadlines are subject to being extended upon approval of the authorized officer based on season, timing limitations, or other constraints on a case-by-case basis.

- b. Topsoil Stripping, Storage, and Replacement. Topsoil shall be stripped following removal of vegetation during construction of well pads, pipelines, roads, or other surface facilities. This shall include, at a minimum, the upper 6 inches of soil. Any additional topsoil present at a site, such as indicated by color or texture, shall also be stripped. The authorized officer may specify a stripping depth during the onsite visit. The stripped topsoil shall be stored separately from subsoil or other excavated material and replaced prior to final seedbed preparation.
- c. 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.

- d. 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 allows use of a seed mix containing sterile hybrid non-native species in addition to native perennial 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.

- e. 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. Hydroseeding and hydromulching may be used in temporary seeding or in areas where drill-seeding or broadcast-seeding/raking are impracticable. Hydroseeding and hydromulching must 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. Requirements for reseeding of unsuccessful temporary seeding will be considered on a case-by-case basis.

- f. Mulch. Mulch shall be applied within 24 hours following completion of seeding. In areas of interim reclamation that used drill-seeding or broadcast-seeding/raking, mulch shall consist of crimping certified weed-free straw or certified weed-free native grass hay into the soil. Hydromulching shall be used in areas of interim reclamation where crimping is impracticable, in areas of interim reclamation that were hydroseeded, and in areas of temporary seeding regardless of seeding method.

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

- g. 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 authorized officer. Biodegradable matting, bales, or wattles of weed-free straw or weed-free native grass hay, or well-anchored fabric silt fence shall be used on cut-and-fill slopes and along drainages to protect against soil erosion. Additional BMPs shall be employed as necessary to reduce erosion and offsite transport of sediment.
- h. 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 authorized officer will approve the type of fencing.
- i. 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 authorized officer 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 authorized officer.

- 10. 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**.

11. Raptor Nesting. Raptor nest surveys for the CCMDP 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. Therefore, a Raptor Nesting Timing Limitation COA is not attached to this EA. Although BLM considers surveys conducted for a NEPA Environmental Assessment to be valid for 5 years, 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. Several established methods to prevent bird access are known to be effective; U.S. Fish and Wildlife Service (USFWS) has determined that the use of flagging is ineffective in deterring birds from using ponds or pits and provides no assurance of compliance with the MBTA. Regardless of the method used, it shall be employed as soon as practicable after the pit has begun receiving liquids. At a minimum, the method 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 970-947-5219 and visit <http://www.fws.gov/mountain-prairie/contaminants/oilpits.htm>.
13. Birds of Conservation Concern. Pursuant to BLM Instruction Memorandum 2008-050, all surface-disturbing activities are prohibited from May 15 to July 15 to reduce impacts to Birds of Conservation Concern (BCC). An exception to this COA will be granted if nesting surveys conducted no more than one week prior to surface-disturbing activities indicate that no BCC species are nesting or otherwise present within 10 meters of the area to be disturbed. Nesting surveys shall include an aural survey for diagnostic vocalizations in conjunction with a visual survey for adults and nests. Surveys shall be conducted by a qualified breeding bird surveyor between sunrise and 10:00 AM under favorable conditions for detecting and identifying a BCC species. This provision does not apply to ongoing construction, drilling, or completion activities that are initiated prior to May 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.

A range fence would be installed around the disturbance perimeter of each pad and a cattleguard would be installed at each pad entrance prior to construction startup to reduce conflicts with livestock grazing. The standard requirement for fencing of pits on well pads as well as the plan to initially install a perimeter fence around newly constructed well pads within the project area would mitigate concerns with livestock being injured around active well drilling activities

15. 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 authorized officer of the findings. The discovery must be protected until notified to proceed by the BLM authorized officer.

Where feasible, the operator shall suspend ground-disturbing activities at the discovery site and immediately notify the BLM authorized officer of any finds. The BLM authorized officer 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.

16. 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 authorized officer 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 authorized officer 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 authorized officer 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 authorized officer. Approval to proceed will be based upon evaluation of the resource. Evaluation shall be by a qualified professional selected by the BLM authorized officer 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 authorized officer 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 authorized officer 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 authorized officer 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 authorized officer will provide technical and procedural guidelines for relocation and/or to conduct mitigation. Upon verification from the BLM authorized officer 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).

17. Visual Resources. Above-ground facilities on the well pads and pipeline corridors including corrugated metal containment rings shall be painted Shadow Gray to blend with the existing landscape.

Production facilities shall be placed to avoid or minimize visibility from travel corridors, residential areas, and other sensitive observation points—unless directed otherwise by the authorized officer due to other resource concerns—and shall be placed to maximize reshaping of cut-and-fill slopes and interim reclamation of the pad. Final locations of facilities including storage tanks and separator units shall be jointly determined by BLM and Noble representatives after pad construction has been completed.

To the extent practicable, existing vegetation shall be preserved when clearing and grading for pads, roads, and pipelines. The authorized officer may direct that cleared trees and rocks be salvaged and redistributed over reshaped cut-and-fill slopes or along linear features. On pads, roads, or pipelines where boulder fields exist, reclamation would include the salvage and replacement of boulders to aid in restoring a natural appearance.

18. Cuttings Trench or Reserve Pit Use. The cuttings trench used to contain drill cuttings or the reserve pit used to contain drilling fluids and cuttings (depending on which method is used) would be lined to prevent infiltration into surrounding soils. A minimum of 2 feet of freeboard shall be maintained in the cuttings trench or reserve pit, whichever is used for cuttings storage. 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.

19. Soils. Topsoil shall be windrowed around the pad perimeter to create a berm that limits and redirects stormwater runoff and to extend 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 microbe health, reduce erosion, and prevent weed establishment.

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.

20. COGCC Project Rulison Compliance. Noble shall comply with all Colorado Oil and Gas Conservation Commission (COGCC) Rules, Orders, and Conditions of Approval associated with the Project Rulison Three-Mile Area, which specify that all well permits issued by COGCC are reported to and reviewed by the Department of Energy (DOE). The Federal wells proposed in the CCMDP shall be subject to meeting the requirements set forth in the COGCC policy statement issued by David Neslin, Director, on December 21, 2007. Included in these requirements are the following:
- a. Drill cuttings from Federal wellbores (mainly shale, sand, and miscellaneous rock minerals) shall be tested as required by the COGCC policy statement.
  - b. A drill rig with a closed-loop system shall be used on the proposed Federal wells.

#### **SITE-SPECIFIC COAS APPLICABLE TO BLM AUTHORIZATIONS**

1. Flare Stock Use on 19H and 19I Pads. The 19H and 19I pads shall utilize flare stacks as opposed to flare pits in order to avoid the risk of igniting surrounding vegetation.
2. Fall Construction Period for 17L Pad. The operator shall construct the 17L well pad and associated infrastructure (road, pipeline, and re-routing of irrigation ditch) in early fall during low flow, to reduce the likelihood of sediment entering Cache Creek.
3. Irrigation Ditch Realignment on 17L Pad. Construction of the 17L pad would require the relocation and reconstruction of an existing irrigation ditch. This ditch diverts water from Cache Creek to the northwest. The relocated irrigation ditch would be located downslope from pad 17L, thus serving as a sediment catchment that would direct any runoff and sediment from the pad away from Cache Creek. Transport of sediment off the pads and road would be minimized by stormwater controls required by the CDPHE Water Quality Control Division.
4. Channel Work on 17M Pad. An approximately 150-foot reach of one of the braids of Cottonwood Creek downstream of the 17M pad would be covered by fill from the portion of rerouted access road between 66+00 and 68+00 feet. This would necessitate rerouting the stream several feet to the northwest along a ditch to be lined with riprap. An existing Parshall (venturi) flume along this creek segment would be relocated approximately 75 feet downstream.

5. Irrigation Ditch Work on Access Road. Four irrigation ditches are also crossed by the existing access road, one of which is crossed twice; all crossings are located on private land. In two locations, the access road would be realigned to improve road gradient, necessitating alterations to the ditch crossings. Both ditch crossings would be culverted with 36-inch-diameter culverts lined with riprap at inlets and outlets; the ditches would not otherwise be diverted. At all other ditch crossings, if existing culverts appear to be inadequate, they would be replaced with new, properly aligned 36-inch culverts. Additionally, segments of two irrigation ditches up to 500 feet in length would be slightly realigned to accommodate pads 17L and 17M; both would incorporate riprap and geotextile linings, as needed.
6. Big Game Winter Range. To minimize impacts to wintering big game, no construction, drilling, or completion activities shall occur during a Timing Limitation (TL) period of December 1 through April 30 of each year. This stipulation applies to Federal lease COC66921 including the 17L and 17M pads.

### **DOWNHOLE REGULATORY REMINDERS**

Approval of this application does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.

All drilling operations, unless otherwise specifically approved in the APD, must be conducted in accordance with Onshore Oil and Gas Order No. 2.

All lease and/or unit operations will be conducted in such a manner that full compliance is made with applicable laws, regulations (43 CFR 3100), Onshore Oil and Gas Orders, and the approved plan of operations. The operator is fully responsible for the actions of his subcontractors.

A copy of the approved application for permit to drill (APD), including the conditions of approval and accompanying surface use plan will be furnished to the field representative by the operator to insure compliance and will be available to authorized personnel at the drillsite whenever active construction or drilling operations are underway.

**Be aware fire restrictions may be in effect when location is being constructed and/or when well is being drilled. Contact the appropriate Surface Management Agency for information.**

Section 102(b)(3) of the Federal Oil and Gas Royalty Management Act of 1982, as implemented by the applicable provisions of the operating regulations at Title 43 CFR 3162.4-1(c), requires that "not later than the 5th business day after any well begins production on which royalty is due anywhere on a lease site or allocated to a lease site, or resumes production in the case of a well which has been off production for more than 90 days, the operator shall notify the authorized officer by letter or sundry notice, Form 3160-5, or orally to be followed by a letter or sundry notice, of the date on which such production has begun or resumed."

If you fail to comply with this requirement in the manner and time allowed, you shall be liable for a civil penalty of up to \$10,000 per violation for each day such violation continues, not to exceed a maximum of 20 days. See Section 109(c)(3) of the Federal Oil and Gas Royalty Management Act of 1982 and the implementing regulations at Title 43 CFR 3162.4-1(b)(5)(ii).

## **EPA'S LIST OF NONEXEMPT EXPLORATION AND PRODUCTION WASTES**

While the following wastes are nonexempt, they are not necessarily hazardous.

- Unused fracturing fluids or acids
- Gas plant cooling tower cleaning wastes
- Painting wastes
- Oil and gas service company wastes, such as empty drums, drum rinsate, vacuum truck rinsate, sandblast media, painting wastes, spent solvents, spilled chemicals, and waste acids
- Vacuum truck and drum rinsate from trucks and drums, transporting or containing nonexempt waste
- Refinery wastes
- Liquid and solid wastes generated by crude oil and tank bottom reclaimers
- Used equipment lubrication oils
- Waste compressor oil, filters, and blowdown
- Used hydraulic fluids
- Waste solvents
- Waste in transportation pipeline-related pits
- Caustic or acid cleaners
- Boiler cleaning wastes
- Boiler refractory bricks
- Incinerator ash
- Laboratory wastes
- Sanitary wastes
- Pesticide wastes
- Radioactive tracer wastes
- Drums, insulation, and miscellaneous solids

**APPENDIX C**

**WRNF Site-Specific Conditions of Approval for NFS lands**

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**WRNF SITE-SPECIFIC CONDITIONS OF APPROVAL FOR NFS LANDS**  
**(See Appendix B for COAs on BLM and Split-Estate Lands)**

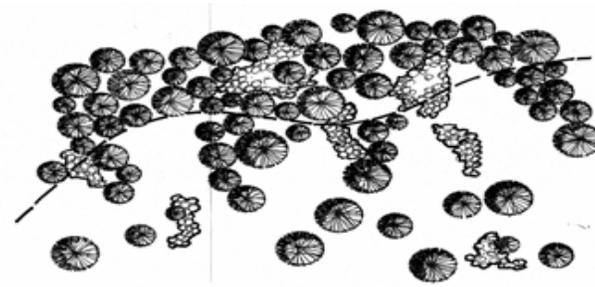
The standard BLM surface-use COAs identified in Appendix B shall also be applicable to actions on NFS lands except as modified by the WRNF Forest Supervisor or Rifle District Ranger in conjunction with issuance of a Road Use Permit and Special Use Permits, respectively.

1. Big Game Winter Range. To minimize impacts to wintering big game, no construction, drilling, or completion activities shall occur during a Timing Limitation (TL) period of December 1 through April 30 of each year. The TL would not be applied to traffic across National Forest Land associated with well or pipeline production or maintenance activities.
2. Big Game Birthing Areas. To protect elk calving, no construction, drilling, or completion activities shall occur during a Timing Limitation (TL) period of April 16 through June 30. This TL would prohibit vehicular traffic across National Forest Land associated with the initiation of construction, drilling, or completion activities on the three Fee pads accessed across the forest. The TL would not be applied to traffic across National Forest Land associated with well or pipeline production or maintenance activities.
3. Range Management. If range improvements are damaged during exploration and development, the operator would be responsible for repairing or replacing the damaged range improvements. A new cattleguard with bypass gate would be installed into the existing boundary fence located at the private/USFS boundary line.
4. Road and Pipeline Construction.
  - a. Noble shall obtain a Road Use Permit from the WRNF Supervisor's Office and a Special Use Permit from the Rifle Ranger District prior to construction and use of the 0.3 mile of road realignment and pipeline installation planned in Section 20.
  - b. Noble shall submit an as-built survey of the reconstructed road and buried pipeline to the Forest Service per requirements specified in the permits.
  - c. No facilities related to the pipeline installation other than the natural gas and water pipelines themselves shall be located on NFS lands. Following pipeline installation, sections of the existing access road on USFS land that are to be decommissioned shall be recontoured, culverts shall be removed, and natural drainage patterns shall be restored and revegetated.
  - d. As proposed by the operator, road crossings on NFS lands that utilize multiple side-by-side culverts shall be installed with grout between culverts and shall include concrete toe walls, in accordance with Colorado Department of Transportation standards.
  - e. As stated in the Road Management Decision and Design Criteria Worksheet prepared by the USFS, on USFS land all cut or fill slopes steeper than 55% and higher than 5 feet shall be buttressed by construction of retaining structures such as gabions, unless directed otherwise by the USFS authorized officer.
  - f. Unless approved by the authorized officer, all side-casting from road construction on slopes greater than 45% or into stream drainages shall be avoided.



by pipeline construction operations shall be removed from the site at sale completion.

- j. Any construction equipment created trails should be rehabilitated to reduce the color contrast of the exposed soil by randomly scattering and spreading slash or replacing scraped material. Cover exposed bare soil with adjacent organic material. Where feasible, construction of skid trails should avoid creating straight line corridors when the skid trails connect with open system roads and trails. Temporary roads and skid trails shall be held to the minimum number, width, and length.
- k. Do not create consistent, even width edge clearing. The pipeline corridor shall vary in width. The existing vegetation shall have a natural appearance with uneven edges rather than straight lines. Clearing edges shall be made irregular and freeform, using feathering and undulating edges where practicable. The edges of the stands shall be varied and random to soften and blend with the native vegetation mosaic.



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**APPENDIX D**

**Noble Energy Master Drilling Plan**

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**Noble Energy, Inc.  
Master Drilling Plan**

Federal 17L pad, located in SW/4 of Section 17, T7S, R94W, Lease COC066921  
Federal 17M pad, located in SW/4 of Section 17, T7S, R94W, Lease COC066921  
Federal 19H pad, located in NW/4 of Section 20, T7S, R94W, Lease COC066921  
Federal 19I pad, located in SE/4 of Section 19, T7S, R94W, Lease COC066921  
Federal 20F pad, located in NW/4 of Section 20, T7S, R94W, Lease COC066921  
Garfield County, Colorado

**DRILLING PROGNOSIS**

(Please see directional drilling plan.)

**1. ESTIMATED TOPS OF IMPORTANT GEOLOGIC MARKERS**

(for KB elevation add 16 feet)

| <b><u>FORMATION</u></b> | <b><u>Top (MD)</u></b> |
|-------------------------|------------------------|
| Wasatch                 | Surface                |
| Williams Fork           | 6,498'                 |
| Top of Gas              | 7,322'                 |
| Cameo Coal              | 9,095'                 |
| Rollins                 | 9,555'                 |
| Cozzette                | 9,894'                 |
| Corcoran                | 10,173'                |
| Mancos                  | 10,303'                |
| <b>Total Depth</b>      | <b>10,453'</b>         |

**2. ESTIMATED DEPTHS OF ANTICIPATED WATER, OIL, GAS OR MINERAL-BEARING FORMATIONS**

| <b><u>FORMATION</u></b> | <b><u>DEPTH (MD)</u></b> | <b><u>SUBSTANCE</u></b> |
|-------------------------|--------------------------|-------------------------|
| Wasatch                 | Surface                  | Water                   |
| Williams Fork           | 6,498'                   | Gas/Oil/Water           |
| Top of Gas              | 7,322'                   |                         |
| Cameo Coal              | 9,095'                   | Gas/Oil/Coal/Water      |
| Rollins                 | 9,555'                   | Gas/Oil/Water           |
| Cozzette                | 9,894'                   | Gas/Water               |
| Corcoran                | 10,173'                  | Gas/Water               |
| Mancos                  | 10,303'                  | Gas/Water               |

Any usable water zones encountered will be adequately protected and reported. All usable water zones, potentially productive hydrocarbon zones, and valuable mineral zones will be isolated.

**3. PRESSURE CONTROL EQUIPMENT**-Schematic attached

- A. Type:           11.00" x 5000 psi WP Annular BOP  
                  11.00" x 5000 psi WP Double Ram BOPs  
                  Rotating Head

**The Blow Out Prevention Equipment will be set up as follows:**

- Rotating Head
  - Annular Preventer
  - Blind Rams (4.5")
  - Pipe Rams
  - Drilling Spool with 2-3" outlets
  - Double Studded Adapter 11" x5000 psi and 11" x 5000 psi
  - Casing Head
  - Kill line equipped with 2-2" x5000 psi valves and 1-2" x 5000 psi check valve as a minimum.
  - Choke line equipped with 2-3" x 5000 psi valves
  - Choke manifold equipped with 2-3" x 5000 psi valves, 4-3" x 5000 psi wing outlet valves, a remote operated choke, a manual choke, 2-3" x 5000 psi valves downstream of the remote chokes, 2-3" x 5000 psi valves downstream of the manual choke and a pressure gauge. Bypass line from flare line to mud gas separator line.
  - Upper Kelly cock with handle available on floor
  - Internal blowout preventer, and full opening safety valve to fit all connections
- B.     **Pressure rating:** 5,000 psi working pressure
- C.     **Testing Procedures:**

***Annular Preventer***

At a minimum, the Annular Preventer will be pressure tested to 50% of the rated working pressure for a period of ten (10) minutes or until provisions of the test are met, whichever is longer. The above pressure test will be performed as required.

- At initial installation
- Whenever any seal subject to test pressure is broken
- Following any related repairs

In addition, the annular preventer will be functionally operated at least weekly.

**Ram Preventers**

At a minimum, the Ram Preventers and the remaining BOPE (with the exception of the annular preventer) will be pressure tested to the approved working pressure of the BOP stack (if isolated from the surface or intermediate casing by a test plug). If the BOP stack is not isolated from the casing, then the equipment will be tested to 70% of the internal

yield strength of the casing. Pressure will be maintained for a period of at least ten (10) minutes or until the requirements of the test are met, whichever is longer.

The above pressure test will be performed as required.

- At initial installation
- Whenever any seal subject to test pressure is broken
- Following any related repairs

In addition to the above, the pipe and blind rams will be activated each trip, but not more than once each day. All BOP drills and tests will be recorded in the IADC driller's log. The Glenwood Springs BLM Petroleum Engineer Technician and the Colorado Oil and Gas Conservation Commission (COGCC) will be notified at least twenty-four (24) hours in advance of pressure tests.

**D. Choke Manifold Equipment:**

All choke lines will be straight unless turns utilize tee blocks or are targeted with running tees, and the lines will be anchored to prevent whip and vibration. A 5000 psi flex choke hose may be utilized from the BOP to the choke manifold upon prior approval from BLM. Any variance requests will need to be on a sundry form 3160-5 and include the manufacturer's recommended installation, pressure rating, maximum turn radius, heat rating, and anchoring.

**E. Accumulator:**

The accumulator will have sufficient capacity to open the hydraulically-controlled choke line valve (if so equipped), close all pipe rams plus the annular preventer, and retain a minimum of 200 psi above the precharge on the closing manifold without the use of the closing unit pumps. The fluid reservoir capacity will be double the usable fluid volume of the accumulator's system capacity and the fluid level of the reservoir will be maintained at the manufacturer's recommendations.

The BOP system will have two (2) independent power sources to close preventers. Nitrogen bottles (3 minimum) will be back-up for the two (2) power sources.

The accumulator precharge pressure test will be conducted prior to connecting the closing unit to the BOP stack and at least once every six (6) months thereafter. The accumulator pressure will be corrected if the measured precharge pressure is found to be above or below the maximum or minimum limits specified in *Onshore Oil a Gas Order Number 2*.

**F. Well Control Drills:**

Well control drills will be conducted by each crew after drilling out of the surface casing. The date and the time of the drills will be recorded in the IADC drilling book.

**G. Monitoring Equipment:**

When drilling below surface casing the following equipment will be utilized. Pit volume totalizer (PVT) equipment will be rigged up in the mud tanks to monitor mud volumes in the active mud system. With a gain and/or loss of ten barrels, an alarm will go off. A

flow indicator will be rigged up on the flow line to show when flow down the flow line is taking place. Stroke counters will be installed on both mud pumps to monitor pump strokes during all pumping activities. All of this equipment will be installed in a manner that will allow the driller to monitor this equipment from the rig floor when drilling.

**H. Miscellaneous Information:**

The Blow-Out Preventer and related pressure control equipment will be installed, tested, and maintained in compliance with the specifications in and the requirements of *Onshore Oil and Gas Order Number 2*.

The choke manifold and BOP extension rods with hand wheels will be located outside the rig substructure. The hydraulic BOP closing unit will be located at least twenty-five (25) feet from the well head and will be readily accessible to the driller. Exact locations and configurations of the hydraulic BOP closing unit will depend upon the particular rig contracted to drill this hole.

Flare lines will be installed downstream from the choke manifold, extending a minimum of one hundred (100) feet from the center of the drill hole to a separate flare pit.

**4. PROPOSED CASING AND CEMENTING PROGRAM**

***Casing Program:***

| Hole Size | Casing Size        | Wt./Ft. Grade | Joint | Depth       |
|-----------|--------------------|---------------|-------|-------------|
| 20"       | 16" Conductor Pipe |               |       | 60'         |
| 12-1/4"   | 8-5/8"             | 24.0          | J-55  | LTC 2500'   |
| 7-7/8"    | 4-1/2"             | 11.6          | I-80  | LTC 10,453' |

Casing strings will be pressure tested to 0.22 psi/ft of casing string length or to 1,500 psi whichever is greater (not to exceed 70% of the internal yield strength of the casing bottom hole pressure), after cementing and prior to drilling out from under the casing shoe. Surface casing shoe will be set in a competent formation. Surface casing shall have centralizers on the bottom three joints, with a minimum of one centralizer per joint.

***Cementing Program:***

Surface Casing: Lead with 370 sx Rockies Lite plus additives mixed at 12.3 ppg with a yield of 2.34 ft<sup>3</sup>/sx. Tail with 180 sx Rockies Lite plus additives mixed at 12.8 ppg with a yield of 2.09 ft<sup>3</sup>/sx. Cement to surface. Top out with 1" pipe if necessary. This will need prior approval from a Glenwood Springs Energy Office Petroleum Engineer.

Production Casing: Lead +/- 200 sks 50/50 POZ plus additives @ 12.0 ppg & tail +/- 250 sks 50/50 POZ plus additives @ 13.1 ppg. TOC ± 6298' (minimum of 200' above top of Mesa Verde (Williams Fork)).

Actual cement volumes to be determined after reviewing logs and shows. All potentially productive zones will be covered with cement. All

waiting on cement times shall be adequate to achieve a minimum of 500 psi compressive strength at the casing shoe prior to drilling out.

## 5. MUD PROGRAM

| Interval    | Type     | Weight      | Viscosity | Fluid Loss/Remarks |
|-------------|----------|-------------|-----------|--------------------|
| 0-2500'     | Gel/Lime | 8.5-9.0 ppg | 30-45     | ≤ 10 cc            |
| 2500' – TD' | LSND     | 8.8-9.5 ppg | 32-50     | ≤ 10 cc            |

The drilling fluids have been designed for optimal wellbore hydraulics and hole stability. Sufficient mud material(s) to maintain mud properties, control lost circulation and maintain well control will be available at the well during drilling operations.

## 6. EVALUATION PROGRAM

### Logs:

Density Neutron/Induction                      Base surface csg to TD

- No cores or DST's are planned.
- No stimulation treatments have been formulated for this well at this time. The drill site as approved will be of sufficient size to accommodate all completion activities.
- The evaluation program may change at the discretion of the wellsite geologist, with prior approval from the Authorized Officer, Glenwood Springs Field Office, Bureau of Land Management.
- Whether the well is completed as a dry hole or as a producer, *Well Completion and Recompletions Report and Log* (Form 3160-4) will be submitted to the Glenwood Springs Field Office and State of Colorado Oil and Gas Conservation Commission Office no later than thirty (30) days after the completion of the well or after completion of operations being performed.
- Two copies of all logs, core descriptions, core analyses, well test data, geologic summaries, sample descriptions and all other surveys or data obtained and compiled during the drilling, workover, and/or completion operations will be filed with Form 3160-4. Samples (cuttings, fluids, and/or gases) will be submitted when requested by the Authorized Officer, Glenwood Springs Field Office, Bureau of Land Management.

## 7. ABNORMAL CONDITIONNS

No abnormal temperatures or pressures are anticipated. No hydrogen sulfide has been encountered or is known to exist from previous drilling in the area at this depth.

## 8. ANTICIPATED STARTING DATES AND NOTIFICATION OF OPERATIONS

### A. Anticipated Starting Dates:

Operation Commencement date:                      January 2, 2009

|                 |                       |
|-----------------|-----------------------|
| Drilling Days   | Approximately 14 days |
| Completion Days | Approximately 14 days |

- B. Notification of Operations: COGCC and BLM must both be notified of spud date.

|                              |              |
|------------------------------|--------------|
| BLM Glenwood Springs Office: | 970-876-9000 |
| COGCC:                       | 303-894-2100 |

## 9. GENERAL CONDITIONS OF APPROVAL

- A. All lease and/or unit operations are to be conducted in such a manner to ensure full compliance with the applicable laws, regulations (43 CFR, Part 3160), Onshore Orders, Notices to Lessees, and the approved plan of operations.
- B. The spud date will be reported orally to the Glenwood Springs Field Office **24 HOURS PRIOR TO SPUDDING**, unless otherwise required in the site specific conditions of approval.
- C. All wells, whether drilling, producing, suspended or abandoned shall be identified in accordance with 43 CFR 3162.6. There shall be a sign or marker with the name of the operator, the lease serial number, the well number, and the surveyed description of the well.
- D. In accordance with *Onshore Oil & Gas Order Number 1*, this well will be reported on MMS form #3160-6, *Monthly Report of Operations and Production*, starting with the month in which operations commence and continuing each month until the well is physically plugged and abandoned. This report will be filed directly with the Royalty Management Program, Minerals Management Service, P.O. Box 17110, Denver, Colorado 80217.
- E. All undesirable events (fires, accidents, blowouts, spills, discharges) as specified in NTL-3A will be reported to the Glenwood Springs Field Office. Major events will be reported verbally within twenty-four (24) hours and will be followed with a written report within fifteen (15) days. Other than major events will be reported in writing within fifteen (15) days. Minor events will be reported on the *Monthly Report of Operations and Production* (form #3160-6).
- F. No well abandonment operations will be commenced without the prior approval of the Authorized Officer. In the case of newly drilled dry holes or failures, and in emergency situations, oral approval will be obtained from the Field Office Petroleum Engineer.
- G. A *Notice of Intention to Abandon* (form #3160-5) will be filed with the Authorized Officer within fifteen (15) days following the granting of oral approval to plug and abandon.
- H. Upon completion of approved plugging, a regulation marker will be erected in accordance with 43 CFR 3162.6. The following information will be permanently placed on the marker with a plate, cap, or beaded-on with a welding torch: Company Name, Well Name and Number, Location by Quarter/Quarter, Section, Township, Range, and the Federal Lease Number.
- I. A *Subsequent Report of Abandonment* (form #3160-5) will be submitted within thirty (30) days following the actual plugging of the wellbore. This report will indicate where plugs were placed and the current status of surface restoration operations. If surface restoration has not been completed at that time, a follow-up report on form 3160-5 will be filed when all surface restoration work has been completed and the location is considered ready for final

- inspection. If the location is on private surface, a *Landowner Acceptance of Reclamation* letter will be attached to this “Sundry Notice.”
- J. Pursuant to NTL-4A, lessees and operators are authorized to vent/flare gas during initial well evaluation tests, not exceeding a period of 30 days or the production of fifty (50) MMCF of gas, whichever occurs first. An application must be filed with the Authorized Officer, and approval received, for any venting/flaring of gas beyond the initial 30 day or otherwise authorized test period.
- K. Not later than the fifth (5th) business day after any well begins production on which royalty is due anywhere on a lease site or allocated to a lease site, or resumes production in the case of a well which has been off production for more than ninety (90) days, the operator shall notify the Authorized Officer by letter or Sundry Notice of the date on which such production has begun or resumed. The notification shall provide at a minimum, the following informational items:
- a. Operator name, address, and telephone number
  - b. Well name and number
  - c. Well location “ $\frac{1}{4}$ ,  $\frac{1}{4}$ , Section, Township, Range, P.M.”
  - d. Date well was placed in a producing status
  - e. The nature of the wells production (i.e.: crude oil casing gas, or natural gas and entrained liquid hydrocarbons).
  - f. The OCS, Federal or Indian lease prefix and number on which the well is located. Otherwise, the non-Federal or non-Indian land category (i.e.: state or private).
  - g. As appropriate, the communitization agreement number, the unit agreement name, number, and participating area name.
10. Within sixty (60) days following construction of a new tank battery, a site facility diagram of the battery showing actual conditions and piping must be submitted to the Authorized Officer. Facility diagrams shall be filed within sixty (60) days after existing facilities are modified. For complete information as to what is required on these diagrams, please refer to 43 CFR 3162.7-4(d).

Pursuant to Onshore Oil & Gas Order Number 1, lessees and operators have the responsibility to see that their exploration, development, production, and construction operations are conducted in such a manner which conforms with applicable Federal laws and regulations and with state and local laws and regulations to the extent that such state and local laws are applicable to operations on Federal and Indian lands.

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**APPENDIX E**

**Noble Energy Master Surface Use Plan of Operations**

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**NOBLE ENERGY, INC.**  
**MASTER SURFACE USE PLAND OF OPERATIONS**

**17L Pad – 16 Wells**  
**17M Pad – 17 Wells**  
**19H Pad – 14 Wells**  
**19I Pad – 13 Wells**  
**20F Pad – 19 Wells**

Garfield County, Colorado

**1. EXISTING ROADS**

An existing two track is in place up into Section 20 and with a few minor exceptions where Noble Energy has to straighten out steep inclines. The road will be upgraded and maintained, access roads built from the road into each location identified for drilling and production operations.

**2. PLANNED ACCESS ROADS**

Beginning at the town of Rifle, Colorado exit 90 on Interstate Highway 70, travel west for 9 miles to the Rulison exit (exit 81) at CR323. Turn left and travel South 0.5 miles to CR320. Turn left and travel easterly and southerly 2.8 miles to CR309. Turn right and travel westerly 0.8 miles to the intersection with CR301, then turn left and travel southerly and westerly 1.5 miles to the access road for the Noble 5L and 8D pads. Turn left and travel Southwesterly on 1.1 miles to the staked Noble 17D Pad access road. Then turn right and travel Southerly 1.1 miles to the staked 17L Pad access road. Continue Southerly 0.5 mile to the staked Noble 17M Pad access road. Continue Southerly 0.25 mile to the Noble 20F Pad staked access road.

**3. LOCATION OF EXISTING WELLS WITHIN A ONE (1) MILE RADIUS**

17 F Pad, Consists of nine wells, located in SENW, Section 17, T7S, R94W

**4. LOCATION OF PRODUCTION FACILITIES**

- A.** Please reference the attached schematic attached to the APD for the location of proposed production facilities on the well pad.
- B.** Facilities on the pad will consist of tank and production units. Reference APD for specific count. A single production unit consists of a separator, line heater, and meter combination. Load lines will have a barrel under the end to catch drips.
- C.** A 16.00” to 20.00” steel gas gathering trunkline and a 4-inch flexsteel produced water line will be buried side by side in a common ditch constructed alongside the new access roads or in the existing two track serving the 17L, 17M, 19H, 19I, and 20F well pads. These gathering lines will extend approximately 2.5 miles in a northerly direction to existing Noble tie-ins. These trunklines will pass alongside the 17L, 17M, and 20F pads to collect their gas and produced fluids. The 19H and 19I pads are located to the west of the trunkline and will each require additional flowlines of 2,200 feet and 1,300 feet of 8.625- to 12.00-inch steel gas line and 4” flexsteel water lines respectively to tie-in to the new trunkline.

All lines will be buried a minimum of 4 feet deep from the top of pipe. The maximum disturbed width will be 60 feet, all within the road corridor. The gas lines will operate at 500 pounds per square inch (psi) and be tested to 1,000 psi using water or nitrogen. The water line will operate at 400 psi. Test water will be disposed of into Noble reserve pits. **Noble anticipates that these lines will handle the production from all wells to be drilled from these pads.**

- D. Construction materials needed for installation of the production facilities will be obtained from the site; any additional materials required, such as gravel, will be purchased from a local supplier having a permitted source of materials in the area.
- E. A berm or metal ring will be constructed completely around the tank battery. The berm will be constructed of compacted subsoil, be impervious, and hold 110% of the capacity of the largest vessel. If a metal ring is used, it, too, will be of sufficient size to hold 110% of the capacity of the largest vessel.
- F. All permanent (onsite for six (6) months or longer) above-the-ground structures constructed or installed on the well location, including, tank batteries, production units, etc., and excluding those subject to OSHA regulations, will be painted Shale Green (5Y 4/2). This also includes metal containment rings surrounding the tank batteries and any pipeline risers.
- G. During drilling and subsequent operations, all equipment and vehicles will be confined to the access road, pad, and any additional areas which may be specified in the approved APD.
- H. Reclamation of disturbed areas no longer needed for operations will be accomplished by grading, leveling, and seeding as recommended by the Authorized Officer, Glenwood Springs Field Office, Bureau of Land Management.

**5. LOCATION AND TYPE OF WATER SUPPLY**

Water for drilling operations will be obtained from the Colorado River on Savage property by a water hauling company permitted for this activity.

**6. SOURCE OF CONSTRUCTION MATERIALS**

- A. Any construction materials (gravel) which may be required for surfacing of the drill pad will be obtained from a private contractor having a previously approved source of materials within the general area. If practicable, a rock crusher will be used to crush existing rock obtained from pad construction to obtain construction material.
- B. No construction materials will be taken from Federal or Indian lands without prior approval from the appropriate Surface Management Agency.
- C. No new access roads will be required for the transportation of construction materials to the well location.

**7. METHOD OF HANDLING WASTE MATERIALS**

Noble plans to utilize a Closed Loop Mud System. This is a requirement set forth in the Colorado Oil and Gas Conservation Commission policy statement of December 21<sup>st</sup>, 2007. A lined cuttings pit will be constructed to hold cuttings from wells.

- A. Cuttings – the drilled cuttings will be incorporated into the pad fill. During drilling operations, cuttings will be placed inside lined cuttings pits.
- B. Drilling Fluids – all fluids will be contained within the closed loop system and recycled.
- C. Produced fluids – liquid hydrocarbons produced during completion operations will be placed in test tanks on the location. Produced water will also be contained in tanks until the pipeline can be installed.
- D. Any spills of oil, gas, salt water or other potentially hazardous substances will be immediately cleaned up and removed to an approved disposal site.
- E. Sewage – portable, self-contained chemical toilets will be provided for human waste disposal. Upon completion of operations, or as required, the toilet holding tanks will be pumped and contents therein disposed of in an approved sewage disposal facility. Sewage disposal will be in strict accordance with Colorado State rules and regulations regarding sewage treatment and disposal.
- F. Garbage and other waste material – all garbage and non-flammable waste material will be contained in a self-contained, portable dumpster or trash cage. Upon completion of operations, or as needed, the accumulated trash will be hauled offsite to a State of Colorado approved sanitary landfill.
- G. Immediately after removal of the drilling rig, all debris and other waste materials not contained in the trash cage will be cleaned up and removed from the well location. No potentially adverse materials or substances will be left on location.

**8. ANCILLARY FACILITIES**

None anticipated.

**9. WELLSITE LAYOUT**

- A. Exhibit 2A shows the drill pad to be constructed; Exhibit 3 provides a cross-sectional view.
- B. All equipment and vehicles will be confined to the approved areas in this Application for Permit to Drill (i.e., access road, well pad, production pad).

**10. PLANS FOR RECLAMATION OF THE SURFACE**

- A. Rat and mouse holes will be backfilled and compacted from bottom to top immediately upon release of the completion rig from the location.
- B. Producing Operations:
  - 1. Backfilling, leveling, and re-contouring are planned as soon as possible after cessation of drilling and completion operations. Waste and spoil materials will be disposed of immediately upon cessation of drilling and completion operations.
  - 2. For production, the fill slopes will be reduced and the cut slopes will be reduced by pushing the fill material back up into the cut.

3. Upon completion of backfilling, leveling and re-contouring, all disturbed surfaces (access road and well pad areas) will be evenly distributed with top soil stockpiled to a depth of six (6) inches over the reclaimed area(s).
  4. Prior to commencement of seeding operations, the seedbed will be prepared by disking on the contour to a depth of four (4) to six (6) inches, leaving no depressions that would trap water or form ponds.
  5. If conditions permit, the restored portions will be left rough and broadcast seeded. All disturbed surfaces (including the access road and the well pad areas) will be re-seeded using a seed mixture recommended by the Glenwood Springs Field Office, Bureau of Land Management.
  6. If the drilling method of seeding is utilized, it will be drilled on the contour with a seed drill equipped with a depth regulator in order to ensure even depths of planting. Seed will be planted between one-quarter (1/4) to one-half (1/2) inches deep, with shrub seeds planted in rows separate from the grass seeds. In this case, utilize the bins on the outside rows of the drill for shrub seeds.
  7. The broadcast method may be used instead of the drilling methods. If this is the case, the surface will be left in a rough condition and the seed mixtures will be doubled. The preferred method will be approved by the BLM at the time of restoration.
  8. Fall seeding will be completed after September 1<sup>st</sup> and prior to ground frost. If applicable, spring seeding will be completed after the frost has left the ground and prior to May 15<sup>th</sup>.
  9. The seeding will be repeated until a satisfactory stand, as determined by the Authorizing Officer, is achieved. The first evaluation of growth will be made following the completion of the first growing season.
  10. Reseeding activities are considered best in the fall, unless requested otherwise by the Authorized Officer Bureau of Land Management.
  11. Mulching may be required on soils with low reclamation potential; where mulching is deemed necessary a certified weed free straw or hay mulch will be crimped into the soil at an application rate of 2 to 4 tons per acre. Mulches may be applied by blowers, spreaders or by hand. The mulch strand lengths should be long enough to be anchored by crimping. The mulch will be crimped to a depth of 2 to 3 inches. The mulch will be spread uniformly over the area so that 75% or more of the surface is covered.
- C. Abandoned Well Location:
1. Upon final abandonment of the well location, gravel will be removed from the access road surface and well location (as directed by the Authorized Officer), water diversion installed as needed, and both the access road and well location will be restored to approximately the original ground contour(s) by pushing the fill material back into the cut and up over the backslope.

2. No depressions will be left that would trap water or form ponds. All disturbed surfaces (including the access road, well pad and production pad areas) will be re-seeded as directed by the BLM and revegetated sites will be monitored to ensure that desired species are thriving and invasive/noxious weeds are not present.

## 11. SURFACE OWNERSHIP

The well site, production pad, and access road are located on private lands except for a access road of 1,600 feet on National Forest System lands.

## 12. OTHER INFORMATION

- A. The Greenback Cutthroat Trout has been found indigenous to this area and Noble Energy will be responsible for all mitigation measures to protect this species during their operations. A Biological Assessment and Biological Evaluation are being prepared and will be addressed in the Environmental Assessment.
- B. Noble Energy will be responsible for informing all persons associated with this project that they will be subject to prosecution for damaging, altering, excavating, or removing any archaeological historical, or vertebrate fossil objects or sites.
- C. If archaeological, historical, or vertebrate fossil materials are discovered, Noble Energy will suspend all operations that further disturb such materials and immediately contact the Authorized Officer. Operations will not resume until authorization to proceed is issued by the Authorized Officer.
- E. Construction activities, reclamation, and/or routine maintenance activities will not be conducted during periods when the soil is frozen or saturated, or when watershed damage is likely to occur as a result of these activities. All BMP's will be in place for each pad and road. Wattles will be in place before the start of construction of all pads.
- F. Noble Energy will be responsible for weed control on disturbed areas within the exterior limits of this permit and will consult with the Authorized Officer and/or local authorities for acceptable weed control measures.
- G. Noble Energy will be responsible for applying dust abatement measures as needed or directed by the Authorized Officer. The level and type of treatment (watering or application of various dust agents, surfactants, and road surfacing material) may be changed in intensity and must be approved by the Authorized Officer. Dust control is needed to prevent heavy plumes of dust from road use that create safety problems and disperses heavy amounts of particulate matter on adjacent vegetation.
- H. Hazardous Materials
  1. The concentration of hazardous substances in the reserve pit at the time the pit is backfilled must not exceed the standards set forth in the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA).
  2. All gas and oil drilling related to CERCLA hazardous substances removed from the location and not reused at another drilling location must be disposed of at an EPA approved hazardous waste facility.

3. The permittee(s) and associated contractors shall comply with all applicable Federal, State and local laws and regulations, existing or hereafter enacted or promulgated, with regard to any hazardous material, as defined in this paragraph, that will be used, produced, transported or stored on the oil and gas lease, "Hazardous material" means any substance, pollutant or contaminant that is listed as hazardous under the CERCLA of 1980, as amended, 42 U.S.C. 9601 et seq., and its regulation. The definition of hazardous substances under CERCLA includes any "hazardous waste" as defined in the RCRA of 1976, as amended, 42 U.S.C. 6901 et seq., and its regulations. The term hazardous materials also includes any nuclear or byproduct material as defined by the Atomic Energy Act of 1954, as amended, 42 U.C.S. 2011 et seq. The term does not include petroleum, including crude oil or any fraction thereof that is not otherwise specifically listed or designated as a hazardous substance under CERCLA Section 101 (14), 42 U.S.C. 9601 (14) nor does the term include natural gas.
4. No hazardous substances or wastes will be stored on the location after completion of the well.
5. Chemicals brought to location must be on the Toxic Substance Control Act (TSCA) approved inventory list. For the list of chemicals and their quantities to be stored, produced, used, transported, or disposed.
6. All hazardous substances brought to the location will have a MSDS, and will be properly handled as to not cause harm to the environment or to people.
7. All Material Safety Data Sheets (MSDS) will be kept on location until the hazardous material is properly disposed of, all in accordance with Federal Law.

Noble Energy, Inc., maintains a file, per 29 CFR 1910.1200 (g) containing current Material Safety Data Sheets (MSDS) for all chemicals, compounds, and/or substances which are used during the course of construction, drilling, completion, and production operations for this project. Hazardous materials (substances) which may be found at the site may include drilling mud and cementing products which are primarily inhalation hazards, fuels (flammable and/or combustible), materials that may be necessary for well completion/stimulation activities such as flammable or combustible substances and acids/gels (corrosives). The opportunity for Superfund Amendments and Reauthorization Act (SARA) listed Extremely Hazardous Substances (EHS) at the site is generally limited to proprietary treating chemicals. All hazardous and Extremely Hazardous Substances and commercial preparations will be handled in an appropriate manner to minimize the potential for leaks or spills to the environment.

All undesirable events (fires, accidents, blowouts, spills, discharges) as specified in Notice to Lessees (NTL) 3A will be reported to the BLM, Glenwood Springs Field Office. Major events will be reported verbally within 24 hours, followed by a written report within 15 days. "Other than Major Events" will be reported in writing within 15 days. "Minor Events" will be reported on the Monthly Report of Operations and Production (Form 3160-6).

**13. LESSEE'S OR OPERATOR'S REPRESENTATIVE AND CERTIFICATION**

Linda Pavelka  
Regulatory Manager  
Noble Energy, Inc.  
1625 Broadway, Suite 2200  
Denver, CO 80202  
**Phone: 303-228-4064**

**Certification**

All lease and/or unit operations will be conducted in such a manner that full compliance is made with all applicable laws, regulations, *Onshore Oil and Gas Orders*, the approved plan of operations, and applicable *Notices to lessees*.

The dirt contractor will be provided a copy of the Surface Use Plan from the approved Application for Permit to Drill.

This drilling permit will be valid for a period of two (2) year from the date of approval. After permit termination, a new application will be filed for approval for any future operations.

I hereby certify that I, or someone under my direct supervision, have inspected the drill site and access route proposed herein; that I am familiar with the conditions which currently exist; that I have full knowledge of State and Federal laws applicable to this operation; that the statements made in this APD package are, to the best of my knowledge, true and correct; and that the work associated with the operations proposed herein will be performed in conformity with this APD package and the terms and conditions under which it is approved. I also certify that I, or the company I represent, am responsible for the operations conducted under this application. These statements are subject to the provisions of 18 U.S.C. 1001 for the filing of false statements.

Executed this 29<sup>th</sup> day of April, 2009.  
Name Linda Pavelka  
Position Title Regulatory Mgr.  
Address 1625 Broadway, Denver, CO 80202  
Telephone 303-228-4064  
Field representative (if not above signatory) \_\_\_\_\_

Address (if different from above) \_\_\_\_\_  
Telephone (if different from above) \_\_\_\_\_  
E-mail (optional) \_\_\_\_\_

Signed: Linda Pavelka  
Linda Pavelka, Regulatory Manager

Date: 4/29/2009