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Bureau of Land Management
Colorado State Office

Glenwood Springs Energy Office May 2008



**Environmental Assessment of the
Helmer Gulch Master Development Plan
for Oil and Gas
EA# CO140-2007-134**



**Drafted by: O&G Environmental Consulting
for
Glenwood Springs Energy Office
2425 South Grand Avenue, Suite 101
Glenwood Springs, CO 81601**

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EXECUTIVE SUMMARY

Project Proposal

Laramie Energy II, LLC, proposes to develop oil and gas resources in an area of approximately 1,360 acres of Federal, private, and split-estate lands located southwest of Rifle, Garfield County, Colorado. The proposed development plan, referred to as the Helmer Gulch Master Development Plan (HGMDP), was prepared by the Bureau of Land Management (BLM), Glenwood Springs Energy Office (GSEO) to meet the requirements for an Environmental Assessment (EA) under the National Energy Policy Act (NEPA). The HGMDP was prepared based on information provided by Laramie and its consultants and on independent review and analysis by a BLM Interdisciplinary (ID) Team.

The proposed action put forth by Laramie II and embodied in the HGMDP consists of drilling up to 131 wells from five new pads on Federal surface and seven existing well pads (six on private surface and one on Federal surface). The bottomhole locations of the 131 wells would include 116 completed in Federal mineral estate and 15 in private mineral estate. The drilling rate is expected to result in 10 wells being completed in 2008, with the remainder being completed in 4 to 7 years.

The ability of Laramie II to reach the planned 131 bottomhole locations from a total of 12 pads (five new, seven existing) results from the use of directional drilling technology. Consequently, surface locations would be at a density of about four pads per square mile (one pad per 160 acres). Because of this type of clustered development, with up to 20 wells on a pad, total surface disturbance from well pad construction would be approximately 20.9 acres, representing a range in pad size from 3.3 to 4.5 acres. Interim reclamation of the pads following completion of the wells would reduce the long-term area of surface disturbance to approximately 5.3 acres for the five new pads.

Other ground-disturbing activities described in the HGMDP would include 3.0 miles of new access roads and 1.5 miles of new pipelines collocated with the new roads. The new roads and buried pipelines would be built within a 50-foot right-of-way (ROW), to be reduced to a 30-foot ROW following construction. An additional 1.5 miles of new pipeline would be built within a separate 50-foot ROW along an existing Encana pipeline and along existing roads. The initial disturbance of road and pipeline construction would be 27.5 acres. Long-term surface disturbance would be 10.9 acres.

Permanent surface facilities needed at each pad to support oil and gas development would include the wellheads, separation/dehydration units, and aboveground tanks for storage of condensate and produced water. Each pad would also have a “cuttings pit” for the disposal of drill cuttings and miscellaneous drilling debris. Following completion of the wells at a pad, the cuttings pit would have debris removed and would then be dried, backfilled, covered, and reclaimed. Produced water from the wells would be transported by buried pipeline or by truck when necessary, to Laramie II’s water collections facilities. Gas pipeline compressors are not expected as part of this proposal.

Following completion activities at a pad, areas not needed during production would be revegetated using reclamation methods, standards, and species specified by BLM. When all of the wells at a pad are no longer producing economic quantities of gas, the wells would be closed and abandoned, and the pad would undergo final reclamation.

No Action Alternative

In order to provide a basis for comparison, the environmental impacts of implementing a no action alternative were also evaluated. In this case, “no action” means that the BLM would not approve any of the proposed developments on Federal surface or involving Federal mineral estate. There are, however, elements of the HGMDP that are proposed on private surface locations involving privately held mineral estate. For the

purposes of comparative analysis, it is assumed that these developments would occur even if the BLM does not approve the developments on the Federal leases.

These developments would consist of the drilling and completion of 15 fee wells on two existing private pads. Since access to these locations already exists, no new road construction would be necessary. Laramie II would continue to drill and develop 11 wells previously analyzed and approved by the BLM on the Mead 30-11 and the Federal 31-01. Under this alternative, natural gas and produced water would be transported offsite through existing pipelines. Construction, drilling and completion, production, interim reclamation, workovers or recompletion, final abandonment, final reclamation, and weed management would follow the methods presented in the proposed action.

Impacts and Mitigation

The estimated total surface disturbance under the proposed action would be approximately 48.4 acres (20.9 acres for pads and 27.5 acres for new roads and pipelines). Long-term disturbance, following interim reclamation, would be approximately 16.2 acres. Protective surface use stipulations associated with the Federal leases include the following:

- Winter Timing Limitation (TL) to preclude exploration, drilling, and completion activities from December 1 through April 30 within 680 acres and January 15 through April 30 within 200 acres on two Federal leases.
- Controlled Surface Use (CSU) to protect Riparian and Wetland Zones by requiring special design, construction, and implementation measures.
- Controlled Surface Use (CSU) to protect BLM Sensitive Species by requiring special design, construction, and implementation measures.
- Controlled Surface Use (CSU) to protect Erosive Soils and Slopes Greater than 30 Percent by requiring special design, construction and operation and reclamation measures.

Conditions of Approval (COAs) developed in conformance to these restrictions on surface use, or within the general authority for resource protections granted to BLM under 43 CFR 3101, are provided in Appendices C and D of the HGMDP. These COAs are mitigation measures addressing road construction and maintenance; dust abatement; reclamation; control of noxious weeds; protection of federally listed, proposed, or candidate threatened or endangered species; protection of nesting raptors, nesting migratory birds, and wintering big game; protection of cultural resources; protection of paleontological resources; protection of surface water, including waters of the U.S.; and protection of visual resources. Downhole COAs (Appendix D) are also enforced by BLM to ensure that drilling operations protect prospectively valuable mineral resources and groundwater, including connected surface waters and domestic water wells.

Based on the existing site conditions of the HGMDP area, environmental consequences expected to result from the proposed action, the COAs presented in Appendices C and D, and applicable Federal and State standards for air quality, water quality, and hazardous materials management, the proposed action is not expected to result in significant impact levels for any environmental elements.

The no action alternative would result in no new surface disturbance. However, developments at the Leverich locations would involve the use of an access road for which an existing ROW grant exists. Laramie II would continue to drill and develop 11 wells previously analyzed and approved by the BLM on the Mead 30-11 and Federal 31-01 pads.

Although the types of environmental impacts anticipated under the no action alternative would be generally similar to the proposed action, the scope of the impacts would be smaller because far fewer developments are proposed that would require no Federal approval. With implementation of the same mitigation measures described for the proposed action, impacts under the no action alternative are considered minor. However, the no action alternative would not meet the purpose and need for the proposed action, that is, the development of Federal leases for the purpose of increasing the availability of oil and gas resources to the public would not occur.

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The environmental assessment analyzing the environmental effects of the proposed action has been reviewed. The approved mitigation measures result in a Finding of No Significant Impact on the human environment. Therefore, an environmental impact statement is not necessary to further analyze the environmental effects of the proposed action.

DECISION RECORD

DECISION: It is my decision to approve (with the exceptions outlined below) the Applications for Permit to Drill (APDs) and rights-of-way (ROWs) associated with the wells and other developments identified in Tables 1 and 3 of the Proposed Action (Helmer Gulch Master Development Plan) with the Conditions of Approval (COAs) identified in Appendices C and D. This decision will provide for the orderly, economical, and environmentally sound exploration and development of oil and gas resources on valid oil and gas leases.

After reviewing the HGMDP and its various recommendations regarding the Laramie II's development plan, any decisions regarding the 20-15 pad will be deferred until an agreement with Laramie II can be reached regarding the placement of production facilities, the appropriate geotechnical survey, report and recommendations are submitted to the BLM Glenwood Springs Energy Office, and resolving these issues would unduly delay the whole project.

RATIONALE:

1. Approval of the proposed action validates the rights granted with the Federal oil and gas leases to develop the leasehold for the purpose of providing commercial commodities of oil and gas.
2. The environmental impacts would be mitigated with measures included in the attached COAs.

MITIGATION MEASURES: Mitigation measures presented in Appendices C and D will be incorporated as COAs for both surface and drilling operations.

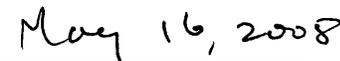
DRAFTED BY: O & G Environmental Consulting

PREPARED BY: Rick Haskins, Natural Resource Specialist, BLM

SIGNATURE OF AUTHORIZED OFFICIAL:



Authorized Officer



Date

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INTRODUCTION

Laramie Energy II, LLC (Laramie II) is proposing a 4- to 7-year development program for natural gas on approximately 1,360 acres of public (Federal) and split-estate (private surface, Federal mineral estate) lands. In addition, approximately 160 acres of private mineral estate lands in the area will also be developed. The lands are located in the southern portion of the Piceance Basin approximately 2 miles southwest of Rifle, Garfield County, Colorado. The project area includes portions of Sections 20, 29, 30 and 31, Township 6 South, Range 93 West (T6S, R93W) of the Sixth Principal Meridian. This proposal, referred to as the Helmer Gulch Master Development Plan (HGMDP), arises from the implementation for the prior Porcupine Creek Plan of Development that successfully demonstrated the potential of the area to contain economically viable reserves of natural gas (Tom Brown Incorporated 1997).

The U.S. Department of the Interior, Bureau of Land Management, Glenwood Springs Energy Office (GSEO), administers the Federal mineral estate in the HGMDP area. The GSEO has prepared this environmental assessment (EA) in compliance with the National Environmental Policy Act (NEPA) and in accordance with the format established by the Council on Environmental Quality (CEQ) regulations that implement NEPA. This EA discloses the direct, indirect, and cumulative impacts of the development proposal (i.e., the proposed action) and a no action alternative, and determines whether significant environmental impacts necessitating an environmental impact statement (EIS) would occur.

This proposal consists of constructing, drilling, completing, and operating up to 116 Federal wells and 15 private wells from five new and one existing location on BLM lands and six existing locations on private lands). Ancillary facilities connected to the project include access roads, pipelines to convey natural gas and produced water, and a variety of surface production equipment. Included in this proposal is a range of mitigation measures to minimize or eliminate impacts to surface and subsurface resources.

Purpose and Need for Action

The purpose of this proposal is to develop natural gas resources on Federal leases COC41916 and COC64181 consistent with existing Federal lease rights. The action is needed to increase the development of natural gas resources for commercial marketing to the public.

Instead of structuring the development of these leases as a series of individual actions, the current Glenwood Springs Resource Area (GSRA) land use plan (USDI 1999a) and more recent BLM policies specify the use of multi-well development proposals to more effectively manage development of Federal leases and Federal surface lands.

Issues

The CEQ regulations require an “early and open process for determining the scope of issues to be addressed and for identifying significant issues related to a Proposed Action” (40 CFR 1501.7). To satisfy this CEQ requirement, the BLM requested input from the public to identify their concerns with Laramie II’s proposal and to develop alternatives or mitigation measures that respond to those issues.

A Public Notice requesting comments on the HGMDP was published in the Glenwood Post Independent on June 19, 2007 and in the Rifle Citizen Telegram on June 21, 2007. Additionally, a letter containing the public notice information was mailed directly to multiple State and Federal agencies, adjacent landowners, the Town of Rifle, Wilderness Workshop, Garfield County, the Colorado Mule Deer Association, and the Colorado Division of Wildlife (CDOW). The 30-day public comment period ended on July 18, 2007.

In response to the solicitation for comment identified in the Public Notice, BLM received comments from the CDOW, the Colorado Mule Deer Association, the Wilderness Workshop, the Town of Rifle, and various citizens of the area (Appendix A).

Concerns identified through the public participation process included:

- traffic use patterns, congestion and associated impacts
- effects of habitat manipulation
- effects on big game and wildlife habitat
- erosion prevention
- use of best management practices
- interim reclamation methods

THE PROPOSED ACTION

The HGMDP is intended to describe future development strategy by Laramie II given current market conditions and company constraints. If fully developed, this proposal would result in 116 Federal wells and 15 private wells drilled at 12 surface locations, including five new and seven existing locations (Figures A and A1). If approved, Laramie II expects to drill up to ten Federal wells within the HGMDP in 2008 and larger numbers per year in subsequent years.

The total number of wells drilled and wells drilled per year would depend largely on factors out of Laramie II's control, such as availability of drill rigs, geologic success, engineering technology, economic factors (e.g., the price of natural gas and the cost of services), availability of commodity markets, and lease stipulations and notices.

In light of these factors, Laramie II may implement all or any combination of the following developments:

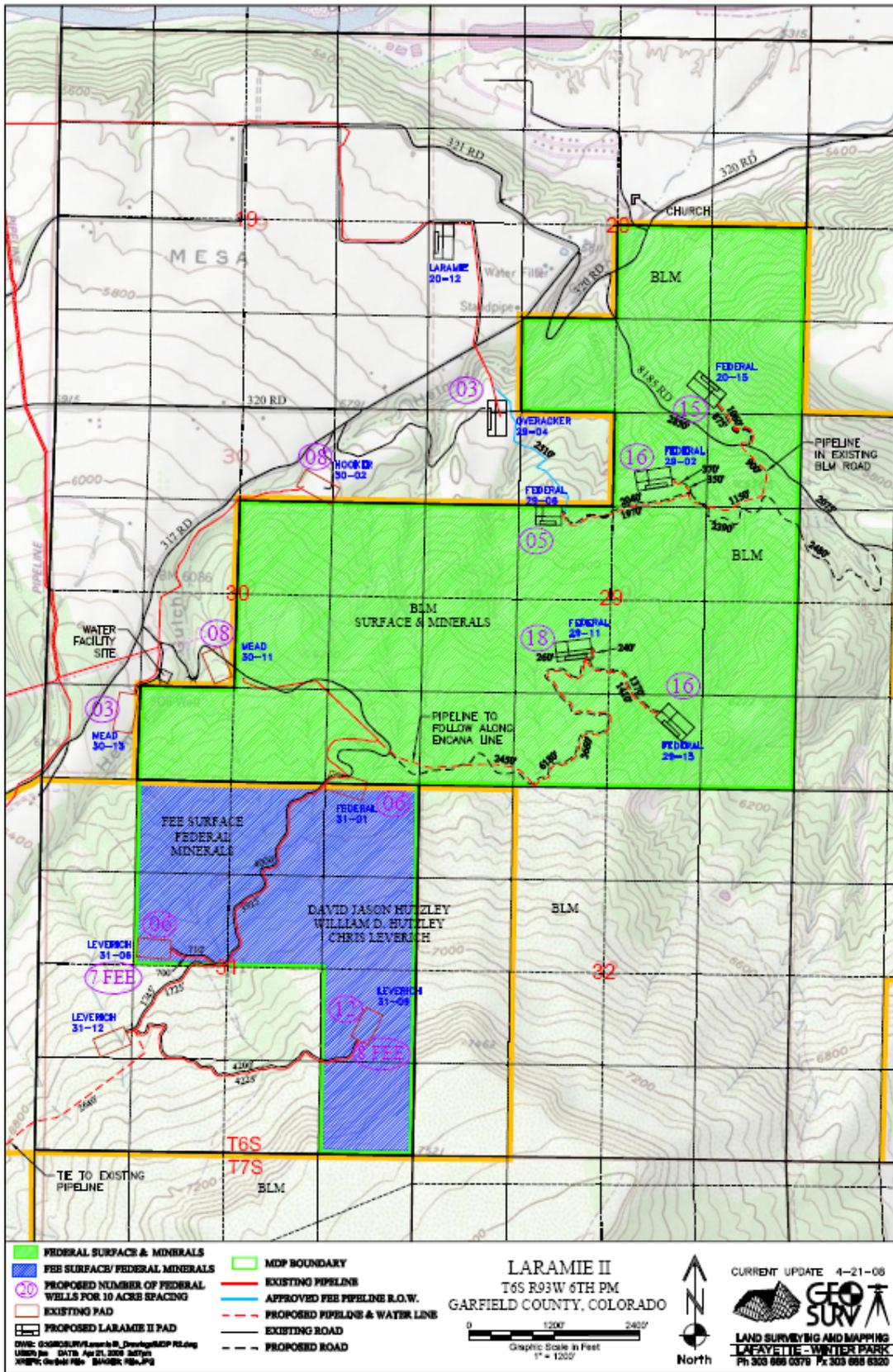
- Five new well pads with 70 Federal wells:
 - Five Federal pads (20-15, 29-02, 29-06, 29-11, 29-15) drilling 70 Federal wells
- Seven existing well pads with 46 Federal wells and 15 fee wells:
 - One existing Federal pad (31-01) drilling six additional Federal wells
 - Two existing split-estate pads (Leverich 31-06 and Leverich 31-09) drilling 18 Federal wells and 15 private wells
 - Four existing fee pads (Overacker 29-04, Hooker 30-02, Mead 30-11, and Mead 30-13) directionally drilling 22 Federal wells

Associated with these developments would be the construction of up to 3 miles of new access roads and up to 3 miles of pipelines, including those buried adjacent to roads (Figure A).

Full development of the proposed action does not preclude additional future development on these Federal leases. It might reasonably be anticipated that additional developments could occur in the future—either within the HGMDP area or in offsite areas accessed by directional drilling techniques from pads in the HGMDP area—due to alterations in downhole spacing orders or changes in environmental, economic, or technological conditions.

The proposed development area encompasses approximately 1,360 acres, of which 1,040 acres have Federal surface and minerals and 320 acres have private surface and Federal minerals. In addition, four proposed well locations have both private surface and private mineral ownership locations (Figure A).

FIGURE "A"



Major elements of the proposed action are described below, under the headings **Development** (Construction, Drilling, and Completion), **Production** (Operation and Maintenance), **Final Abandonment and Reclamation**, and **Wildlife Habitat Mitigation**. The proposed elements contain a standard 13-Point Surface Use Plan (SUP) and 10-Point Drilling Plans for gas well development (Appendix B).

With the BLM's approval, all measures discussed in the SUP would be implemented as part of the proposed action. Any deviations from the standard practices below are identified in the standard and site-specific Conditions of Approval (COAs) (Appendices C and D).

Development: Construction, Drilling, and Completion

During the course of development, numerous construction activities would be needed, all of which 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, the operator, and subcontractors to assess proposed pad and pit layout, proposed access routes, cuts and fills, topsoil stockpiles, erosion control measures, and reclamation potential. The primary purpose of the onsite inspections was to assess potential resource impacts associated with their construction. In some cases, revisions to the design of the proposed developments were made to minimize potential impacts. The locations of the two split-estate pads reflect the results of agreements between Laramie II and the private landowner. Revisions to the proposed layout, orientation, and access for these two pads were based on the landowner's requests. Laramie II has negotiated and recorded a Surface Use and Right-of-Way Agreement with the Landowner.

Construction

Proposed Well Pads

The proposed well pads would be constructed from the native soil and rock materials present using a bulldozer, grader, and excavator. The pad would be constructed by clearing all vegetation, stripping and stockpiling topsoil, and leveling the pad area using cut-and-fill techniques. Juniper trees would be selectively removed by the excavator and placed at the toe of the fill slopes to catch the fill and act as a filtration system for stormwater management. Pinyon trees would be chipped onsite or logged and removed from the site. Any other woody vegetation would be mulched or used in reclamation, and/or placed at the toe of the fill slopes. Cut slopes, associated with pad construction, would be left rough to provide a seed catchment surface, and may require "step cutting" when heights exceed 15 feet. Cut slopes for pad construction should not be steeper than 1.5:1 (horizontal:vertical), except when approved by the Authorized Officer. The tops of the cut banks and pad corners may be rounded to improve their appearance and reduce the volume of cut and fill.

Initially, the size of the newly constructed pads would range from 3.3 to 4.5 acres (Table 1). The variation in the size of the pads is a function of topography and the number of bottomhole locations targeted. The completed Federal pad (Federal 31-01) has a total disturbed area of 5.22 acres. The construction of the five proposed pads would result in an estimated 20.9 acres of new surface disturbance on Federal lands.

After all wells are drilled and completed and production facilities are installed at each pad, interim reclamation activities would begin. Cuts and fills would be recontoured to blend with adjacent natural slopes as much as practicable, covered with the salvaged topsoil material, and seeded to reestablish vegetation. These interim reclamation techniques would reduce the amount of surface disturbance from the 20.9 acres associated with initial construction to an estimated 5.3 acres (Table 1). The 5.3 acres of disturbance would remain over the life of the project (i.e., 20 to 30 years).

Table 1. Proposed Well Pads, Roads, and Pipelines						
<i>Well Pad</i>	<i>Lease</i>	<i>Legal Description T6S, R 93W</i>	<i>Surface</i>	<i>Short-term Acres</i>	<i>Long-term Acres</i>	
Federal 20-15	COC41916	SWSE Sec.20	BLM	4.5	1.0	
Federal 29-02	COC64181	NENE Sec. 29	BLM	4.3	1.1	
Federal 29-06	COC64181	SENE Sec. 29	BLM	3.3	0.7	
Federal 29-11	COC64181	NESW Sec. 29	BLM	4.5	1.3	
Federal 29-15	COC64181	SWSE Sec. 29	BLM	4.3	1.2	
Subtotal			BLM	20.9	5.3	
<i>Roads *</i>	<i>Length</i>		<i>Location</i>	<i>Surface</i>	<i>Short-term Acres</i>	<i>Long-term acres</i>
	<i>miles</i>	<i>feet</i>				
20-15	0.1	875	See Figure A	BLM	1.0	0.6
29-02	1.0	5,240	See Figure A	BLM	6.0	3.6
29-06	0.4	2,040	See Figure A	BLM	2.3	1.4
29-11 + Main	1.2	6,420	See Figure A	BLM	7.4	4.4
29-15	0.3	1,370	See Figure A	BLM	1.6	0.9
Subtotal	3.0	15,945		BLM	18.3	10.9
<i>Pipelines**</i>	<i>Length</i>		<i>Location</i>	<i>Surface</i>	<i>Short-term Acres</i>	<i>Long-term acres</i>
	<i>miles</i>	<i>feet</i>				
29-06 to 29-04	0.5	2,510	See Figure A	private	2.9	0
20-15 to 29-06***	1.0	5,080	See Figure A	BLM	3.5	0
29-02 spur	< 0.1	350	See Figure A	BLM	0	0
29-11 spur	< 0.1	260	See Figure A	BLM	0	0
Existing Encana PL	0.5	2,450	See Figure A	BLM	2.8	0
Existing PL to 29-15	1.0	5,070	See Figure A	BLM	0	0
Subtotal BLM	2.5	13,210		BLM	6.3	0
Subtotal private	0.5	2,510		private	2.9	0
TOTAL	3.0	15,720			9.2	0
TOTAL (Pads + Roads + Pipelines)				BLM	45.5	16.2
				private	2.9	0
GRAND TOTAL (All Disturbances, BLM + Private)					48.4	16.2
Notes: *Disturbance estimated to average 50 ft from toe of fill to top of cut. Long-term disturbance estimated at 30 ft (16 -24 ft running surface, 4 ft borrow ditches, and 6 ft for water and gathering line).						
**Pipelines to be installed within 50 ft disturbance corridor of access roads so not reflected here except where pipelines deviate from road, with associated 50 ft short-term disturbance. Permanent right-of-way width 30 feet.						
***Pipeline route from 20-15 to 29-06 would be installed in existing roads (average 20 ft) before reclaiming. For this calculation, short-term acres of disturbance uses 30 ft for new disturbance.						

Dewatering systems would be used during 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 to protect livestock? 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 rip-rap to dissipate energy and control erosion. Laramie II’s stormwater management efforts may include additional engineering measures as the installation of culverts to divert water flow away from surface locations as needed.

Existing Well Pads

The seven existing well pads (Table 2) were constructed using the same general methodology as proposed for the new pads. The development of the wells proposed for these locations would not require new surface disturbance. The development of the existing well pads on Federal surface or on private lands but involving Federal mineral estate would be subject to the same mitigation measures as described for the proposed new well pads.

Table 2. Existing Well Pads				
<i>Well Pad</i>	<i>Mineral Lease</i>	<i>Legal Description</i>	<i>Surface Ownership</i>	<i>Previous NEPA</i>
Overacker 29-04	Fee	T6S R93W Sec 29 NWNW	Overacker/Johnson	EA CO-140-2007-13EA
Mead 30-11	Fee	T6S R93W Sec 30 NESW	Mead/Miles	EA CO-140-2006-062EA
Mead 30-13	Fee	T6S R93W Sec 30 Lot 4	Mead/Miles	
Hooker 30-02	Fee	T6S R93W Sec 30 NWNE	Hooker	
Federal 31-01	COC64181	T6S R93W Sec 30 SESE T6S R93W Sec 31 NENE	BLM H & L	EA CO-140-2006-084EA
Leverich 31-06	COC64181	T6S R93W Sec 31 SENW	H & L	
Leverich 31-09	COC64181	T6S R93W Sec 31 NESE	H & L	

It is assumed that the existing well footprint would suffice for the proposed wells or that the proposed wells would satisfy language presented in BLM Washington Office Instruction memorandum No. 2005-247 (dated 9/30/05), which states:

“Additional disturbance or expansion of the existing well pad is not restricted as long as

it is tied to the original location or well pad. This provision does not extend to new well sites merely in the general vicinity of the original location or well pad.”

Proposed Access Roads

The primary access route to the HGMDP area would be from Interstate 70 exiting at Rulison (Exit 81). Traffic would then travel south on Garfield County Road (CR) 323 and turn east onto CR320 (Rifle-Rulison Road). Vehicles would travel in an easterly direction on CR320 and travel for approximately 5 miles to CR317 (Beaver Creek Road). At this point, traffic to the southern part of the project area would turn south and travel 0.75 mile to the existing Federal 31-01 access road, while traffic to the northern part of the project area would stay on CR320 and travel through the switchbacks, turning east on BLM Road 8185. Heavy loads would access the Helmer Gulch Project area from the Rulison Exit on I-70 and follow the Rifle-Rulison road to the project area as identified in Garfield County’s “Preferred County Road Haul Route” map (Revision 11, 1/14/2008) on the Garfield County website.

Within the project area, the road network would be extended from existing roads to provide access to the proposed pad locations (Figure A). The extension of the road network would involve construction of approximately 3 miles of new road. Portions of BLM Road 8185 and the powerline road in Section 29 will be rerouted and the old sections reclaimed as part of the pipeline construction and installation process, resulting in 0.4 mile of existing road being re-contoured and reclaimed.

Roads would be designed and maintained to an appropriate standard no higher than necessary to accommodate their intended functions, as described in the Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development (BLM and USFS 2006) and BLM Handbook 9113 (Roads Manual).

Various segments of the proposed existing access roads are outside Laramie II’s lease boundaries. To gain access for the use of existing roads and the construction and use of proposed roads, Laramie II intends to apply to BLM for a Right-of-Way (ROW) grant that would authorize access across BLM-administered lands outside the lease boundaries. Laramie II would also apply for ROW authorization to access the Federal 29-02 and 29-06 well pads. The permanent ROW area applied for the proposed roads would be 30 feet wide, with a Temporary Use Area to be determined by the Road Plans.

Running surfaces would be all-weather type with an aggregate surface. Road widths may vary from 16 to 24 feet and incorporate pull outs and curve widening throughout the project area. Safety, site distance, grade, topography, anticipated traffic flow, and visual resource management concerns being factors in width determination. Roads and the majority of gathering pipelines would be constructed within a 50-foot disturbance corridor, which would be reduced to a 30-foot finished road surface (including bar ditch) after interim reclamation (see Table 1).

Road construction/reconstruction would include clearing and grubbing of brush and trees, windrowing of topsoil, construction of reinforced rolling dips and grade dips where feasible, installation of culverts in ditched sections and side drainages to provide ditch relief and sediment control, construction of retaining structures on steep slopes (as approved by the BLM), placement of slash and topsoil on cut and fill slopes, placement of erosion control matting on cut and fill slopes as designated on the ground by the BLM, seeding of all disturbed areas outside of the travelway, and installation of cattle guards and road closure gates with proper signage where needed. Road maintenance would be performed as needed to ensure safe travel.

Revegetation of road ditches and cut-and-fill slopes would help stabilize exposed soil and reduce sediment loss, reduce the growth of noxious weeds, reduce maintenance costs, maintain scenic quality and forage, and protect habitat. To ensure successful growth of plants and forbs, topsoil would be stripped and stockpiled during road construction and respread to the greatest degree practicable on cut slopes, fill slopes, and borrow ditches prior to seeding.

The road grade would be 10% or less, wherever practicable. The 10% grade would only be exceeded where the 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 18.3 acres of short-term ground disturbance. Following interim reclamation, the long-term disturbance would be approximately 10.9 acres. The short and long-term disturbance includes the installation of the gas gathering and water lines in the road corridor.

Proposed Gas Gathering and Water Pipelines

A gas gathering and produced water pipeline network would be needed to both gather and deliver gas offsite to existing main gathering lines owned and operated by Energy Transfer (formerly Canyon Gas Resources, LLC) and to transport produced water to facilities outside the project area.

Energy Transfer, LLC has a contractual agreement with Laramie II to gather natural gas in the project area. Energy Transfer, LLC would prepare and submit a ROW application to construct and operate the gas gathering lines and would operate and maintain the gas gathering system once in place.

The gas gathering system would consist of steel pipelines, with a maximum allowable working pressure (MAWP) of 740 psig and a diameter up to 8 inches. The gas produced by the three pads in the central portion of the HGMDP area is expected to flow to the existing Mead 30-11 pad and eventually tie-in to the existing Energy Transfer 12-inch main gathering line, which currently flows to the West Rifle compressor station. The gas produced by the pads in the southern portion (Section 31) of the HGMDP area is expected to flow North in an existing 8-inch gathering line to a tie-in point on the existing Federal 31-01 pad and then continue to the same 12-inch main gathering line. The gas produced by the three pads in the northern portion of the HGMDP area is expected to flow west to the Federal 29-06 location and then north to an 8-inch gathering line tie-in at the existing Overacker 29-04 pad. The existing 8-inch line continues north and ties into the 12-inch main gathering line. Gathering lines that parallel new road construction would be installed in the uphill or cut side of the road (in the shoulder) prior to final grading and aggregate application.

Laramie II would install 4-inch produced water lines in a common trench with the gas gathering lines at the same time to minimize surface disturbance. A ROW application would be submitted by Laramie II for the construction and operations of these water lines. The water lines would be operated and maintained by Laramie II through the life of the project.

The ROW request for the pipeline would be 30-feet wide with additional 20-feet also authorized as a temporary work space for a period of up to one year (usually one year). The 30 foot width would include the road travelway. Laramie II's policy is to install the gathering lines in the disturbed area necessary to construct the access road. For this project, exceptions to this general policy include the line installed in the existing powerline access road in the NW¼ of Section 29 and the line paralleling (offsetting 15-to-25-foot) the existing Encana Oil and Gas pipeline ROW

(Figure “A”). Construction would be performed within this area of disturbance. The road would be the working side of the construction.

Following construction, the permanent 30-foot ROW would be needed for maintenance purposes. The pipeline trench would be excavated mechanically, primarily in the uphill or cut side of the road corridor with an excavator (trackhoe) and would be approximately 3 feet wide and at least 4 feet deep. Gas pipeline segments would be welded together and lowered into the trench. The water line would then be placed into the ditch and separated from the gas line by sandbags or other means. Both lines would be covered with excavated material and then 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, the water would be disposed at an existing offsite evaporation pond facility or used by Laramie II for drilling or completion operations. If used instead of water, nitrogen would be vented to the atmosphere.

Mitigation Common to All Construction Operations

As part of the HGMDP, Laramie II 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 HGMDP area. Mitigation for site specific pads not incorporated by Laramie II in the MAPD would be attached as Conditions of Approval (COAs) for Applications for Permits to Drill (APDs) filed with the Glenwood Springs Energy Office once the APDs are approved.

Trees removed from pad locations and access road alignments using heavy equipment would be placed at the toe of the fill slope to capture excess fill and provide filtration for stormwater management, or placed back on reclaimed surfaces. If heavy equipment is not used to remove the trees, they would be cut to a maximum stump height of 6 inches and placed back onto the cut-and-fill slopes with a slash height not to exceed 24 inches. Trees would not be dozed off the access road, except on private surface where trees may be dozed upon consent from the landowner.

Cut pinyon trees would be chipped, buried, or logged and removed from the site to prevent the spread of the *Ips* beetle. Trees and other vegetation may be dozed on pipeline routes and then pulled back onto the ROW during reclamation. Other vegetation, such as sagebrush and other shrubs, may be scattered offsite or placed on fill slopes at well pad and along roads for visual screening. On pads where boulder fields exist, reclamation would include the salvage and replacement of boulders to aid in restoring a natural appearance.

Drilling and Completion

As described above, up to 116 Federal and 15 fee wells would be drilled as part of the proposed action. Table 3 lists the surface and bottomhole locations.

Table 3. List of Wells and Bottomhole Locations				
<i>Lease</i>	<i>Pad No. (No. of Wells)</i>	<i>Surface Location T. 6 S., R. 93 W.</i>	<i>Well No.</i>	<i>Bottomhole T. 6 S., R. 93 W.</i>
Proposed Pads – Federal Surface, Federal Minerals				
COC41916	Federal 20-15 (15)	SWSE Sec. 20	Fed. 20-09A, B, C, D	NESE Sec. 20
			Fed. 20-10A, B, C, D	NWSE Sec. 20
			Fed. 20-15A, C, D	SWSE Sec. 20
			Fed. 20-16A, B, C, D	SESE Sec. 20
COC64181	Federal 29-02 (16)	NWNE Sec. 29	Fed. 29-01A, B, C, D	NENE Sec. 29
			Fed. 29-02A, B, C, D	NWNE Sec. 29
			Fed. 29-07A, B, C, D	SWNE Sec. 29
			Fed. 29-08A	SENE Sec. 29
	Federal 29-06 (5)	SENW Sec. 29	Fed. 29-05A, C	SWNW Sec. 29
			Fed. 29-06A, B, C	SENW Sec. 29
	Federal 29-11 (18)	NESW Sec. 29	Fed. 29-05D	SWNW Sec. 29
			Fed. 29-06D	SENW Sec. 29
			Fed. 29-11A, B, C, D	NESW Sec. 29
			Fed. 29-12A, B, C, D	NWSW Sec. 29
			Fed. 29-13A, B, C, D	SWSW Sec. 29
			Fed. 29-14A, B, C, D	SESW, Sec. 29
	Federal 29-15 (16)	SWSE Sec. 29	Fed. 29-09A, B, C, D	NESE Sec. 29
			Fed. 29-10A, B, C, D	NWSE Sec. 29
			Fed. 29-15A, B, C, D	SWSE Sec. 29
			Fed. 29-16A, B, C, D	SESE Sec. 29
Proposed or Recently Approved Private Pads – Private Surface, Federal Mineral or Private Minerals				
COC64181	Leverich 31-06 (6 Federal + 7 Fee) Approved 04-03-08	SENW Sec. 31	Leverich Fed. 31-03C, D	NENW Sec. 3
			Leverich Fed. 31-06A, B, C, D	SENW Sec. 31
			Leverich 31-04B, C, D	NWNW Sec. 31
			Leverich 31-05A, B, C, D	SWNW Sec. 31
COC64181	Leverich 31-09 (12 Federal + 8 Fee) Approved 4-3-08	NESE Sec. 31	Leverich Fed. 31-07C, C	SWNE Sec. 31
			Leverich Fed. 31-08C, D	SENE Sec. 31
			Leverich Fed. 31-09A, B, C, D	NESE Sec. 31
			Leverich Fed. 31-16A, B, C, D	SESE Sec. 31
			Leverich 31-10A, B, C, D	NWSE Sec. 31
			Leverich 31-15A, B, C, D	SWSE Sec. 31
Existing BLM Pad – Federal Surface, Federal Minerals				
COC64181	Federal 31-01 (6) Has 3 Federal Producing Gas Wells and 8 Approved Federal APDs	NENE Sec. 31	Fed. 30-15C, D	SWSE Sec. 30
			Fed. 30-16B, C	SESE Sec. 30
			Leverich Fed. 31-01A, B	NENE Sec. 31
Existing Private Pads – Private Surface, Federal Minerals				
COC41916	Overacker 29-04 (3)	NWNE Sec. 29	Overacker Fed. 20-14A, B, C	SESW Sec. 20

Table 3. List of Wells and Bottomhole Locations				
<i>Lease</i>	<i>Pad No. (No. of Wells)</i>	<i>Surface Location T. 6 S., R. 93 W.</i>	<i>Well No.</i>	<i>Bottomhole T. 6 S., R. 93 W.</i>
COC64181	Hooker 30-02 (8) Has 4 Fee Producing Gas Wells	NWNE Sec. 30	Hooker Fed. 30-07A, B, C, D	SWNE Sec. 30
			Hooker Fed. 30-08A, B, C, D	SENE Sec. 30
	Mead 30-11 (8) Has 7 Federal Approved APDs and 1 Approved Fee APD	NESW Sec. 30	Mead Fed. 30-09A, B, C	NESE Sec. 30
			Mead Fed. 30-10A, C, D	NWSE Sec. 30
			Mead Fed. 30-15A	SWSE Sec. 30
			Mead Fed. 30-16A	SESE Sec. 30
	Mead 30-13 (3) Has 4 Fee Producing Gas Wells	SWSW Sec. 30	Mead Fed. 30-14C	SESW Sec. 30
			Mead Fed. 31-03A, B	NENW Sec. 31

Note: Bottomhole locations are dependent on reservoir parameters. COGCC Cause Order 139-47 identifies equivalent 10-acre downhole spacing with no more than 4 wells equivalent per each 40-acre (quarter-quarter) drilling unit.

Laramie II’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 HGMDP area would be targeting natural gas producing horizons in the Mesaverde and Iles formations at depths of 6,500 to 10,000 feet. Wells would require approximately 15 days to drill and 30 days to complete. Pads with multiple wells would be occupied longer, in proportion to the number of wells drilled. Production results for wells drilled during the first year would be used to plan and design the drilling program for subsequent years.

Laramie II intends initially to drill and complete 4 to 6 wells on a pad, causing drilling operations to be conducted in more than one phase. Development would be highly sensitive to the price of gas and cost of services. If all wells on the pad are not drilled concurrently, Laramie II would request approval for the pad to remain unreclaimed until the following drilling season. However, topsoil storage piles, stormwater control features, and cut-and-fill slopes would undergo temporary seeding within 30 days following completion of pad construction to stabilize the material and minimize weed infestations.

Because of geologic and market uncertainties, Laramie II may drill fewer wells than those described in this MDP.

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). Laramie II 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 1996. Material Safety and Data Sheets (MSDS) are required to be readily available at all times.

For the directional wells, an S-shaped directional design would be used to reach the targeted bottomhole locations. In general, a target radius of 50 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.

Drill cuttings from the wellbore (mainly shale, sand, and miscellaneous rock minerals) would be buried on location. Cuttings pits, containing the cuttings used in the drilling process, are planned for each new pad location in this MDP. Initially, Laramie II would excavate the pit for season one and store the spoils as identified on the plats. The cuttings pit would only be excavated to the size required to accommodate the wells planned for that drilling season (the cuttings pits are laid out on the plats to satisfy the volumes of cuttings anticipated for all wells to be drilled on the pad). Once the season is over and if the cuttings are dry enough, Laramie II may reclaim that section of the pit. The next season the 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 the wells are drilled. Any spoils remaining on top of the covered pit could then be “pushed” up 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.

Laramie II estimates 300 yards of cuttings per well bore using a 50% expansion. However, since the cuttings do not expand proportionately and vary between well bores, the volumes are estimates only. If the drill cutting volumes increase more than anticipated due to expansion, Laramie II 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 Laramie II would consult with the BLM prior to conducting this operation) and cover them with dirt from the excess piles, recontour, cover with topsoil, and seed. No hazardous substances would be placed in any pits.

After drilling the hole 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 with non-toxic fluids is pumped 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 well bore.

Production – Operation and Maintenance

Surface Facilities

Surface facilities at each well pad location would consist of wellheads, separation units, gas metering units, and above-ground condensate and produced water tanks with approximately 300- to 400-barrel capacities each. When needed for visual mitigation, low-profile steel tanks would be installed. Multi-well locations would share production equipment, whenever feasible, to minimize surface disturbance. All production equipment located on or associated with the development of Federal leases would be painted to blend with the surrounding terrain and located to minimize visual impact. BLM would select the color for these facilities, including containment barriers, at each site. The production equipment would be fenced to prevent contact with livestock. Telemetry equipment would be used to remotely monitor well conditions. The use of telemetry would minimize traffic to and from the well locations. Automated tank gauging would also be employed to minimize the risk of spills.

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 rings. Construction of the containment rings surrounding the tank batteries would be conducted to prevent lateral movement of fluids through an impermeable barrier attached to the rings and laid under the tanks. Secondary containment would be sized to contain a minimum of 110% of the storage capacity of the largest tank within the barrier. All loading lines would be placed inside the containment barrier.

Produced Water Management

Completion Phase: All “frac” flowback water would be contained in temporary tanks during completion operations and re-cycled for re-use or trucked offsite to approved commercial disposal facilities.

Production Phase: Permanent 300- to 400-barrel steel tanks or, where needed for visual mitigation, low-profile steel tanks would be installed on the well pad or offsite facilities to contain produced water. These tanks would remain onsite for the life of the wells. Produced water would be transferred from the onsite tanks to centralized tank batteries by one of two methods: (1) the primary method is by buried pipelines 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. Once collected at a central site, the produced water would be recycled for use in drilling and completion operations, or processed into freshwater by the use of a distillation system for a variety of local uses such as dust suppression, irrigation, or ponding for wildlife use, 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.

Site Specifics: Produced water (water) from the Leverich 31-09 pad would be piped (or trucked when system is not operating) to the Leverich 31-12 (private pad outside the HGMDP boundaries) pad. The water would then be piped to the Leverich 31-06 pad. The water would continue via pipe to the Federal 31-01 pad. Finally, the produced water from all four pads would be piped to a central collection facility (Appendix F) in the NESW Sec. 30, T6S, R93W, adjacent to the existing Mead 30-13 pad. Four to six low profile steel tanks would store the water. The water would then be re-cycled for use in drilling and completion operations, processed into fresh

water for various uses, or trucked offsite to approved commercial disposal facilities.

Produced water from the proposed Federal 29-15 pad would be piped to the Federal 29-11 pad. The water would then continue via pipe and tied into the existing water line from the Federal 31-01 pad and continue onto the central collection facility (Appendix F) in the NESW of Section 30, T6S, R93W, for collection and disposal as described above.

Produced water from the Federal 29-02, Federal 29-06, and Federal 20-15 pads would be piped to the existing Overacker 29-04 pad, then across Helmer Gulch to the 20-12 pad through existing buried lines. Collection and disposal by the same means previously described would occur on the 20-12 pad.

Laramie II anticipates that most of the water management would be accomplished by gravity flow. To facilitate the flow of the water, small natural gas diaphragm pumps (Appendix E) may be needed at each of the well pads adjacent to the production tanks. These pumps are pneumatic in nature and use the pressure from natural gas as the source of power. After use, the residual gas would be piped to the VOCs incinerator for burn-off.

Road Maintenance

The access roads would be inspected by the BLM and maintained by Laramie II on an as-needed or quarterly basis (at a minimum) to include such items as:

- Road surface grading and 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 vehicular traffic
- Road and slope stabilization measures as required until final abandonment and reclamation;
- Weed control
- Dust abatement, using techniques and frequencies determined by BLM and Laramie II

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 pad 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. After completion activities for the last well planned on location, Laramie II 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 on average to approximately 1 acre after full development (Table 1).

The following is a summary of interim reclamation activities Laramie II would implement after all wells have been completed on a location:

- The well location and surrounding areas(s) would be cleared of all debris, materials, and trash not required for production. Other waste and spoil materials would be disposed at a local landfill.
- All pits, cellars, rat holes, and other bore holes at drilling locations unnecessary for further lease operations would be backfilled to conform to surrounding terrain after the drilling rig is released.
- 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 different mix on private land if specified by the landowner), 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.

Workovers and Recompletion

Periodically, the workover or re-completion of a well may be required to ensure that efficient production is maintained. Workovers can include repairs to the well bore equipment (casing, tubing, rods, or pump) the wellhead, or the production facilities. These repairs would usually be completed during daylight hours. The frequency of this type of work cannot be accurately projected because workovers vary from well to well. In the case of multi-well pads, space for equipment would usually be limited to the “in-use” (i.e., disturbed) area of the surface location, although it is possible that interim reclamation could be delayed by workover operations. In the case of a well recompletion, a water completion pit may have to be constructed.

Final Abandonment and Reclamation

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 and site contouring would be accomplished using appropriate heavy equipment. 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 (COGCC) standards for plugging would be followed. A configuration diagram, a summary of plugging procedures, and a job summary with techniques used to plug the well bore (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 and Gas Leasing and Development EIS. One of the basic goals of the policy is to

“establish desirable (seeded and 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 those pads with a large final reclamation or “in use” area. Unreclaimed areas or 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 HGMDP and referenced with each APD. Laramie II 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.

Laramie II or its successors would restore the well locations and access roads to approximately their original contours. 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. If the seeding is unsuccessful, Laramie II 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). To summarize the objectives 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.

Wildlife Habitat Mitigation

A wildlife habitat mitigation plan (Appendix E) was developed as part of the MDP and is meant to serve as mitigation for project related impacts to wildlife habitat. The MDP area is considered elk and deer winter range by the Colorado Division of Wildlife (CDOW). Energy developments proposed in the MDP are expected to impact winter range through direct loss of habitat, habitat fragmentation, disturbance, and displacement.

Laramie II proposes to improve wildlife habitat to offset anticipated project-related big game habitat loss. The proposed improvements were developed with the support and guidance of BLM

and CDOW. Mitigation objectives include improving and expanding winter habitat conditions and water availability within a portion of the MDP.

Improvements to Foraging Habitat

Within the HGMDP project area, openings/meadows within pinyon-juniper woodlands provide foraging habitat for big game species (deer and elk). These openings, which are often dominated by sagebrush, are slowly being replaced by young junipers. As the landscape loses this patchwork quality, the balance of herbaceous forage to woody cover shifts, reducing the overall value of the area to big game is diminished.

Laramie II proposes to restore a desirable balance between forage and cover by removing juniper where encroachment is occurring. Small groups of trees may be retained to serve as wildlife cover. Older and structurally diverse trees within treatment units may also be retained. Edges would be feathered in an irregular pattern. Juniper removal would be accomplished with a Hydro-Ax or Fecon Bullhog brush and tree shredder attached to either a rubber-tired or tracked vehicle. Rubber, flotation-type tires are preferred to minimize ground disturbance.

Improvements and Addition of Watering Features

Where practicable, installations of new water features and improvements to existing stock ponds would be made. These efforts would provide water to big game and livestock in the area and would include (1) lining existing stock ponds with bentonite clay to slow infiltration rates and provide water available for longer periods following runoff or periodic rain events; and (2) installing a single big game guzzler to provide additional water resources for wildlife.

THE NO ACTION ALTERNATIVE

The proposed action involves Federal subsurface minerals that are encumbered with Federal oil and gas leases, which grant the lessee a right to explore and develop the lease. Although BLM cannot deny the right to drill and develop the leasehold, individual APDs can be denied to prevent unnecessary and undue degradation. The no action alternative constitutes denial of the APDs associated with the proposed action.

However, there are elements of the proposed action that do not require Federal approval prior to implementation. For example, two of the existing pads (Leverich 31-06, and Leverich 31-09) are not located on Federal surface and the 15 proposed fee wells could be developed on these pads even if the APDs associated with the Federal leases are denied. Fee mineral estate would continue to be developed from the existing private pads outside the HGMDP boundaries.

Although the development of the fee wells would not result from the selection of the no action alternative *per se*, impacts to the affected environment would occur from the development of the fee locations. These effects provide the basis for comparison to the impacts of the proposed action. This comparison is important because it shows what is likely to happen if the proposed action was not taken.

Laramie would continue to drill and develop 11 wells previously analyzed and approved by the BLM on the Mead 30-11(CO-140-2006-062 EA) and the Federal 31-01 (CO-140-2006-084 EA). For the existing well pads, Laramie would be expected to submit Applications for Permit to Drill anticipating approval of the APDs through the Energy Policy Act of 2005 Section 390 Categorical Exclusions. Laramie would continue submitting Federal APDs for the Overacker 29-04, Mead 30-11, and the Federal 31-01, until the maximum number of Federal wells that could be reached directionally are developed. Laramie would

also submit Federal APDs for the Hooker 30-02, Mead 30-13, Leverich 31-06, and Leverich 31-09.

For the purposes of comparison, the no action alternative is associated with the drilling and development of 15 fee wells on 2 fee pads, but the development of up to 70 wells from 5 new federal pads would not occur and associated access roads and pipelines involving Federal surface would not be installed or constructed. Access to the 15 fee wells would follow the route defined for the southern project area as presented in the proposed action.

Gas and produced water would be transported offsite through existing pipelines. Construction, drilling and completion, production, interim reclamation, workovers or recompletion, final abandonment, final reclamation, and weed management would generally follow the methods presented in the proposed action.

Under this alternative, the BLM would have no authority to institute mitigation measures designed to minimize impacts to natural and cultural resources. Any such measures would come under the jurisdiction of the Colorado Oil and Gas Conservation Commission (COGCC).

SUMMARY OF LEASE STIPULATIONS

Table 4 provides a summary of lease stipulations that would apply to the proposed action.

Table 4. Summary of Lease Stipulations within the HGMDP Area		
<i>Lease</i>	<i>Description of Lands*</i>	<i>Lease Stipulations</i>
COC64181	Section 29: SENE Section 31: SENE, E2SE	No Surface Occupancy: No Surface occupancy or use is allowed on the lands 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. Any changes to this stipulation will be made in accordance with the land use plan/or the regulatory provisions for such changes.
	Section 31: E2SE	No Surface Occupancy: No Surface occupancy or use is allowed on the lands for the purpose of protecting the I70 Viewshed: To protect slopes 30% with high visual sensitivity in the I70 viewshed. Lands with high visual sensitivity are those lands within 5 miles of the interstate highway, of moderate to high visual exposure, where details of vegetation and landform are readily discernible and changes in visual contrast can be easily noticed by the casual observer on I70. Any changes to this stipulation will be made in accordance with the land use plan/or the regulatory provisions for such changes.
	Section 29: NE, S2NW, S2; Section 30: S2NE; Section 31: SESE	Timing Limitation: No surface use is allowed during the following time period December 1 to April 30. This stipulation does not apply to operation and maintenance of production facilities. For the purpose of protecting Big Game Winter Habitat (includes mule deer, elk, pronghorn antelope and bighorn sheep) which includes severe big game winter range and other high value winter habitat as mapped by CDOW. Any changes to this stipulation will be made in accordance with the land use plan/or the regulatory provisions for such changes.
	Section 29: E2NE	Controlled Surface Use: Surface occupancy or use is subject to special operating constraints for the purpose of protecting 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 well pads, 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 most important to the function of the riparian zone and will be avoided. Any changes to this stipulation will be made in accordance with the land use plan/or the regulatory provisions for such changes.
	Section 31: E2E2, SWNE, SENW	Controlled Surface Use: Surface occupancy or use are subject to operating constraints for the purpose of protecting BLM Sensitive Species: for those species listed as sensitive by BLM and for significant natural plant communities, special design, construction and implementation measures, including relocation of operations by more than 200 meters, may be required. For plants, habitat areas include occupied habitat and habitat necessary for the maintenance or recovery of the species or communities. For animals, habitat areas are areas that are important during some portion of the lifecycle, such as nesting and production areas or communal roost areas. Any changes to this stipulation will be made in accordance with the land use plan/or the regulatory provisions for such changes.
COC64181	Section 29: NE, S2NW, S2; Section 30: S2NE, SESW, SE; Section 31: NE, E2NW, E2SE	Controlled Surface Use: Surface occupancy or use are subject to operating constraints for the purpose of protecting Erosive Soils and Slopes Greater than 30 Percent: special design, construction, and operation and reclamation measures will be required. Highly erosive soils are soils in the “severe” and “very severe” erosion classes. 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. 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 and to protect the site and adjacent areas. Specific performance objectives for the plan include: <ul style="list-style-type: none"> - 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. The operator must also provide an evaluation of the site’s reclamation potential based on characteristics of the site and comparison of other comparable sites. The operator will then make adjustments and take any special measures where needed. The Authorized Officer 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, revegetation potential and minimizing overall disturbance. Any changes to this stipulation will be made in accordance with the land use plan/or the regulatory provisions for such changes.
COC41916	Section 20: SESW, SE	Timing Limitation: No surface use is allowed during the following time period: January 16 to April 29. This stipulation does not apply to operation and maintenance of production facilities. For the purpose of protecting Big Game Winter Habitat (includes mule deer, elk, pronghorn antelope and bighorn sheep) which includes severe big game winter range and other high value winter habitat as mapped by CDOW. Any changes to this stipulation will be made in accordance with the land use plan/or the regulatory provisions for such changes.

COC52583	Section 28: W2W2	Timing Limitation: No surface use is allowed during the following time period: January 15 through April 30. This stipulation does not apply to operation and maintenance of production facilities. For the purpose of protecting critical deer and elk winter range. Any changes to this stipulation will be made in accordance with the land use plan/or the regulatory provisions for such changes.
<i>*Note: All Legal Descriptions are T6S, R93W</i>		

Although these lease stipulations do not apply to all of the elements of the proposed action and no action alternative, these and any other protective measures deemed appropriate by the Authorized Officer could be applied as COAs on individual APDs. The lease stipulations would not apply to the wells drilled from the existing Overacker 29-04, Hooker 30-02, Mead 30-11, and Mead 30-13 pads, since these well sites are accessed by and located on private lands. They would also not apply to the 15 wells drilled under the no action alternative from the Leverich 31-06 and Leverich 31-09 pads, since no Federal gas would be produced.

ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

Based on onsite examinations, several elements of the original proposal presented by PetroGulf were altered or eliminated to minimize or mitigate resource impacts. Because these elements are either no longer part of the proposed action or have been substantially changed from the original proposal, they will not be analyzed in detail.

- 29-24 Pad, Access Road, and Pipeline – During preparation of this MDP, Laramie II made the decision to drop this location. Laramie II determined that the bottomhole targets could be reached from other pad locations, thereby eliminating the need for 0.6 miles of new access road and pipeline and disturbance of 2.9 acres for the pad.
- 29-41 Pad – During preparation of this MDP, Laramie II made the decision to drop this location. Laramie II determined that the bottomhole locations could be reached from other locations, thereby eliminating 3.3 acres of disturbance for the pad.
- 30-33A and B Pad, Access Road, and Pipeline – During preparation of this MDP, Laramie II made the decision to drop these locations. Laramie II determined that the bottom hole locations could be reached from other locations, thereby eliminating the need for 0.3 miles of new access road and pipeline and 6.8 acres of disturbance for the pad.
- Leverich 31-06 and 31-09 Pad, Access Road, and Pipeline – There were several pad locations and associated roads and pipelines originally proposed that have since been constructed to pursue private mineral interests. Thus, for purposes of analysis in this MDP, these pads, roads, and pipelines are existing and support private and Federal mineral interests.

LAND USE PLAN CONFORMANCE REVIEW

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

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

Date Approved: Amended in November 1991 - Oil and Gas Leasing and Development - Final Supplemental Environmental Impact Statement; amended in March 1999 – Oil and Gas Leasing & Development Final Supplemental Environmental Impact Statement.

Decision Number/Page: Record of Decision, Glenwood Springs Resource Management Plan Amendment, November 1991, page 3. Record of Decision and Resource Management Plan Amendment, March 1999, page 15.

Decision Language: “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.” This decision was carried forward unchanged in the 1999 RMP amendment (BLM 1999a).

“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” (BLM 1999a).

Discussion: The proposed action is in conformance with the 1991 (and 1999) RMP amendments because the Federal mineral estate proposed for development is open for 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 GAPs (MDPs).

STANDARDS FOR PUBLIC LAND HEALTH

In January 1997, Colorado BLM approved the Standards for Public Land Health. The five standards cover upland soils, riparian systems, plant and animal communities, threatened and endangered species, and water quality. Standards describe conditions needed to sustain public land health and relate to all uses of the public lands. The environmental analysis must address whether the proposed action or alternatives being analyzed would result in impacts that would maintain, improve, or deteriorate land health conditions relative to these resources. These analyses are located in specific elements listed below.

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

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

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

A variety of laws, regulations, and policy directives mandate the evaluation of the effects of a proposed action and alternative(s) on certain critical environmental elements. Not all of the critical elements that require inclusion in this EA are present, or if they are present, may not be affected by the proposed action and alternative (Table 5). Only those mandatory critical elements that are present and affected are described in the following narrative. In addition to the mandatory critical elements, there are additional resources that would be impacted by the proposed action and alternative. These are presented under **Other Affected Resources**.

Table 5. Critical Elements of the Human Environment									
<i>Critical Element</i>	<i>Present</i>		<i>Affected</i>		<i>Critical Element</i>	<i>Present</i>		<i>Affected</i>	
	<i>Yes</i>	<i>No</i>	<i>Yes</i>	<i>No</i>		<i>Yes</i>	<i>No</i>	<i>Yes</i>	<i>No</i>
Air Quality	X		X		Prime or Unique Farmlands		X		X
ACECs		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/ WSAs		X		X
Native American Religious Concerns	X		X						

* *Public Land Health Standard*

Critical Environmental Elements

The following discussion presents critical elements of the human environment that are present and affected by the proposed action and/or no action alternative.

Air Quality

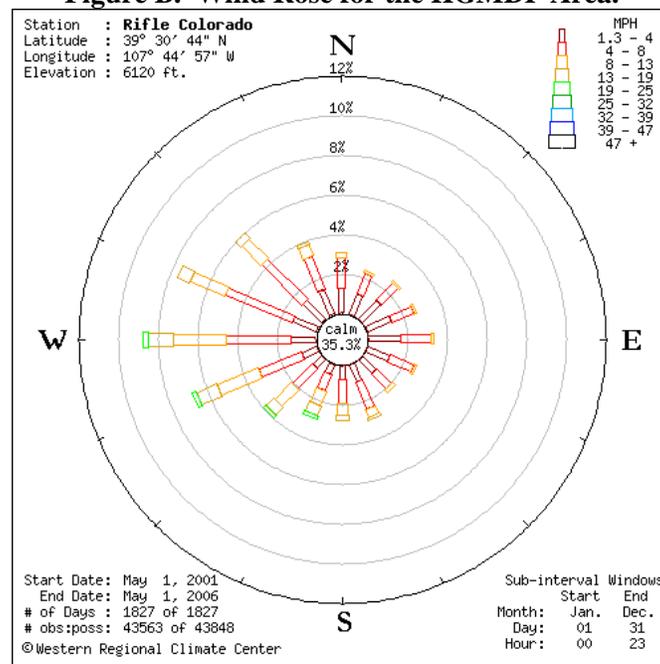
Affected Environment: The HGMDP is located in a semi-arid (dry and cold), mid-continental climate regime. The area is typical of the western high country with abundant sunshine, low humidity, low rainfall, and cold, snowy winters. The nearest meteorological measurements were collected at Rifle, Colorado (1910-2005) (WRCC 2006), approximately 3 miles northeast of the HGMDP area.

The annual average total precipitation at Rifle is 11.61 inches and includes an average total snowfall of 38.6 inches, with December and January being the snowiest months. Precipitation is relatively evenly distributed throughout the year. The Rifle area has cool temperatures, with average daily temperatures (in degrees Fahrenheit, °F) ranging between 9.4°F (low) and 36.8°F (high) in mid winter and between 52.0°F (low) and 90.2°F (high) in mid summer. The frost-free period (at 32°F) generally occurs from mid-May to mid-September. Table 6 shows the mean monthly temperature ranges and total precipitation amounts.

Table 6. Mean Monthly Temperature Ranges and Total Precipitation Amounts.		
<i>Month</i>	<i>Average Temperature Range (°F)</i>	<i>Total Precipitation (inches)</i>
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
ANNUAL	31.2-64.3	11.61
<i>Source: (WRCC 2006)</i>		

Figure B shows the relative frequency of winds, with radial distributions by speed class, indicating the direction of the wind source. Table 7 provides the wind direction distribution in a tabular format. From this information, it is evident that the winds originate from the northwest to southwest nearly 33% of the time. The annual mean wind speed is approximately 4 mph.

Figure B. Wind Rose for the HGMDP Area.



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

Table 7. Wind Direction Frequency Distribution for Rifle, CO.	
<i>Wind Direction</i>	<i>Percent of Occurrence</i>
N	3.1
NNE	2.3
NE	2.6
ENE	2.7
E	3.3
ESE	2.7
SE	2.3
SSE	3.0
S	2.9
SSW	2.9
SW	4.0
WSW	6.8
W	8.7
WNW	7.6
NW	6.0
NNW	3.9

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

The frequency and strength of the winds greatly affect the dispersion and transport of air pollutants. The potential for atmospheric dispersion is generally good, although nighttime cooling enhances stable air, inhibiting air pollutant mixing and transport. Dispersion conditions are the greatest along ridges, plateaus, and on mountain tops. Table 8 shows the wind speed distribution.

Table 8. Wind Speed Distribution.	
<i>Wind Speed (miles/hour)</i>	<i>Percent of Occurrence</i>
0-4.0	16.0
4.0-7.5	40.3
7.5-12.1	26.4
12.1-19.0	13.7
19.0-24.7	2.7
Greater than 24.7	1.0

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

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 at all locations to which the public has access. Although specific air quality monitoring has not been conducted in-field, regional air quality monitoring has been conducted near the study area. Air pollutants measured in the region for which ambient air quality standards exist include: carbon monoxide (CO), nitrogen dioxide (NO₂), ozone (O₃), particulate matter less than 10 microns (μ) in effective diameter (PM₁₀), particulate matter less than 2.5 μ in effective diameter (PM_{2.5}), and sulfur dioxide (SO₂). Background pollutant concentrations for these pollutants are compared to the CAAQS and NAAQS in Table 9.

As shown in Table 9, 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 adopted and enforced by Colorado Department of Health and Environment (CDPHE) limit incremental emissions increases to specific levels defined by the classification of air quality in an area. The Prevention of Significant Deterioration (PSD) Program is designed to limit the incremental increase of specific air pollutant concentrations above a legally defined baseline level. Incremental increases in PSD Class I areas are strictly limited, while increases allowed in Class II areas are less strict.

The project area and surrounding areas are classified as PSD Class II. The PSD Class I areas located within 100 miles of the project area are Flat Tops Wilderness (approx. 37 miles NE), Maroon Bells – Snowmass Wilderness (approx. 65 miles SE), West Elk Wilderness (approx. 65 miles SE), Black Canyon of the Gunnison National Monument (approx. 70 miles S), Eagles Nest Wilderness (approx. 95 miles E), and Arches National Park (approx. 95 miles SW). Dinosaur National Monument (approx. 80 miles NW) is listed as a Federal Class II area but is regulated as a Class I area for SO₂ 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 9.

Table 9. Air Pollutant Background Concentrations, Colorado and National Ambient Air Quality Standards, and Prevention of Significant Deterioration (PSD Increments (ug/m³)).				
<i>Pollutant/Averaging Time</i>	<i>Measured Background Concentration</i>	<i>Colorado and National AAQS</i>	<i>Incremental Increase Above Legal Baseline PSD Class I/ II</i>	
Carbon Monoxide (CO) ¹				
1-hour	1,145	40,000	n/a	n/a
8-hour	1,145	10,000	n/a	n/a
Nitrogen dioxide (NO ₂) ²				
Annual	9	100	2.5	25
Ozone ³				
1-hour	173	235	n/a	n/a
8-hour	145	157		
Particulate Matter (PM ₁₀) ¹				
24-Hour	41	150	8	30
Annual	11	50	4	17
Particulate Matter (PM _{2.5}) ⁴				
24-Hour	18	65	n/a	n/a
Annual	8	15	n/a	n/a
Sulfur dioxide (SO ₂) ⁵				
3-hour (NAAQS)	24	1,300	25	512
3-hour (CAAQS)	24	700	25	512
24-hour (NAAQS/CAAQS)	13	260	5	91
Annual (NAAQS/CAAQS)	5	80	2	20

¹ Background data collected at American Soda, Piceance 2003-2004 (CDPHE 2006).

² Background data based on a rural default that is based on Southern Ute stations near Ignacio (CDPHE 2006).

³ 1-hour ozone based on Mesa Verde, 2003 data. 8-hour ozone based on CASTNET in Mesa Verde, Canyonlands, and Gothic (CDPHE 2006).

⁴ Background data collected at 515 Patterson, Grand Junction, CO (CDPHE 2006).

⁵ Background data collected at Unocal 1983-1984 (CDPHE 2006).

CDPHE, under their 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, and 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 the project prior to its operation. Unlike the conceptual “reasonable, but conservative” engineering designs used in NEPA analyses, any CDPHE air quality preconstruction permitting demonstrations required would be based on very site-specific, detailed engineering values, which would be assessed in the permit application review.

Proposed Action:

Environmental Consequences: The HGMDP includes constructing five well pads and access roads, drilling 131 wells, and installing 58-400 barrel (bbl) condensate tanks, several water pumps, and 37 separators with small heaters. The project does not include construction of any compressor stations or installation of any generators, dehydration units, or other treatment processes. Construction of each well pad, associated access road, and associated pipeline is anticipated to take up to 5 or 6 weeks; the individual activities lasting approximately 2 weeks.

Air quality would decrease during construction of the Helmer Gulch wells due to pollutants generated from drilling and well pad construction. These pollutants include combustion emissions and fugitive dust associated with construction equipment and vehicles. Construction activities for each well pad would take place during the hours of 7:00 a.m. and 6:00 p.m. each day for a period of 5 or 6 weeks. Once construction activities are complete, air quality impacts associated with these activities will also cease. Drilling the wells (with 1100 hp Drilling Rigs) at each of the pads is anticipated to take between 6 months and a little over 1 year, depending on the number wells. The drilling time assumes each well will take 22 days to drill and 30 days to complete, with 40% drill rig utilization. Two or three pads will be drilled per year, requiring two drilling rigs over the next few years. Table 10 provides the annual emission rates from the Helmer Gulch drilling and construction activities. Tier I emission factors for the drill rig were used to identify the largest potential impacts. However, based on drill rig availability and contracting, one or both of the drill rigs used may satisfy the Tier II standards.

Table 10. Potential Emissions from Drilling and Construction Activities					
<i>Source</i>	<i>Pollutant</i>	<i>Emission Factors (g/hp-hr)</i>	<i>Yearly Hours of Operation</i>	<i>Annual Emissions (tons/year)</i>	<i>Reference</i>
Drilling	NO _x	6.9	8760	58.6	Tier I
Two 1100 HP Drill Rigs	CO	8.5	8760	72.2	Tier I
	VOC	1	8760	8.5	Tier I
	PM ₁₀	0.4	8760	3.4	Tier I
	PM _{2.5}		8760	0.5	EPA Multiplier
	Formaldehyde	0.0018	8760	0.015	AP42 Table 3.3-2
Construction Heavy Equipment	PM ₁₀	1.2 (Tons/acre*month)	20 acres 2 weeks *	11.1	AP42 13.2.3.3
	PM _{2.5}			1.7	EPA Multiplier

*Activity durations are about 2 weeks. (Well pad construction, 2 weeks; access road construction 1-2 weeks; and pipeline construction 2 weeks.)

The anticipated air impacts associated with well pad construction and drilling are limited in duration and are anticipated to be minor sources. The emissions from drilling are not anticipated to impact any of the Class I areas. These activities are also not anticipated to exceed any ambient air quality standards.

Once the wells are completed, ancillary equipment will be installed at each well pad associated with production and operation including: four to six 400 bbl condensate tanks, several water pumps, and two or three small heaters associated with the separators. The pumps are anticipated to be small (10-25 hp) units and will be used to move water from the sites. Similarly, the separators will include small 500 BTU/hr heaters. The emissions from the pumps and heaters are anticipated to be negligible. The emissions from the condensate tanks are provided in Table 11. The calculated estimates assume that 15 bbl/day of water will be produced from each well and that approximately 10% of the produced water will be separated into condensate.

Table 11. Condensate Tank Emission Estimates Per Completed Well Pad					
<i>Source</i>	<i>Pollutant</i>	<i>Emission Factors (lb/bbl)</i>	<i>Production* (bbl/day)</i>	<i>Annual Emissions* (tons/year)</i>	<i>Reference</i>
4 to 6-400 BBL Condensate Tanks Per Well Pad (Includes 6 to 12 Wells)	VOC	10	9-18	16-33	CDPHE Guidance for Garfield County

*Production and Annual Emission estimates are based on 6 and 12 wells respectively.

The air 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%. Once site specific production information is available, emission estimates can also be refined using the TANKS model and extended fuel analyses.

Emissions from the central produced water gathering site are anticipated to be negligible. Currently, pumps are not planned for this site. However, if a pump is required, it will be pneumatic in nature or natural gas fired. If enough condensate collects at the site, then a VOC's burner or other control technology will be implemented to control VOCs.

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 radiated by the Earth back into space.

In 2001, the Intergovernmental Panel on Climate Change (IPCC) predicted that by the year 2100, global average surface temperatures would increase 1.4 to 5.8°C (2.5 to 10.4°F) above 1990 levels. The National Academy of Sciences (2006) supports these predictions, but has acknowledged that there are uncertainties regarding how climate change may affect different regions. In 2007, the IPCC also concluded that "warming of the climate system is unequivocal" and "most of the observed increase in globally average temperatures since the mid-20th century is very likely due to the observed increase in

anthropogenic [man-made] greenhouse gas concentrations.” Other theories about the effect of GHGs on global climate change exist.

The assessment of GHG emissions and climate change remains in its formative phase; therefore, it is not yet possible to know with certainty the net impact to climate from GHGs produced globally over the last century or from those produced today. The lack of scientific tools designed to predict climate change on regional or local scales limits the ability to quantify potential future impacts of climate change on the specific area of the proposed action. In addition, while any oil and gas leasing or development projects may contribute GHGs to the atmosphere, these contributions would not have a significant effect on a phenomenon occurring at the global scale believed by some to be due to more than a century of human activities.

No Action Alternative:

Environmental Consequences: The no action alternative would impact the air quality in similar ways to the proposed action. Well pad, road, and pipeline construction and well drilling would still occur on adjacent lands so there would still be temporary fugitive dust and combustion emissions associated with construction equipment, drilling rigs, and vehicles. Once the wells are installed, the air impacts are anticipated to be small to negligible and would include emissions from condensate tanks, separator heaters, and pumper traffic. In general, the air impacts of the no action alternative would be less than the proposed action, but would include similar types of emissions and sources.

Cultural Resources

Cultural resources are fragile and nonrenewable remains of prehistoric and historic human activity, occupation, or endeavor as reflected in districts, sites, structures, buildings, objects, artifacts, ruins, works of art, architecture, and natural features that were of importance in human history. Cultural resources comprise the physical remains themselves, the areas where significant human events occurred even if evidence of the event no longer remains, and the environment surrounding the actual resource. Because of the sensitive nature of cultural resources, the technical reports for this project are not included with the EA. These reports are protected from public disclosure and are exempt from the Freedom of Information Act.

The National Historic Preservation Act (NHPA) of 1966 and the Archaeological Resource Protection Act of 1979 provide for the protection of significant cultural resources and traditional cultural properties. Section 106 of the NHPA describes the process that federal agencies must follow to identify, evaluate, and coordinate their activities and recommendations concerning cultural resources. Significant cultural resources are defined as those listed on, or eligible for listing on, the National Register of Historic Places (NRHP).

The significance of traditional cultural properties is usually assessed by communication with knowledgeable individuals of a cultural group and through historical documentation. Some traditional cultural properties may be significant to an entire cultural group, whereas others may be significant to an individual or family.

Affected Environment:

For the purposes of this analysis, the study area for cultural identification was defined as the combination of the current Laramie II project area (HGMDP), and the project area previously inventoried for the PetroGulf Corporation’s Helmer Gulch Geographic Area Plan (HGGAP). The study area is located in the Piceance Basin of Garfield County, approximately 2 miles southwest of the town of Rifle, Colorado.

Environmental Consequences:

Proposed Action:

As mentioned above, the project area for the Laramie II HGMDP has been the subject of intensive (“Class III”) cultural resource inventory between 2004 and 2008. A total of 2,055 acres were inspected during the cultural resource inventories. These inventories resulted in the identification of 13 isolated finds, 13 not eligible sites, and three “need data” sites. One of these “need data” sites (5GF3428) was tested to determine eligibility prior to construction of an access road.

A Class III survey of a 10-acre well pad and access road was conducted by Grand River Institute in May 2001 (Conner 2001; BLM GSFO #1101-4). No sites were identified. Based on changes in BLM Class III survey standards, Alpine Archaeological Consultants, Inc. resurveyed three well pads and two access road locations with 40-acre survey blocks in 2004 (Neely and Pfertsh 2004). That survey identified four isolated finds (5GF3582-5GF3584).

Alpine conducted a series of additional Class III cultural resource inventories associated with federal lease COC-64181 on behalf of Petrogulf Corporation, et al between 2005 and 2007. These additional surveys total 1,935 acres (Kinnear-Ferris 2006a and 2006b, Reed 2006, Gibson 2007). The 1,156-acre survey in November 2005 identified six not eligible sites (5GF3798, 5GF3800, 5GF3802-5GF3805), one “need data” site (5GF3801), and one isolated find (5GF3806) (Kinnear-Ferris 2006a). The 292-acre survey in August of 2006 identified three not eligible sites (5GF3936-5GF3938) and two isolated finds (5GF3939 and 5GF3940) (Kinnear-Ferris 2006b). The Class III cultural resource inventory of an 80-acre parcel in October 2006 identified one isolated find (5GF3949) (Reed 2006). The April 2007 inventory of 407 acres identified three not-eligible sites (5GF4033-5GF4035) and five isolated finds (5GF4036-5GF4040) (Gibson 2007). Additional inventory and testing was conducted by Alpine in April of 2008 for Laramie II, resulting in the determination of non-eligibility for a newly identified site (5GF4151) through limited testing, and the determination of non-eligibility of the “need data” site 5GF3428 through limited testing (Horn 2008).

Impacts to cultural resources that are caused directly or indirectly by project activities would be significant only if they occur to a cultural resource that is considered eligible for or listed on the National Register of Historic Places (NRHP). Disturbance to eligible or listed resources, referred to as historic properties, is an adverse effect, and should be avoided or the adverse effects mitigated. Isolated finds and sites considered not eligible for listing on the NRHP do not constitute historic properties, so potential impacts to those resources require no further consideration.

No formal consultation was initiated with the Colorado SHPO, as all historic properties identified during the inventories would be avoided by various methods including rerouting and/or relocation of facilities. The two remaining “need data” sites will be treated as historic properties until an official determination of eligibility status can be made. Based upon the Class III inventories and the avoidance of all historic properties, the BLM made a determination of “**No Historic Properties Affected**” for Laramie II’s proposed actions within the HGMDP project area. This determination was made in accordance with the 2001 revised regulations [36CFR 800.4(d)(1)] for Section 106 of the National Historic Preservation Act (16U.S.C 470f), the BLM/SHPO Programmatic Agreement (1997) and Colorado Protocol (1998)].

Should any cultural resources that were not discovered during Class III Survey be encountered during construction or maintenance, ground-disturbing activities at that location will be suspended until the provisions of the National Historic Preservation Act and enabling legislation have been carried out.

A standard Education/Discovery Condition of Approval (COA) for the protection of cultural resources would be attached to the APDs (Appendix C, Number 16). The importance of these COAs should be stressed to the operator and its contractors, including informing them of their responsibilities to protect and report any cultural resources encountered.

No Action Alternative:

Under the no action alternative, the proposed action would not be approved. The existing environment would remain in its current condition and there would be no new impacts on the area as a result of selecting this alternative.

Under the no action alternative, Laramie II would continue to develop 11 wells previously analyzed and approved by the BLM on the Mead 30-11 and Federal 31-01 pads pursuant to two previous EA documents. Additionally, two of the existing pads (Leverich 31-06 and Leverich 31-09) are not located on Federal surface, and the 15 proposed fee wells on these pads could be developed even if the APDs associated with the Federal leases are denied. Fee mineral estate would continue to be developed from the existing private pads outside the HGMDP boundaries. Although no direct impacts to cultural resources would occur, cultural resources in the general area would still remain vulnerable to damage from illegal activities and natural processes.

Invasive, Non-native Species

Affected Environment:

No large populations of invasive non-native species were observed within the HGMDP. However, cheatgrass (*Anisantha tectorum*), a List C noxious weed, is present throughout most of the project area in low density. Two small infestations of musk thistle (*Carduus nutans*) and scattered houndstongue (*Cynoglossum officinale*), List B noxious weeds, occur along existing two-track roads in the project area. Redstem filaree (*Erodium cicutarium*), a List B noxious weed, is found in low density in the area burned in the 1987 fire. Other invasive weeds found in the burned area include tumble mustard (*Sisymbrium altissimum*) and prickly lettuce (*Lactuca serriola*).

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 a variety of invasive, non-native species are already present in the project area, the potential for invasion following construction activities is high. Mitigation measures designed to minimize the spread of these species are presented in Appendix C (Number 8).

No Action Alternative:

Under the no action alternative, none of the proposed 45.5 acres of ground disturbance on BLM land would occur. Therefore, the potential for weed invasion would be much less than under the proposed action. Continued operations and maintenance activities associated with the existing pads and associated wells, roads, and pipelines on BLM and private surface in the HGMDP would present a continued potential source of weed introductions.

Migratory Birds

Affected Environment:

The project area is comprised of pinyon-juniper woodlands, sagebrush shrublands, and Gambel oak shrublands. Given this vegetation, the project area provides cover, forage, breeding, and nesting habitat for a variety of migratory birds. Species found on the U. S. Fish and Wildlife Service (USFWS) list of Birds of Conservation Concern (BCC) that may be present in pinyon-juniper woodlands include the pinyon jay (*Gymnorhinus cyanocephalus*) and black-throated gray warbler (*Dendroica nigrescens*). Within the sagebrush habitats the sage sparrow may occur. Within the oakbrush/mixed mountain shrub community, Virginia's warbler (*Vermivora virginiae*) may occur (USFWS 2002; BLM 2005). Other species that are not on the BCC list but associated primarily with these habitat types include year-round residents such as the juniper titmouse (*Baeolophus griseus*) and Townsend's solitaire (*Myadestes townsendi*) and migrants such as the blue-gray gnatcatcher (*Poliophtila caerulea*).

A variety of raptor species are known to exist in this area, including, but not limited to: Cooper's hawk (*Accipiter cooperii*), Sharp-shinned hawk (*Accipiter striatus*), turkey vulture (*Cathartes aura*), golden eagle, northern harrier (*Circus cyaneus*), Swainson's hawk (*Buteo swainsoni*), and American kestrel (*Falco sparverius*). A raptor survey was conducted by O&G Environmental during May and June of 2007. No active nest sites were identified within 0.25 mile of the greater Helmer Gulch project area. However, the project area offers suitable foraging and nesting habitat for a variety of raptor species. The suitability of the area was illustrated by the vocalization of an accipiter both east and southeast of pad 29-41 (was probably a single bird). In addition, a red-tailed hawk flew over the area northeast of Federal pads 30-33A and 30-33B, west of Federal pads 30-33A and 30-33B, and south of Leverich C following calling surveys (may have been 3 different individuals).

Environmental Consequences:

Proposed Action:

The proposed action will result in the removal of approximately 48.4 acres of vegetation due to pad, road, and pipeline construction. Some of the vegetation loss will be short-term until such time as interim reclamation is completed. Total long-term vegetation/habitat loss is estimated at 16.2 acres. Where larger pinyon and juniper trees are removed and replaced with grasses and forbs, the vegetation/habitat will not function as it does in its current capacity. This will result in a loss of cover, forage, breeding and nesting habitat.

The action will further fragment habitat and reduce habitat patch size and connectivity in the area. Fragmentation could alter species composition and abundance. Species that require interior habitat could be displaced, while more common species that prefer openings or forest edges could benefit. In fragmented habitats, nest predation occurs more frequently near forest edges (Dobkin 1994). In addition, the most common avian and mammalian nest predators (e.g. American crow, blue jay, common grackle, raccoons, opossums, and domestic cats) typically occur in higher densities around forest edges (Bider 1968). Fragmentation can also increase the risk of nest parasitism by brown-headed cowbirds (*Molothrus alter*), causing declines in local bird populations, including birds of conservation concern species. These impacts, in conjunction with existing fragmentation and disturbance within and adjacent to the HGMDP area, would reduce the value of the largely unfragmented interior habitat available to migratory birds.

Use of heavy equipment will likely displace birds away from preferred habitats for a short time due to noise and human presence. Research indicates that noise associated with development and production

activities can also lead to lower avian diversity and density in both adjacent and distant areas (Forman 2000, Forman and Deblinger 2000). Noise can decrease usable habitat for birds by reducing the distance at which calls made by males are heard, impacting mate selection and reproductive potential.

If vegetation clearing is conducted during the spring nesting season then the action could result in the destruction of nests and/or eggs. Indirect take (e.g. failure due to abandonment of one or both adults) of nearby nests can also occur as a result of disturbance, although reactions vary between bird species. Reactions can range from subtle body changes undetectable to human observers to aggressive defense behavior. Some birds may fly away from the nest appearing undisturbed, leaving nestlings vulnerable to overheating, chilling, predation, or starvation.

The development of water completion pits in the project area may be expected to attract waterfowl and other migratory birds for purposes of resting, foraging, or as a source of water. The extent and nature of the problem is not well defined, but management measures must be conservative and relegated to preventing bird contact with produced water and drilling and completion fluids that may pose a problem (e.g., acute or chronic toxicity, compromised insulation).

These impacts may result in a short-term decrease in the local populations of some species such as the pinyon jay, although a loss of species viability within their overall range is not expected. Other species such as the black-throated gray warbler are less likely to be impacted, because either the project area is on the edge of their geographic range or the scale of habitat loss is within levels tolerated by the species.

No direct effects to nesting raptors are expected as a result of the proposed action. Because upland foraging habitat for raptors is abundant in the area, the proposed action is not expected to impact raptor foraging opportunities or behavior.

No Action Alternative:

Compared to the proposed action, the no action alternative would have less potential to cause disturbance to migratory birds because ground disturbance would not occur and federal well development would be confined to two locations. Disturbance to migratory birds would occur as localized, short-term events that are not expected to have a negative impact on the breeding population.

Mitigation: Pursuant to BLM Instruction Memorandum 2008-050, all surface-disturbing activities are prohibited from May 1 to June 30 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.

The operator shall comply with the Migratory Bird Treaty Act with respect to “take” of migratory bird species. The term “take” means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Accordingly, the operator shall prevent use by migratory birds of reserve pits, produced water pits, and evaporation pits. Areas used to store such fluids during and after completion activities may pose a risk to migratory waterfowl, shorebirds, wading birds, raptors, and other birds. Several established methods to prevent bird access are known to be effective. These include but are not limited to netting, bird-balls, and other methods that prevent bird access and use. Regardless of the method employed, it shall be implemented within 24 hours after completion activities have begun.

All lethal and non-lethal events that involve migratory birds shall be reported to the Natural Resource Specialist immediately upon their discovery.

Native American Religious Concerns

Affected Environment:

The Ute Indian Tribes claim this area as part of their ancestral homeland. At present, no Native American concerns are known within the project area and none was identified during the cultural resource records search or inventories. Additionally, the Ute Tribes of the Uinta and Ouray Bands (Northern Ute), Southern Ute, and Ute Mountain Ute Tribes were notified of the proposed HGMDP on May 30, 2007. No responses, questions, or requests for additional information were received by July 10, 2007. If new data are disclosed, new terms and conditions may have to be negotiated to accommodate their concerns.

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. There may also be other unidentified culturally sensitive or significant locations in the area that have not been identified by the Ute tribes. All known Native American sites have been avoided. However, unauthorized modification of roads, pipelines, and well pads may lead to adverse impacts.

Cumulative impacts of increased development, accesses, construction, operation, and maintenance may also adversely impact 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 impacting them.

A standard Education/Discovery Condition of Approval (COA) for the protection of Native American values would be attached to the APDs (Appendix C, Number 16). The importance of these COAs should be stressed to the operator and its contractors, including informing them of their responsibilities to protect and report any cultural resources encountered.

No Action Alternative

Under the no action alternative, the proposed action would not be approved. The existing environment would remain in its current condition and there would be no new impacts on the area as a result of selecting this alternative.

Under the no action alternative, Laramie II would continue to develop 11 wells previously analyzed and approved by the BLM on the Mead 30-11 and Federal 31-01 pads pursuant to two previous EA documents. Additionally, two of the existing pads (Leverich 31-06 and Leverich 31-09) are not located on Federal surface, and the 15 proposed fee wells on these pads could be developed even if the APDs associated with the Federal leases are denied. Fee mineral estate would continue to be developed from the existing private pads outside the HGMDP boundaries. Although no direct impacts to Native American cultural resources would occur, cultural resources in the general area would still remain vulnerable to damage from illegal activities and natural processes.

Special Status Species (includes an analysis of Public Land Health Standard 4)

Affected Environment:

Federally Listed, Proposed, or Candidate Plant and Animal Species

According to the latest species list from the U. S. Fish and Wildlife Service (<http://mountain-prairie.fws.gov/endspp/CountyLists/COLORADO.pdf>), the following Federally listed, proposed, or candidate plant and animal species may occur within or be impacted by actions occurring in Garfield County: Uinta Basin hookless cactus (*Sclerocactus glaucus*), Parachute beardtongue (*Penstemon debilis*), DeBeque phacelia (*Phacelia submutica*), Canada lynx (*Lynx canadensis*), Mexican spotted owl (*Strix occidentalis*), yellow-billed cuckoo (*Coccyzus americanus*), razorback sucker (*Xyrauchen texanus*), Colorado pikeminnow (*Ptychocheilus lucius*), bonytail chub (*Gila elegans*), and humpback chub (*Gila cypha*). The Colorado River and its 100-year floodplain, which lie in proximity to the proposed activity, are designated Critical Habitat for the razorback sucker and Colorado pikeminnow. The U. S. Fish and Wildlife Service announced the delisting of the bald eagle in June 2007 with an effective date of August 8, 2007. The BLM now considers the bald eagle a sensitive species.

Of the Federally listed, proposed, or candidate wildlife species listed above, habitat is present near the project area for two of the endangered fishes, the Colorado pikeminnow and razorback sucker. Canada Lynx potential habitat exists more than 1 mile south of the Helmer Gulch MDP area boundary. Canada Lynx could move through the Helmer Gulch MDP area but without suitable habitat present, effects from the proposed action are not expected. Habitat for the yellow-billed cuckoo and Mexican spotted owl does not occur near the Helmer Gulch MDP area and these species would not be affected by the project. While the bonytail chub and the humpback chub have historically occupied the Colorado River in the vicinity of the project, their Designated Critical Habitat lies 90+ miles downstream at the Utah/Colorado border. The species potentially affected by the proposed action are discussed below.

Razorback Sucker – The razorback sucker is one of the largest suckers in North America, growing to lengths exceeding 3 feet and weighing up to 13 pounds. Once widespread throughout most of the Colorado River Basin, this species is now found only in the upper Green River in Utah, the lower Yampa River in Colorado, and occasionally in the Colorado River near Grand Junction. The current population estimate is about 500 individuals (USFWS, 2006b). Razorback suckers inhabit only large rivers and are not found in smaller tributaries and headwater streams. Adults are associated with backwaters and areas of strong current in depths from 4 to 10 feet.

Colorado Pikeminnow – The Colorado pikeminnow is the largest minnow in North America, growing at one time to nearly 6 feet in length and weighing up to 80 pounds. It was historically found throughout the entire Colorado River Drainage but is now restricted to the lower reaches of the Green, Yampa, White, Colorado, and Gunnison Rivers in Colorado (USFWS, 2006b). Within the Colorado River, this fish is found from Palisade, Colorado, downstream to Lake Powell. Adults are found in large, deep eddies, pools, and other areas adjacent to the main current flow; young inhabit shallow, quiet backwater areas off main river channels.

Federally Listed, Proposed, or Candidate Plant Species

The results of May and June 2007 surveys indicate that there are no Federally listed, proposed, or candidate plant species or suitable habitat for these species in the project area.

BLM Sensitive Plant Species

Suitable habitat in the HGMDP occurs for only one BLM sensitive plant species, Harrington's penstemon (*Penstemon harringtonii*). Habitat for Harrington's penstemon is typically open sagebrush shrublands or sagebrush with encroaching pinyon-juniper. Soils are typically rocky loams and rocky clay loams derived from coarse calcareous parent materials (basalt) ranging in elevation from 6,200-9,200 feet.

BLM Sensitive Animal Species

BLM sensitive animal species with habitat and/or occurrence records in the area include bald eagle (*Haliaeetus leucocephalus*), milk snake (*Lampropeltis triangulum taylori*), midget faded rattlesnake (*Crotalus viridis concolor*), and Great Basin spadefoot (*Spea intermontana*). In addition, four BLM sensitive fish species - the flannelmouth sucker (*Catostomus latipinnis*), bluehead sucker (*Catostomus discobolus*), roundtail chub (*Gila robusta*), and Colorado River cutthroat trout (*Oncorhynchus clarki pleuriticus*) - are known to inhabit the Colorado River.

Bald eagle nesting and winter range habitat exists 0.5 mile or more north of the Helmer Gulch MDP area boundary within the 100-year floodplain of the Colorado River (CDOW, 2006). Because of this distance, effects from the proposed action to bald eagle and their habitat are not expected.

Milk Snake – The milk snake occurs in a wide variety of habitats in Colorado, including shortgrass prairie, sand prairie, shrubby hillsides, canyons, open stands of ponderosa pine, pinyon-juniper woodland, and arid river valleys. Although no occurrence records for this species exist near the project area, suitable habitat is present (CNHP, 2005).

Midget Faded Rattlesnake – The midget faded rattlesnake is a small, pale-colored subspecies of the common and widespread western rattlesnake. The midget faded rattlesnake is endemic to a small area of southwestern Wyoming, northwestern Colorado, and adjacent Utah. Suitable habitats include sandy and rocky areas in pinyon-juniper and semi-desert shrub. The relatively densely vegetated and generally north-facing aspects of the HGMDP area are less suitable than the more barren south-facing areas north of I-70.

Great Basin Spadefoot – This species is found in rocky canyons, broad dry basins, and stream floodplains scattered throughout northwestern Colorado. It is inactive most of the year, emerging from the substrate of seasonal ponds or ephemeral streams to breed and feed during periods of protracted surface moisture.

Flannelmouth Sucker – The flannelmouth sucker is restricted to larger streams and rivers in the middle and upper Colorado River Basin. In Colorado, this species is found only in large rivers, where it occupies in all habitat types, including riffles, runs, eddies, and backwaters (CDOW, no date).

Bluehead Sucker – This species is found throughout the middle and upper Colorado River Basin, in a variety of areas from headwater streams to large rivers (CDOW, no date). The bluehead sucker prefers areas with a rock substrate and mid to fast flowing waters.

Roundtail Chub – The roundtail chub is found in the Colorado River mainstem and large tributaries (CDOW, no date). Adults inhabit slow-moving water near areas of faster water and swim into the faster water in small groups to forage. Young-of-the-year prefer shallow river runs, while juveniles concentrate in eddies.

Colorado River Cutthroat Trout – Remaining populations of this species now occur mostly in headwater streams and lakes of the Colorado River drainage. This includes Beaver Creek, which is located 0.3 mile west of the project area.

Environmental Consequences:

Proposed Action:

Federally Listed, Proposed, or Candidate Plant Species

The results of May and June 2007 surveys indicate that there are no Federally listed, proposed, or candidate plant species or suitable habitat for these species in the project area. Therefore, the proposed action would have “**No Effect**” on these species.

BLM Sensitive Plant Species

Surveys for Harrington’s penstemon were conducted in May and June 2007 by O&G Environmental Consulting, LLC in all areas of suitable habitat within the HGMDP area. Because of the large number of Harrington’s penstemon individuals found during initial survey work, counting 100% of the Harrington’s penstemon plants within the HGMDP was amended to statistically sampling a portion of the Harrington’s penstemon and counting all plants within randomly placed circular plots (1/100 radius plots). These plots were placed in the three habitat types in which the Harrington’s penstemon occurred – sagebrush shrublands, pinyon juniper woodlands, and previously burned pinyon/juniper woodland, currently dominated by grasses and forbs. The density of Harrington’s penstemon in the three different habitat types was estimated at 165 plants per acre in the previously burned pinyon-juniper woodland, 400 plants per acre in sagebrush shrubland, and 128 plants per acre in pinyon-juniper woodland. According to the rare plant report submitted to the BLM by O & G Environmental Consulting (2007), there are an estimated 45,777 Harrington’s penstemon plants just within the 187.67 acres surveyed within the HGMDP. There are many more penstemon outside of the surveyed area, and it is unknown how many total plants occur in this population.

The proposed action would result in both direct and indirect impacts to populations of Harrington’s penstemon present in the HGMDP area. Construction of pads, roads and pipelines as proposed is estimated to result in the potential loss of 658 individual Harrington’s penstemon plants on BLM land within the HGMDP (Table 12) or approximately 1% of the estimated population of 45,777 + plants. This would lead to the determination that the Proposed Action is “not likely to result in a loss of viability to the population or cause a trend toward Federal listing.”

<i>Habitat</i>	<i>Estimated Harrington’s Penstemon Plants per Acre</i>	<i>Proposed Disturbance (Acres) in Harrington’s Penstemon Habitat</i>	<i>Estimated Number of Harrington’s Penstemon Lost on BLM Land</i>
Burned Pinyon-Juniper	165	1.06	175
Big Sagebrush	400	0.77	308
Pinyon-Juniper	128	1.37	175
Total		3.2	658

A number of indirect effects to Harrington's penstemon could result from the proposed action, including an increase in dust, weed invasion, sedimentation and erosion, and a loss of pollinators and their habitat. Potential impacts to plants from the accumulation of dust include clogged plant pores, reduced light reception, and alteration of glyphosate uptake mechanisms (Boerboom 2006, Ferguson et al. 2007). The clogging of pores can interfere with growth rates and water transpiration (Salisbury and Ross 1992).

The road-effect zone can extend several times the actual width of a road and as much as 50 meters down slope and has been documented as accounting for approximately 40% of fugitive dust within an area (Forman and Alexander 1998, Ferguson et al. 2007). Impacts from dust would decrease as activity within the project area moves from construction and completion phases to production and operations/maintenance phases. Additionally, implementation of best management practices for dust reduction would further decrease dust impacts.

Another indirect effect could be an increase in invasive weeds from ground disturbing activities. Invasive weeds could compete with Harrington's penstemon for water, nutrients, and light or change ecosystem processes, such as increasing fire regimes. Mitigation measures designed to minimize the spread of invasive species are presented in Appendix C (Number 8).

The building of pads, roads and pipelines uphill of Harrington's penstemon populations could lead to indirect impacts from soil erosion and sedimentation. These impacts would be mitigated by requiring the installation of sediment fences above potentially affected plants. If erosion and sedimentation are determined to be affecting Harrington's penstemon, additional erosion and sediment control measures would be required.

Finally, the proposed action could reduce the amount or quality of habitat needed by pollinator species. Mitigation to minimize this effect would include reclaiming the disturbed areas using a BLM-approved native seed mix. Mitigation measures designed to minimize the loss of pollinator habitat are presented in Appendix C (Number 7).

Cumulatively within the Helmer Gulch MDP, 658 plants will be lost on BLM land, plus an additional 8,938 plants on private land. The impacts to Harrington's penstemon on private land within the HGMDP are analyzed under the no action alternative. The BLM has no jurisdiction over sensitive plants on private land. However, cumulative impacts and losses of Harrington's penstemon are recognized. The GSFO has never lost more than 1% of a Harrington's penstemon population from the effects of oil and gas development. Because Harrington's penstemon has a wide range in western CO, and because Eagle County is considered the core population of this species, losses of 1% of a population on the edge of known occupied habitat has not to date caused concern that viability of this species is reduced, that this species is in jeopardy, or that there is a need for Federal listing of this species.

Federally Listed, Proposed, or Candidate Animal Species

Canada Lynx – Project activities would not occur within a Lynx Analysis Unit. Suitable lynx habitat including travel linkages does not occur within one mile of proposed developments. Therefore, implementation of the proposed action would have “**No Effect**” on Canada lynx.

Razorback Sucker and Colorado Pikeminnow – In May 1994, BLM prepared a programmatic biological assessment (PBA) that addressed water-depleting activities in the Colorado River Basin. In response, USFWS issued a programmatic biological opinion (PBO), which determined that depletions from the Colorado River Basin would jeopardize the continued existence of the endangered Colorado River fishes and consequently would lead to a “**May Affect, Likely to Adversely Affect**” determination for all water-depleting activities. The PBO was written to remain in effect until a total depletion of 2,900 acre-feet per year for Federally permitted activities is reached and includes measures to allow BLM to authorize projects with depletions of less than 125 acre-feet per year.

An amendment to the PBO in 2000 increased the threshold to 3,000 acre-feet per year and excluded depletions associated with oil and gas drilling, based on the assumption at that time that such operations produce more water than they deplete. BLM will soon complete a new PBA addressing the impact of depletions associated with oil and gas development in western Colorado, including the GSFO area. Once the USFWS issues a new PBO—anticipated for early summer 2008—the BLM will be responsible for tracking all wells drilled into Federal leases and reporting the corresponding depletions annually to the USFWS. In the meantime, BLM is continuing to operate under the 2000 amendment to the 1994 PBO.

Construction of the proposed developments would increase the potential for soil erosion and sedimentation. The mitigation measures presented in Appendix C would reduce the potential. Although a minor temporary increase in sediment transport to the Colorado River may occur, it is not likely that the increase would be detectable above current background levels. In any case, all of these Federally listed fishes are adapted to naturally high sediment loads.

BLM Sensitive Animal Species

Milk Snake, Midget Faded Rattlesnake, and Great Basin Spadefoot – Direct effects on these species could include injury or mortality as a result of construction, production, and maintenance activities. These effects would be most likely during the active season for these species, which are April to October for the milk snake, March to October for the midget faded rattlesnake, and May through September for the Great Basin spadefoot. Indirect effects for the two snake species could include a greater susceptibility to predation if the road or pad is used for temperature regulation. The potential for injury or mortality as a result of vehicles traveling on new roads and pads would increase for individuals of all three species. However, the potential for effects is low and impacts at the population level are not expected.

Flannelmouth Sucker, Bluehead Sucker, and Roundtail Chub – Mitigation measures presented in the groundwater/soils sections and water quality, surface and ground sections would be implemented to minimize sedimentation of the Colorado River and tributary streams. Although minor temporary increases may occur, they are unlikely to be detectable above background levels. For this reason, and because the flannelmouth sucker, bluehead sucker, and roundtail chub are adapted to high sediment loads, the proposed action would not be expected to adversely affect these species.

Colorado River Cutthroat Trout – A potential increase in sediment as a result of the project would not impact CRCT populations in Beaver Creek because no portion of the project area drains to this creek. Individuals present in the Colorado River would not be expected to be adversely affected as only minor temporary increases in sediment are expected that are unlikely to be detectable above background levels.

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.

BLM Sensitive Plant Species

There would be no Harrington's penstemon lost on BLM lands within the HGMDP with implementation of the no action alternative, because the 45.5 acres of proposed disturbance on BLM lands would not occur. However, an estimated 8,938 Harrington's penstemon plants would be lost on private lands within the HGMDP (Table 13) because BLM has no jurisdiction over sensitive plant species on private surface.

Table 13. Estimated loss of Harrington’s penstemon on private land in the HGMDP.

<i>Habitat</i>	<i>Estimated Harrington’s Penstemon Plants per Acre</i>	<i>Proposed Disturbance (Acres) in Harrington’s Penstemon Habitat</i>	<i>Estimated Number of Harrington’s Penstemon Lost on private Land</i>
Grassland	165	0	0
Big Sagebrush	400	19.97	7,988
Pinyon-Juniper	128	7.42	950
Total		27.39	8,938

Federally Listed, Proposed, or Candidate Animal Species

For the purposes of comparison, the no action alternative is associated with the drilling and development of 15 fee wells on 2 fee pads, but the development of up to 116 wells from 5 new federal pads would not occur and associated access roads and pipelines involving Federal surface would not be installed or constructed. Access to the 15 fee wells would follow the route defined for the southern project area as presented in the proposed action.

The potential for the no action alternative to impact endangered fish would be less than the proposed action because no new surface disturbance would occur. The potential for soil erosion and sedimentation into nearby ephemeral drainages would still exist due to the exposed soil on the two pads and associated access roads. However, it is unlikely that the no action alternative would cause a sediment load increase in the Colorado River above detectable background levels. Consequently, listed fish species are unlikely to be impacted under this alternative.

BLM Sensitive Animal Species

The potential for the no action alternative to impact sensitive species would be less than the proposed action because no new surface disturbance would occur. Sensitive fish species are unlikely to be impacted for the same reasons identified for federally listed fish species. Sensitive reptiles and amphibians could be affected as a result of exposure to traffic on roads and pads. However, given the small amount of potential exposure relative to undisturbed habitat, it is unlikely that the no action alternative would cause impacts to these species.

Analysis on the Public Land Health Standard No. 4 for Special Status Species: The area where Harrington’s penstemon is found has experienced increasing levels of natural gas development in the past few years. Although the disturbances are usually relocated to minimize direct losses, often a portion of the occurrence is impacted by construction activities and potential habitat is lost. Furthermore, indirect impacts associated with the proposed action, like competition from aggressive non-native species, may cause additional impacts to the populations. Standard 4 is presently being met for this species; however the habitat alteration associated with the proposed action would likely contribute to a declining trend and help to reduce the potential for meeting or maintaining Standard 4 for Harrington’s penstemon over the long-term. With the implementation of the mitigation measures identified in this section and elsewhere in the EA, Standard 4 for special status plants and their habitats would be achieved, but populations are at risk due to increasing natural gas development.

As a whole, the portions of the Colorado River Designated Critical Habitat for the Colorado pikeminnow and razorback sucker provide sufficient vegetation cover to minimize increased erosion of sediments into the Colorado River above and beyond what is normal. The main factor identified as affecting these fish is the depletion of water, resulting in decreased flows and adverse modification of critical habitat. Based on overall habitat condition within the landscape area, Standard 4 is being achieved for these fish species.

The milk snake and midget-faded rattlesnake have no known records within the Rifle West Watershed. The landscape as a whole appears to provide suitable habitat in quantities commensurate with the limited number of individuals likely to occur in the area. Standard 4 is being achieved for these snake species.

Great Basin spadefoot toad habitat is experiencing increased natural gas development which is fragmenting habitats. Habitat fragmentation is a concern for this species as any activity or action that effectively cuts off migration routes to breeding ponds will negatively affect the toad. Roads, pipelines, well pads and increased human use will have negative effects to this species. The landscape as a whole appears to provide enough quality habitats to sustain the limited number of toads likely occurring in the area. As such, Standard 4 is being achieved for this species.

The proposed action should not result in a failure of the area to achieve Standard 4 for special status, threatened or endangered species. However, the proposed action would facilitate increased natural gas development which would further fragment habitat, reduce habitat connectivity, and reduce habitat patch size within the watershed. When considered with natural gas development that has occurred since the assessment, this Federal action would likely contribute to a declining trend and further reduce the potential for meeting or maintaining Standard 4 for certain special status animal species over the long-term.

Wastes, Hazardous or Solid

Affected Environment:

BLM Instruction Memoranda numbers WO-93-344 and CO-97-023 require that all National Environmental Policy Act documents list and describe any hazardous and/or extremely hazardous materials that would be produced, used, stored, transported, or disposed of as a result of a proposed project. The Glenwood Springs Resource Area, Oil & Gas Leasing 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. It also includes a description of the common industry practices for use of these materials and disposal of the waste products. These practices are dictated by various Federal and State laws and regulations, and the BLM standard lease terms and stipulations which 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 would include any tributary, including any dry wash that eventually connects with the Colorado River.
- The Comprehensive Environmental Response, Compensation, and Liability Act (Public Law 96-510 of 1980) provides for liability, compensation, cleanup, and emergency response for hazardous substances released into the environment. It also provides national, regional, and local contingency plans. Applicable emergency operations plans in place include the National Contingency Plan (40 CFR 300, required by section 105 of CERCLA), the Region VIII Regional

Contingency Plan, the Colorado River Sub-Area Contingency Plan (these three are Environmental Protection Agency produced plans), the Mesa County Emergency Operations Plan (developed by the Mesa County Office of Emergency Management), and the BLM Grand Junction Field Office Hazardous Materials Contingency Plan.

- The Resource Conservation and Recovery Act (RCRA) (Public Law 94-580, October 21, 1976) regulates the use of hazardous substances and disposal of hazardous wastes. Note: While oil and gas lessees are exempt from RCRA, right-of-way holders are not. RCRA strictly regulates the management and disposal of hazardous wastes.

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

Twelve EPA-Regulated Facilities are located within one mile of the MDP area (Table 14) (EPA 2007). Eleven of the sites are permitted to emit hazardous air pollutants – all are currently in compliance with EPA-procedural requirements including two sites which are currently shut down. The remaining site is water treatment plant which holds a non-major NPDES discharge permit. It has not been cited for permit violations. Activities at these sites are not expected to have caused contamination of the MDP area.

Table 14. EPA-Regulated Facilities within One Mile of the Pipeline Corridor			
<i>Facility Name</i>	<i>Location</i>	<i>Distance from Boundary</i>	<i>Environmental Concerns</i>
Encana (West) – K28NW	NE ¼, SW ¼, Sec 28, T6S, R93W	1000 feet	emits hazardous air pollutants – in compliance
Williams Prod Olman Health - 53151	NW ¼, SW ¼, Sec 6, T7S, R93W	3000 feet	emits hazardous air pollutants – in compliance
Tom Brown Inc. Savage #1-3	NE ¼, Sec 1, T7S, R 94 W	2000 feet	emits hazardous air pollutants – in compliance
Tom Brown Inc. Savage #1-21	SW ¼, NW ¼, Sec 1, T7S, R 94 W	5000 feet	emits hazardous air pollutants – in compliance
Encana (West) – RE1 Pad	SW ¼, NW ¼, Sec 1, T7S, R 94 W	5000 feet	emits hazardous air pollutants – in compliance
Tom Brown Inc. Savage #1-22	SE ¼, NW ¼, Sec 1, T7S, R 94 W	4000 feet	emits hazardous air pollutants – in compliance
Tom Brown Inc. Savage #1-32	NE ¼, SW ¼, Sec 1, T7S, R 94 W	4000 feet	emits hazardous air pollutants – in compliance
Tom Brown Inc. Savage #1-31	NW ¼, SW ¼, Sec 1, T7S, R 94 W	5000 feet	emits hazardous air pollutants – in compliance
Tom Brown Inc. Rulison Federal 1-42	SE ¼, SW ¼, Sec 1, T7S, R 94 W	5000 feet	emits hazardous air pollutants – in compliance

Snyder Oil Corp Grass Mesa 27-4	NW ¼, NW ¼, Sec 27, T6S, R93W	5000 feet	permitted to emit hazardous air pollutants but shut down
Snyder Oil Corp Grass Mesa 33-1	NE ¼, NE ¼, Sec 33, T6S, R93W	5000 feet	permitted to emit hazardous air pollutants but shut down
Beaver Creek Water Treatment Plant	NW ¼, SW ¼, Sec 20, T6S, R93W	adjacent to MDP boundary	NPDES non-major chemical discharges

A variety of substances, including fuels, lubricants, and treatment chemicals, would be used to construct and operate the proposed wells, pipelines, and associated facilities. Potentially harmful substances used in the construction or operation would be kept onsite in limited quantities for short periods.

Waste generated by construction activities would not be exempt from hazardous waste regulations under the oil and gas exploration and production exemption of RCRA. Exempt wastes would include those associated with well production and transmission of natural gas through the gathering lines and the natural gas itself.

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

No listed or extremely hazardous wastes, in excess of threshold quantities, would be used or produced by construction or operation of the facilities. Substances used during construction may include solvents, explosives, gasoline, diesel fuel, lubricating oils, and hydraulic fluid. Explosives may be used for blasting rock on portions of the pipeline corridors. Smaller quantities of other materials such as herbicides, paints, and other chemicals would be used during project operation and maintenance. These materials would be used to control noxious weeds, facilitate revegetation on the ROW, and operate and maintain meter stations during the life of the project.

Solid waste (human waste, garbage, etc.) would be generated during construction activities and, to a limited extent, during project operations.

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

Environmental Consequences:

Proposed Action:

Possible pollutants that could be released during the construction phase of this project would include: diesel fuel, hydraulic fluid and lubricants. These materials would be used during construction of the road, pad and pipeline and for refueling and maintaining equipment and vehicles. Potentially harmful

substances used in the construction and operation would be kept onsite in limited quantities and trucked to and from the site as required. No hazardous substance, as defined by 40 CFR 355 would be used, produced, stored, transported, or disposed in amounts above threshold quantities.

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

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

No Action Alternative:

This alternative would result in no new surface disturbance and would have no effect on soil or hazardous wastes.

Water Quality, Surface and Ground (includes a finding on Standard 5)

Affected Environment:

Surface Water and Waters of the U.S.

The HGMDP area is located within the Colorado Headwaters-Plateau (HUC 14050006) drainage basin unit (EPA 2007). The climate of project area is semiarid: annual precipitation ranges from less than 16 inches in the project area to more than 30 inches at the higher elevations near the drainage divide to the south (Robson and Banta 1995). Thus, perennial surface water flow is limited to larger streams.

The HGMDP area lies entirely within the Helmer Gulch sub-basin. Helmer Gulch is an intermittent tributary of the Colorado River. All other streams within this sub-basin are ephemeral and unnamed. Drainage within the sub-basin is northerly from Flatiron Mesa toward the Colorado River.

Within the HGMDP area, the gathering lines and access roads cross several “Waters of the U.S.” as defined by the U.S. Army Corps of Engineers (USACE) in 33 CFR Part 328. Access roads and gathering lines cross Helmer Gulch in four locations, all of which are outside the HGMDP boundary. In addition, access roads and gathering lines would cross several unnamed intermittent and ephemeral tributaries of Helmer Gulch (as shown on 1:24,000 scale USGS topographic maps) within the HGMDP area. Utility line crossings fall under USACE Nationwide Permit (NWP) 12, while road crossings are covered under NWP 14. Locations of these crossings are presented in Table 15.

Flow in HGMDP area drainages occurs in response to spring (March through May) snowmelt and intense summer to early autumn thunderstorms. Studies in the Uinta Basin to the northwest found that flow in ephemeral washes correlates more closely with storm intensity than with total precipitation (VTN 1977). Precipitation intensity of at least 0.5 cm/hour sometime during a storm event was found to be necessary for flow in ephemeral washes to occur. Other factors influencing flow in ephemeral washes included soil

moisture, topography, basin aspect, and storm path. During large flow events, channels are often deeply incised with steep banks that slough and develop new head cuts.

Natural surface water in the project area is generally a calcium bicarbonate type of good quality with low sediment and salinity yields (USDI 1999a). During snowmelt runoff, and especially during intense thunderstorm activity, sediment and salinity yields are likely to be higher than during low flow periods. Sparsely vegetated areas tend to yield higher sediment and salinity during runoff events than do areas with more vegetation cover.

The Colorado Water Quality Control Commission (CWQCC) identifies stream segments according to river basin and specific water segments. Helmer Gulch enters the Colorado River in the segment between the Roaring Fork and Parachute confluences. Therefore, it is within the State-designated Lower Colorado River segment 4a (Table 16). Water quality standards and guidance for drainages within the Lower Colorado River Basin are included in the CWQCC Regulation No. 37 (CDPHE 2007b). A complete listing of numeric standards for physical, biological, inorganic, and metal parameters for segment 4a can be found in Regulation No. 37.

<i>Location</i>	<i>Relationship to project</i>	<i>Width of channel bottom (ft)</i>	<i>Estimated bankfull width (ft)</i>
SWNW 28	crossed by access road 8185	8	60
SWNW 28	crossed by access road 8185	3	25
SWSW 29	crossed by access road & pipeline east of 31-01	4	18
SESW 29	crossed by access road & pipeline east of 31-01	4	18
NESW 29	crossed by access road & pipeline adjacent to 29-11	13	31
NENE 29	crossed by access road & pipeline SE of 29-02	13	30
SESE 30	crossed by access road & pipeline NE of 31-01	8	38

Source: USGS 1:24,000 scale topographic maps for Rifle and North Mamm Peak quadrangles, Colorado

The State has adopted basic standards and anti-degradation rules for surface waters. These standards define four different categories of classified uses: aquatic life, water supply, recreation, and agriculture; designate uses for each water body; and adopt numeric or narrative water quality standards to protect those classified uses. The classified uses for surface water are Aquatic Life Cold, Class 1 or 2; Aquatic Life Warm, Class 1 or 2; Recreation Class 1 (1a or 1b) or 2; Domestic Water Supply; Agriculture; and Wetland (CDPHE 2007a). As noted above, the HGMDP area is located within Lower Colorado River segment 4a. This segment has been assigned four of the classified/protected uses as follows (Table 16): *Aquatic Life Cold Class 2* waters are not capable of sustaining a wide variety of cold water biota, including sensitive species, due to physical habitat, water flows or levels, or uncorrectable water quality conditions that result in substantial impairment of the abundance and diversity of species; *Recreation Class 2* waters are suitable or intended to become suitable for recreational uses, including fishing and other streamside recreation; *Water Supply* waters are suitable or intended to become suitable water supplies; *Agriculture* waters are suitable or intended to become suitable for crop irrigation and are not hazardous as drinking water for livestock.

Table 16. Beneficial Use Classifications for Potentially Affected Streams	
<i>Stream Segment Description</i>	<i>Classifications</i>
BASIN: LOWER COLORADO RIVER	
4a. All tributaries, including wetlands, to the Colorado River from the confluence with the Roaring Fork River to a point immediately below the confluence with Parachute Creek except for the specific listings in Segments 4b, 5, 6, 7, 8, 9, 10, 11a - h, and 12.	Aquatic Life Cold 2 Recreation 2 Water Supply Agriculture

Source: CDPHE 2007a.

Newly promulgated Colorado Regulations Nos. 93 and 94 (CDPHE 2006a and 2006b, respectively) were also reviewed for information related to the proposed project area drainages. Regulation No. 93 is the State's Section 303(d) list of water-quality-limited segments requiring Total Maximum Daily Loads (TMDLs). The 2006 303(d) list of segments needing development of TMDLs includes Lower Colorado Segment 4a which includes the HGMDP area. In general, the Colorado River tributaries in this area are impaired because of selenium levels. Regulation 94 is the State's list of water bodies identified for monitoring and evaluation to assess water quality and determine if a need for TMDLs exists. Lower Colorado Segment 4a is listed for monitoring and evaluation for iron in Mamm and South Canyon creeks which are east of the HGMDP area.

The U.S. Geological Survey (USGS) collects water quality data at several area stations. However, there are no water quality records for Helmer Gulch. The Colorado River was sampled twice in 2002 immediately below the confluence with Helmer Gulch. Results are summarized in Table 17 (USGS 2007b).

Table 17. General Water Quality Parameters for USGS Station 393143107465200 (Colorado River near Rifle, CO)		
<i>Parameter</i>	<i>7/31/2002</i>	<i>9/5/2002</i>
specific conductance ($\mu\text{S}/\text{cm}$ at 25°C)	1,070	1,290
pH (standard units)	8.5	8.5
temperature (°C)	20.2	17.9
dissolved oxygen (mg/l)	9.1	9.5
instantaneous discharge (cfs)	1,460	1,190

Source: USGS 2007b.

There are no sediment measuring stations in Helmer Gulch or on the Colorado River near the HGMDP area. The closest downstream station on the Colorado River is near DeBeque, Colorado. A summary of the two years of data collected at this station is presented in Table 18 (USGS 2007a). The closest upstream station is near Glenwood Springs but data are limited to only eight samples from 1959.

Table 18. Sediment Yields USGS Station 9093700 (Colorado River near DeBeque, CO)				
<i>Maximum (tons/day)</i>	<i>Minimum (tons/day)</i>	<i>Mean (tons/day)</i>	<i>Median (tons/day)</i>	<i>Period of Record</i>
41,300	8.4	1817.6	267	1974 – 1976

Source: USGS 2007a.

Groundwater

The proposed activities are located within the Colorado 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 in the upper reaches and thicker in the lower reaches. Generally, alluvial well depths are less than 200 feet and typically water levels range from 50 to 100 feet. 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 Tertiary Green River Formation. The Mahogany Zone is a poorly permeable oil shale, which effectively serves as an aquitard. 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, exposing the lower Green River and Wasatch Formations. The surface formation of the proposed pads is primarily Quaternary Landslide Deposits, with the exception of Federal 20-15, which is underlain by Wasatch Formation, and Leverich 31-09, which is underlain by Quaternary Older Gravels and Alluvium of Pre-Bull Lake Age.

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

According to the Colorado Division of Water Resources (DWR), one fresh water well is located within the HGMDP area, in Section 31. This domestic water well is listed as 147 feet deep, with a water level of 80 feet. There are numerous fresh water wells located in the southwest corner of Section 20 and the north half of Section 30. A check of water level data from wells located just outside the MDP boundary indicates most of the wells are monitoring wells, or those with expired permits. Data from wells that had numerical data indicated water levels less than 200 feet. Although not within the HGMDP Boundary, three wells checked in Section 21 listed water levels just over 250 feet. The wells are likely completed in the Wasatch Formation or surface alluvium. The use of the wells is primarily domestic; therefore it can be assumed that the quality of the water is fit for human consumption.

Water Rights: A search of well records at the Colorado Division of Water Resources (CDWR) (2007b) found twelve registered water wells within the HGMDP area or within ¼ mile of the HGMDP boundary (Table 19). One well is completed in the Helmer Gulch alluvium, and the remainder in bedrock aquifers.

<i>Permit #</i>	<i>Depth (ft)</i>	<i>SWL (ft)</i>	<i>Yield (gpm)</i>	<i>Sec*</i>	<i>¼ ¼</i>	<i>Use</i>
45735FR	unknown	unknown	unknown	20	NE, SW	domestic
60638	unknown	unknown	15	20	SW, SW	domestic
45735F	120	70	15	20	SE, NW	domestic
221943	130	85	8	20	NW, SW	domestic
59657A	255	155	10	20	SW, SW	domestic
199383	280	254	4.6	21	NW, SW	domestic, stock
201481	318	267	10	21	SW, SW	domestic
156538	unknown	unknown	unknown	30	NE, NW	domestic
170967	250	230	3	30	NE, NW	domestic
212420	12	unknown	4.5	30	NE, NE	domestic
25731F	unknown	unknown	unknown	31	NW, NW	irrigation
32393	147	80	8	31	SE, NW	domestic

Source: CDWR 2007b

*All are located in T6S, R93W

<i>ID</i>	<i>Water Right Name</i>	<i>Stream</i>	<i>Location</i>
45 / 5021	DRM Spring No 2	Unnamed Trib (Colo. River)	SE, SE, NW, 20, 6S, 93W
45 / 5130	Burdick No 1 Spring	Seep and waste	SE, SE, NW, 20, 6S, 93W
45 / 5020	DRM Spring No 1	Unnamed Trib (Colo. River)	SW, SE, NW, 20, 6S, 93W
45 / 5591	Neal Spring	Colorado River	SW, SE, NW, 20, 6S, 93W
45 / 3629	Flatiron Reservoir	Helmer Gulch	SW, NW, SE, 20, 6S, 93W
45 / 876	Upton Spring E	Helmer Gulch	NE, NE, SW, 20, 6S, 93W
45 / 877	Upton Spring F	Helmer Gulch	NE, NE, SW, 20, 6S, 93W
45 / 878	Upton Spring G	Helmer Gulch	NE, NE, SW, 20, 6S, 93W
45 / 889	Burdick Point of Div	Seep and waste	NW, NE, SW, 20, 6S, 93W
45 / 874	Upton Spring C	Helmer Gulch	SE, NE, SW, 20, 6S, 93W
45 / 875	Upton Spring D	Helmer Gulch	SE, NE, SW, 20, 6S, 93W
45 / 872	Upton Spring A	Helmer Gulch	SW, NE, SW, 20, 6S, 93W
45 / 873	Upton Spring B	Helmer Gulch	SW, NE, SW, 20, 6S, 93W
45 / 5217	Powerline Spring	Helmer Gulch	NW, SW, NW, 28, 6S, 93W
45 / 601	G W T Ditch	Helmer Gulch	SW, SE, NW, 30, 6S, 93W
45 / 5447	V Mead Spring	Helmer Gulch	SE, SW, SW, 30, 6S, 93W
45 / 5022	Feedlot Spring	Helmer Gulch	NE, NW, NW, 31, 6S, 93W
45 / 5367	Klondike Spring No 1	Helmer Gulch	NE, SW, SE, 31, 6S, 93W
45 / 5368	Klondike Spring No 2	Helmer Gulch	NE, SW, SE, 31, 6S, 93W
45 / 5016	Stauffer Spring	Helmer Gulch	SW, SW, SE, 31, 6S, 93W
45 / 5236	Grassy Mesa Spring No 2	Helmer Gulch	NE, NE, NE, 32, 6S, 93W
45 / 5596	Beaver Mamm Spring	Helmer Gulch	SW, SE, NE, 32, 6S, 93W
45 / 619	Hann Ditch	Beaver Creek	SW, SE, SE, 25, 6S, 94W
45 / 739	Rifle Town Intake Pl	Beaver Creek	SW, NE, NE, 36, 6S, 94W
45 / 5388	North Flatiron Spring	Helmer Gulch	NW, NW, NE, 6, 7S, 93W
45 / 613	Gus Anderson Ditch	Elk Horn Gulch	SE, NE, NW, 6, 7S, 93W

Source: CDWR 2007a

Proposed Action:

Environmental Consequences:

Surface Water

Constructing the project facilities including pads, pipelines, and access roads could have temporary to short-term impacts on surface water quality if construction takes place when streams are flowing. Clearing and grading of streambanks, placement of fill for access roads in stream channels, in-stream trenching, trench dewatering, and backfilling could affect surface waters through increased sedimentation and releases of chemical pollutants from sediments. A reduction in streambank integrity could increase streambank erosion. Suspended sediment during flow events would increase until disturbed areas were stabilized by reclamation. The greatest sediment load would occur immediately downstream of stream crossings, and suspended sediment concentration would progressively decrease downstream as the large sediment particles were deposited in the channel bed.

Near-surface soil compaction caused by construction equipment and vehicles could reduce the soil's ability to absorb water and could increase surface runoff and the potential for ponding. The magnitude and duration of potential impacts to surface runoff would depend on soil depth, susceptibility of a particular soil type to erosion, vegetation cover, slope aspect and gradient, erosive force of rainfall or surface runoff, and duration and extent of construction activities. Impacts would be greatest immediately following commencement of construction activities and would naturally decrease thereafter due to soil stabilization and revegetation.

Groundwater

Potential impacts to groundwater resources from the proposed action would include contamination of the groundwater with produced water, drilling mud, and petroleum constituents. Hydraulic fracturing (fracing) would be incorporated to 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 5,000 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 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 deep groundwater resources would be affected, as the thick impermeable layers of rock at the top of the Williams Fork Formation would prevent water or hydrocarbons from migrating to potable water zones.

No Action Alternative:

Surface Water and Waters of the U.S.

Environmental consequences of the No Action Alternative would be considerably less than consequences of the Proposed Action. No drainage channels would be crossed instead of the seven crossed under the Proposed Action. There would also be fewer potential impacts to water wells, water rights, and surface water quality in general

Groundwater

Under the no action alternative, there would be no impacts to groundwater resources.

Finding on the Public Land Health Standard for Water Quality: Reestablishment of pre-construction contours and vegetation would allow surface waters to infiltrate back into groundwater recharge areas and would not affect the land health status. The surface water quality is within the criteria set by the state, thus meeting the land health standard. With proper water body crossing and streambank restoration techniques, sediment and erosion control measures, spill prevention practices, and successful revegetation of disturbed areas, the Proposed Project would not change the land health status.

Wetlands and Riparian Zones

Affected Environment:

Floodplain habitats occur along the intermittent drainages within the Helmer Gulch basin, but no floodplain habitat would be impacted by the proposed action. No wetland habitats or riparian zones have been documented along Helmer Gulch.

One seep/spring feeds into a drainage that will be crossed by a proposed road in the SWNW Section 28 Township 6S, Range 93W, outside the boundaries of the HGMDP area. The area where the road crosses the drainages supports riparian vegetation.

Proposed Action:

Environmental Consequences: The approximate disturbance to the riparian area would be about 300 square feet where the road crosses the drainages in the SWNE Section 28 Township 6S, Range 93W. Indirect and cumulative impacts, i.e., sedimentation to floodplains, are discussed under the Water Quality (Surface and Groundwater) section of this EA.

No Action Alternative:

Wetland and riparian habitat would not be affected by the drilling of 30 fee wells on three new fee pads because of the lack of wetland or riparian zones within the Helmer Gulch basin.

Lease Stipulations: Federal Lease COC64181 has a Controlled Surface Use stipulation for the purpose of protecting Riparian and Wetland Zones. For areas 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 well pads, may require special design, construction, and implementation measures, including relocation of operations beyond 200 meters to protect the values and functions of riparian and wetland zones. Such measures would be based on the nature, extent, and value of the riparian vegetation, and those that are most important to the function of the riparian zone and would be avoided.

Analysis on the Public Land Health Standard No. 2 for riparian systems: Riparian habitats were assessed along the Lower Colorado River during the Rifle-West Land Health Assessment (USDI 2005). The Lower Colorado River was found to be in Properly Functioning Condition. The small amount of riparian habitat along the seep/spring complex next to the proposed road in the SWNW Section 28 T6S R93W was not evaluated in the 2005 Land Health Assessment; however it probably would have been considered in Properly Functioning Condition. If all mitigation measures are implemented, the proposed action should not prevent Standard No. 2 from being met.

Other Affected Resources

In addition to the critical elements, the resources presented in Table 21 were considered for impact analysis relative to the proposed action and no action alternative. Those resources that would be affected by the proposed action and no action alternative are discussed below.

Table 21. Other Resources Considered in the Analysis.			
<i>Resource</i>	<i>NA or Not Present</i>	<i>Present and Not Affected</i>	<i>Present and Affected</i>
Access and Transportation			X
Cadastral Survey	X		
Fire/Fuels Management		X	
Forest Management	X		
Geology and Minerals			X
Law Enforcement	X		
Paleontology		X	
Noise			X
Range Management			X
Realty Authorizations			X
Recreation			X
Socio-Economics			X
Soils			X
Transportation			X
Vegetation			X
Visual Resources			X
Wildlife, Aquatic			X
Wildlife, Terrestrial			X

Access and Transportation

Affected Environment:

The primary access route to the HGMDP area would be from Interstate 70 exiting at Rulison (Exit 81). Traffic would then travel south on CR323 and turn east onto CR320 (Rifle-Rulison Road). Vehicles would travel in an easterly direction on CR320 and travel for approximately 5 miles to CR317 (Beaver Creek Road). At this point, traffic to the southern part of the project area would turn south and travel 0.75 miles to the existing Federal 31-01 access road, while traffic to the northern part of the project area would stay on CR320 and travel through the switchbacks, turning east on BLM Road 8185. These county roads are open for public use and are also considered by the county as the preferred haul routes for use by drilling, construction, and operations traffic. Heavy loads would access the Helmer Gulch Project area from the Rulison Exit on Interstate-70 and follow the Rifle to Rulison road to the project area as identified in Garfield County’s “Road Haul Route Map” on the Garfield County website.

Environmental Consequences:

Proposed Action:

Garfield County’s preferred haul routes would be used, and Laramie II would be restricted from using other county roads for heavy loads. The proposed action would result in periods of substantial increases in the volume of traffic on the preferred haul routes, other existing BLM roads and newly constructed roads within the HGMDP area. The greatest increase in traffic 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 22). Once

Table 22. Traffic Associated with Drilling and Completion Activities.		
<i>Vehicle Class</i>	<i>Number of trips per well</i>	<i>Percentage of total</i>
16-wheel tractor trailers	88	7.6%
10-wheel trucks	216	18.6%
6-wheel trucks	452	39.0%
Pickup trucks	404	34.8%
Total	1,160	100.0%

Source: USDI 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 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 seven days.

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 roads may occur from heavy equipment travel, resulting in increased maintenance and safety management requirements.

Within the project area, the road network would be extended from existing roads to provide access to the proposed pad locations (see Figure A). The extension of the road network would involve construction of approximately 3 miles of new road. Portions of the BLM 8185 road and powerline road in Section 29 will be rerouted and the old sections reclaimed as part of the pipeline construction and installation process resulting in 0.4 miles of existing road being re-contoured and reclaimed. Use of multi-well pads and directional drilling minimizes the need for new access road construction. Public motorized access to BLM lands within the HGMDP area is limited to lands accessed from the 8185 road.

Roads would be designed and maintained to an appropriate standard no higher than necessary to accommodate their intended functions, as described in the *Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development* (BLM and USFS 2006) and BLM Handbook 9113 - *Roads Manual*.

Mitigation measures presented in Appendix C would help reduce potential road and traffic related impacts.

No Action Alternative:

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

Geology and Minerals

Affected Environment:

The HGMDP 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 west 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 area that encompasses the HGMDP is located south of the Colorado River on the predominantly north-facing slopes below Flatiron and Grass Mesas. Elevations range from approximately 5400 feet and the lower end of Helmer Gulch (SE ¼, Section 20) to 7560 feet on Flatiron Mesa (SW ¼, Section 32). Total relief within the MDP area is approximately 2160 feet with slopes ranging from 5 to 60% .

The youngest rocks in the HGMDP are Quaternary in age and are distributed as unconsolidated sedimentary surface deposits. Surface deposits that cover much of the area are made up of landslide deposits and older gravels and alluvium of Pre-Bull Lake Age, a recognized Pleistocene glaciation period of the Southern Rocky Mountain Region dating between 500,000 and 700,000 years ago. Wasatch surface exposures are mapped along the northern section of the MDP, located in the SE of Section 20. A field inspection of proposed well pad Federal 20-15, which is located in this area of Section 20 indicated some Wasatch bedrock exposure, but was mantled by unconsolidated deposits of colluvial origin.

The target zone is the Mesaverde Group, which lies unconformably below the Wasatch Formation. The Mesaverde can be over 7,000 feet in thickness within the Piceance Basin, but within the HGMDP is estimated to be approximately 5,000 feet thick. The Mesaverde Group is often called the Mesaverde "Formation" and includes informal subdivisions based on gas productivity characteristics including the barren Ohio Creek, the stacked lenticular, fluvial sandstones, sandy shales, carbonaceous shales and coals of the Williams Fork Formation, and the underlying marine sandstones and shales of the Iles Formation.

The proposed HGMDP drilling project would target sandstone layers within the Williams Fork (including the Cameo Coal and un-named sandstones) between 5,000 and 9,000 feet TVD. The Williams Fork Formation sandstones are considered "tight" because of their low permeability reservoir characteristics. Individual sandstones are stacked and concentrated into 400-500 foot thick potentially productive sequences, and distributed throughout a vertical interval of about 3,000 feet. Studies of the Rulison Gas Field, located just west and incorporating a portion of Section 30 of the HGMDP boundary, 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 2004).

Environmental Consequences:

Proposed Action:

If the proposed HGMDP project wells were to become productive, implementation of the Proposed Action would result in natural gas and associated water being produced from the hydrocarbon-producing 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 bcf per well (Vargas 2006). However, if the wells become productive, initial production rates would be expected to be highest during the first few years of production, then steadily decline during the remainder of the wells' economic life. 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 the 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 will be encountered are used to determine drilling fluids, fluid densities, surface casing depths and production planning. In the HGMDP, the proposed casing and cementing program has been designed to protect and isolate all usable water zones, potentially productive zones, lost circulation zones, and abnormally high-pressure zones.

The specific casing depths will vary depending on well location and drilling conditions. To accommodate protection and isolation of usable water zones, 8 5/8-inch surface casing will be set at anticipated depths of 1500 feet, well below the average depth to known aquifers. Cement will be circulated to surface to assure an adequate seal between the pipe and the rock formations. The 4 1/2-inch production casing will be set at total depth of the well and cement volumes will be sufficient to fill the annulus between the rock formations and the exterior of the casing to 200 feet above the top of the Mesaverde. 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:

Environmental Consequences: Under the no action alternative, the proposed action would not be approved. No new impacts to the geology and mineral resources would occur as a consequence of selecting this alternative.

Noise

Affected Environment:

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

Sound levels have been calculated for areas that exhibit typical land uses and population densities. In rural recreational areas, ambient sound levels are expected to be approximately 30 to 40 dBA (EPA 1974, Harris 1991). The proposed action would be located in a rural, unpopulated area with few potential noise sources. Noise levels from human activity are mostly mechanical, consisting mainly of existing oil and gas wells, new exploration activities, and ranching/farming operations. Human noise is widely dispersed throughout the area, and there are few impacts associated with industrial noise sources and vehicular traffic. As a basis for comparison, the noise level during normal conversation of two people 5 feet apart is 60 dBA.

Interstate 70 is the only high-speed road within the vicinity of the plan area, and it does not contribute to the existing noise levels because of its distance from the area. Roadway traffic on county roads and BLM roads in the HGMDP area contributes to noise, but this source is transient, produced primarily by vehicles used for exploration and maintenance.

Noise from oil and gas development comes from a number of sources: truck traffic, drilling and completion activities, well pumps, and compressors. Table 23 summarizes noise levels of typical construction equipment; Table 24 summarizes noise levels for a number of oil and gas activities.

Noise levels experienced by a receptor depend on the distance between the receptor and the equipment, the topography, vegetation, and meteorological conditions (e.g., wind speed and direction, temperature, humidity).

Overall, ambient sound levels within the vicinity of the plan area are likely to be slightly elevated above the typical levels for rural recreational areas. Sensitive noise receptors include wildlife and recreationists and hunters visiting the area for solitude and a sense of remoteness.

Table 23. Noise Levels Associated with Typical Construction Equipment			
<i>Equipment</i>	<i>Noise Level dB(A)</i>		
	<i>50 feet</i>	<i>500 feet</i>	<i>1,000 feet</i>
Tractor	80	60	54
Bulldozer	89	69	63
Motor Grader	85	65	59
Mechanic Truck	88	68	62
Backhoe	85	65	59
Crane	88	68	62
Air Compressor	82	62	56
Dump Truck	88	68	62
Average (rounded to nearest whole dB(A))	85	65	59
La Plata County (2002)			

Table 24. Noise Levels Associated with Oil and Gas Activity	
<i>Noise Source</i>	<i>Sound Level at 50 Feet*</i>
Well drilling	83 dBA
Pump jack operation	82 dBA
Produced water injection facilities	71 dBA
Gas compressor facilities	89 dBA

Source: Woodward-Clyde 1988 Raw noise data. Portland, Oregon.; USDI, BLM, 2003b, Las Cruis Field Office, December 2003 PRMPA/FEIS for Federal Fluid Minerals Leasing and Development in Sierra and Otero Counties

Note: *Sound levels are based on highest measured sound levels and are normalized to a distance of 50 feet from the source.

The November 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 following maximum permissible levels (Table 25).

Table 25. Noise Standards for Light industrial, Residential/Agriculture/Rural		
Zone	7:00 A.M. to next 7:00 P.M	7:00 P.M. to next 7:00 A.M
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, where there is no reasonably proximate occupied structure or designated outside activity area, the light industrial standard is applicable. The allowable noise level for periodic, impulsive or shrill noises is reduced by five (5) db(A) from the levels shown (COGCC 2006).

Environmental Consequences:

Proposed Action:

Implementation of the proposed action would result in increased noise levels above the general background levels during all phases of project development. Noise disturbances during road, well pad, and pipeline construction would be temporary and most noticeable at the construction site and along the access roads used by project-related traffic. Typical noise levels from construction sites at 50 feet are 85 dB(A). 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 23), construction noise would equal approximately 59 dB(A) at 1,000 feet. At 1,000 feet, noise levels would approximately those of an active commercial area (EPA 1974).

Noise levels around the well pads during drilling and completion activities will also increase above the general background levels. These elevated levels would last approximately 45 to 60 days at each well. Noise would occur continuously, 24 hours per day, during the drilling and completion period. Based on a measured noise level of 68 dB(A) at 500 feet, actions associated with drilling and completion would generate approximately 62 dB(A) at 1,000 feet. This level of noise approximates that associated with light industrial activities (EPA 1974).

Traffic noise levels would also be elevated as a consequence of the proposed action. The greatest increase would be along County and BLM access roads during the drilling and completion phases. Based on the La Plata County data presented in Table 23, 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.

Noise impacts would decrease after construction and drilling activities are completed and the production phase begins, but greater than background noise levels. Permanent sources of noise and noise level increases would be associated with an increase in periodic truck traffic to the well sites, and during maintenance and workovers, noise would increase above levels associated with routine well production. This noise level increase is not anticipated to be significant and will be short in duration.

Refer to Appendix C, (Number 19) for mitigation measures related to noise impacts.

No Action Alternative:

Under the no action alternative, the proposed action would not be approved. The existing environment would remain in its current condition and there would be no new noise impacts on the analysis area as a consequence of selecting this alternative.

Paleontology

Affected Environment:

The predominant surface formation present within the boundary of the HGMDP is Quaternary Landslide Deposits (Ql). Isolated areas of Quaternary Gravels and Alluvium of Pre Bull Lake Age (Qgo) are interspersed throughout the study area and cover older Wasatch Formation sediments. Wasatch Formation surface exposures can be seen in the roadcut of the 8185 Road, which is the main access road to several of the HGMDP proposed pads in Sections 20 and 29. According to the Colorado Oil and Gas Commission (COGCC) website, the Wasatch Formation is the surface exposure mapped in the vicinity of the Federal 30-15 well pad. A field inspection of this location revealed that Wasatch sediments were present at the surface, but not in the immediate vicinity of the proposed pad location. Wasatch Formation was present immediately to the north and south, but the proposed well pad is underlain by landslide debris. The road cut immediately down gradient of the pad location revealed the unconsolidated sediments of the landslide to be approximately 4 feet thick. Wasatch Formation sediments will most likely be encountered during excavation of the pad and access road.

The Wasatch Formation is a BLM Condition 1 formation, defined as an area that is known to contain vertebrate fossils or noteworthy occurrences of invertebrate fossils. The Wasatch Formation is divided into the early Eocene Shire, and the Paleocene age Molina and Atwell Gulch Members. All members of the Wasatch Formation 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 Creek Basin as heterogeneous continental fluvial deposits with interfingering channel sandstone beds and overbank deposits consisting of variegated claystone, mudstone, and siltstone beds (Franczyk et al. 1990).

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, crocodylians, gars and other fishes, freshwater clams, gastropods (snails), and other invertebrates (BLM 1999a).

Environmental Consequences:

Proposed Action:

Construction activities have the potential to adversely affect scientifically important fossils that may be present in the underlying Wasatch Formation. The greatest potential for impacts is associated with excavation shallow bedrock that may be unearthed during the pad and access road construction. In general, alluvium and colluvium 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 known fossil deposits in Sections 20 and 29 of the HGMDP study area. Five sites are located in Section 20, T6S R93W, and three sites are found in Section 29. Areas covered with thick vegetation and soil cover do not usually yield fossil resources, but any areas with “badlands” type surface exposures would warrant further inspection.

“Badlands” in this case are described as multi-colored claystones with localized lenticular fine to coarse grained sandstone, usually devoid of vegetation. In the event that paleontological resources are encountered, a standard paleontological condition of approval would be attached to the APDs (Appendix C, Number 15).

No Action Alternative

Because of no new ground-disturbing activities, no impacts to paleontological resources would occur under the no action alternative.

Range Management

Affected Environment:

The HGMDP would include approximately 1,103 acres of the 4,144 acres in the Beaver Mamm #08104 Allotment. One hundred twenty-four cattle are allowed to graze the allotment from May 15 through October 15. The allotment is 100% Public Land. In the allotment, 633 Animal Unit Months (AUMs) are allowed of which approximately 168 AUMs would be located within the HGMDP project boundary (BLM GSFO 2005).

Environmental Consequences:

Proposed Action:

Development of the proposed HGMDP would result in approximately 45.5 acres of short-term surface disturbance within the allotment and a loss of up to 9 Animal Unit Months (AUMs) of available livestock forage. This loss would last for approximately three years or until grasses and forbs seeded during interim reclamation became productive. Long-term loss, which would last 20 to-30 years, would then be reduced to approximately 16.2 acres or about 3.6 AUMs.

In addition to the loss of forage, 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 and/or steep slopes. Improvement in livestock distribution would improve forage utilization throughout the allotment.

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 will be monitored on the allotment and if necessary, adjustments in livestock use will be made to protect land health.

Mitigation: Range improvements (fences, gates, reservoirs, pipelines, etc.) will 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.

The following Table 26 shows cattle numbers and season of use.

Table 26. Cattle numbers and season of use			
45	CATTLE	5/15	10/15
79	CATTLE	5/15	10/15

No Action Alternative:

No impacts to range management resources would occur because development would take place on proposed pads located on private lands.

Realty Authorizations

Affected Environment:

Road rights-of-way are granted through the HGMDP approval process. Pipelines internal to the HGMDP will require the approval of an SF 299, Right of Way approval form. Roads used for access to the HGMDP area from outside the HGMDP boundary are also subject to the SF 299 approval process. Three miles of road construction is projected, with 3 miles of pipelines. Terms and conditions of the grants will include a wildlife winter range timing limitation that precludes construction, drilling or completion activity traffic during the period December 1 to April 30.

Environmental Consequences:

Proposed Action:

Under the proposed action, the ROW authorizations would be granted subject to appropriate terms and conditions. These authorizations would provide Laramie II legal access for the construction and development of the proposed pads, roads, and pipelines. Standard BLM reclamation requirements would apply.

No Action Alternative:

Subject to the completion and approval of the HGMDP, Laramie II would have legal access to conduct operations and would therefore require no additional realty authorizations.

Recreation

Affected Environment:

No Special Recreation Management Areas (SRMAs) are located within or adjacent to the proposed action (USDI 1999b). The proposed action is located within Region 4 (area within GSRA with the highest potential for oil and gas development), which provides for dispersed recreation in rural to semi-primitive motorized settings on BLM lands. Recreation activities primarily consist of hunting (big and small game), camping (undeveloped), OHV riding and sightseeing.

The project area is located within both private and BLM surface lands, where the private landowners have seasonal hunting restrictions identified within their SUAs. Hunting activities occur on both private and BLM lands with restrictions on the private lands. Hunting is managed and licensed by the Colorado Division of Wildlife (CDOW), provides permits for both big and small game within the area.

There are no developed recreational facilities such as campgrounds, picnic areas, or improved hiking/biking trails within the project area. Several unpaved two-track roads including county roads suitable for four-wheel drive and all-terrain vehicles extend within the project area, but their use is limited primarily to hunters and hikers.

Oil and gas development activities modify the landscape and the quality of recreational settings to varying degrees. The proposed activity (gas field development) is more consistent with roaded natural (RN) settings, based on the BLM-administered lands, the Recreation Opportunity Spectrum (ROS) classification system. The RN physical and social recreation setting is typically characterized by a natural appearing environment with moderate evidence of the sights and sounds of man, where modification and use practices are evident, but harmonize with the natural environment (USDI 1982). The recreational setting character of the proposed project area remains generally natural and primitive.

Environmental Consequences:

Proposed Action:

The proposed action would temporarily result in increased vehicle traffic, noise, dust, and human activity during construction, and would decrease nominally throughout the operational life of the project. Well pad construction and drilling activities would likely displace wildlife in localized areas adjacent to these activities. Recreation activities, such as hunting would be displaced to other locations within or adjacent to the project area, except where SUAs call for no drilling activities during certain hunting seasons.

Over the 20-30 year operating life of the project, the presence of natural gas production facilities (wells, tanks, pipelines, power lines, operations and maintenance traffic) would alter the recreational character of the project area but not enough to lose the general natural setting of the area. The recreation setting of the project area can be expected to remain RN.

The use of multi-well production pads limits the extent of surface disturbance within a given area, which allows the RN settings to be retained after the project area has been developed. Changes in the physical and social recreation setting would impact the recreation experience of traditional users, both short term (construction) and long term (operations). During the short term, hunters and other recreationists, would be temporarily displaced, but would be able to complete their activities on surrounding public lands. Long term impacts could potentially increase access to public lands from the newly constructed access roads and pipeline ROWs supporting the proposed project. It is recommended that BMPs (fencing and other movable barriers) be installed to limit access to previous inaccessible public lands. Without such BMPs, traditional recreational users such as hunters would be replaced by recreational users seeking different activity opportunities and experiences; however, recreation activities of the new users would not be outside of the RN experience and activity opportunity characters. The proposed action is unlikely to increase public recreational access to and through the project area. Recreational activities would likely continue on adjacent lands by existing users.

No Action Alternative:

Under the no action alternative, the proposed action would not be approved. The existing environment would remain in its current condition and there would be no new impacts on the area as a result of selecting this alternative.

Socio-Economics

Affected Environment:

The HGMDP area is located within Garfield County, Colorado. The population of Garfield County has grown by approximately 2.8% per year from 2000 to 2005, resulting in an increase from 44,300 to 51,000 residents (U.S. Bureau of the Census 2005). 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 (Colorado Department of Local Affairs 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 (USDI 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 (USDI 2006).

Activities on public land in the vicinity of the plan area are primarily ranching/farming, hunting, 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 (USDI 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 in USDI 2006).

The growth of the oil and gas industry in the past 10 years has been increasingly important to local economies (USDI 2006). Oil and gas production in Garfield County has increased more than three-fold during the past five years from 70 billion cubic feet (BCF) in 2000 to more than 235 BCF in 2005 (COGCC 2006 in USDI 2006). In addition, Garfield County is experiencing the fastest oil and gas development in Colorado with 1,800 drilling permits issued in 2005 (USDI 2006). In 2005, 60 drill rigs were operating in Garfield County, and a new well was estimated to be drilled every 15 to 20 days (COGCC 2006 in USDI 2006). 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 (USDI 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 (USDI 2006). Payments are based on Federal acreage in the county for all land management agencies, including BLM, U.S. Forest Service, U.S. Fish and Wildlife Service, and National Park Service. The amount may also be adjusted based on population and as appropriated by Congress. By formula, payments are decreased as other Federal funds, such as mineral royalty payments, increase. PILT received by Garfield County in the last 4 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 (USDI 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 \$5.5 million. In 2001, the amount was \$14.1 million (USDI 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 (USDI 2006). In the year 2007, oil and gas assessed valuation in Garfield County amounted to \$1,867,927,350 or about 65% of total assessed value. Total tax revenues from property taxes and special district levies were \$130,180,686. 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 HGMDP 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 land owners 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) reducing scenic quality (see Visual Resources), 3) increased dust levels especially during construction (see Air Quality), and 4) increasing traffic (see Transportation).

No Action Alternative:

Due to the small-scale of development that would occur under this alternative, there would be little additional job opportunities. Local governments would not benefit from Federal mineral royalties because the development would occur on private mineral estate from private surface locations.

On the other hand, landowners and guides should not be impacted because the displacement of big game should not be widespread. There would be no new disturbance on Federal land, but development on private land may continue resulting in lower dust levels and less increase in traffic.

Soils (Including Analysis on Standard 1)

Affected Environment:

Soils crossed by the pipeline corridor have formed in three types of surficial materials (Tweto et al. 1978):

- Residual material produced by in-situ weathering of the underlying Tertiary-age bedrock which is primarily variegated claystone, siltstone, sandstone, and conglomerate.
- Colluvium comprised of old gravels and alluvium transported down-slope slowly by creep.
- Stable and unstable landslide deposits consisting of mudflow and some talus deposits.

Lack of moisture associated with the semi-arid climate has suppressed vegetation growth and slowed the chemical and biological processes commonly associated with soil development (USDI 1994). In addition, soil fertility is hampered by susceptibility to water erosion. Soils in the project area support low density livestock grazing and wildlife habitat but generally have a poor revegetation potential due to these limiting factors.

Table 27 lists the soil mapping units which are found within the HGMDP boundary. The environmental and construction-related constraints associated with these soil mapping units are included in the table. Field observations of soils at the various well pad locations in April 2007 indicated the presence of fine sandy clay loam, fine sandy loam, silty clay loam, and silty loam. Several sites had greater than a 30% cover of stones, cobbles, and/or boulders at the soils surface. Soils with a severe water erosion hazard tend to be found on moderately to steeply sloping lands. As a result, precipitation tends to run off of the surface rather than infiltrating into the soil causing formation of rills and gullies. Other important soil characteristics which make a soil highly erodible by water include high contents of silt and very fine sand; expansive types of clay minerals; a tendency to form surface crusts; the presence of impervious soil layers; and blocky, platy, or massive soil structure (Brady and Weil 2002).

In areas of soils which average less than 60 inches depth to bedrock, pipeline trenching may encounter bedrock. Blasting may be necessary to cut through hard bedrock not easily broken up by trenching equipment.

<i>Map ID#</i>	<i>Mapping Unit Name</i>	<i>Water Erosion Hazard</i>	<i>Flood Duration</i>	<i>Flood Freq.</i>	<i>Water Table</i>	<i>Bedrock Depth</i>	<i>Potential for Herbaceous Plants</i>
34	Ildfonso stony loam, 25-45% slopes	severe	none	none	>6'	>60"	Fair
45	Moryal-Tridell complex, 6-25% slopes	moderate	none	none	>6'	>60"	good-poor
55	Potts loam, 3-6% slopes	moderate	none	none	>6'	>60"	Fair
56	Potts loam, 6-12% slopes	severe	none	none	>6'	>60"	Fair
66	Torriorthents-Camborthids-Rock outcrop complex, steep	moderate-severe	not rated	not rated	not rated	not rated	not rated
67	Torriorthents-Rock outcrop complex, steep	moderate-severe	not rated	not rated	not rated	not rated	not rated
68	Vale silt loam, 3-6% slopes	moderate	none	none	>6'	>60"	good
71	Villa Grove-Zoltay loams, 15-30% slopes	slight-moderate	none	none	>6'	>60"	Good

Some soil mapping units within the HGMDP boundary contain areas with poor potential for plant growth (Harman and Murray 1985) (Table 27). Reestablishing grasses and other plants in these areas during restoration may be challenging. The proposed pipelines will cross no soils with high water tables or soils subject to flooding.

Environmental Consequences:

Proposed Action

Table 27 identifies each soil mapping unit within the HGMDP boundary and indicates the environmental and construction-related constraints associated with each soil type. Figure C shows the locations of proposed facilities in relation to erosive soils and steep slopes.

Within the HGMDP boundary, the proposed action would disturb 48.4 acres of soils during construction. A minority of these soils have a severe water erosion hazard. Clearing, grading, and movement of construction equipment along the ROW will remove the protective vegetation cover from erosive soils accelerating the erosion process. Water erosion of soils associated with construction is a concern because it results in loss of valuable topsoil by rill and gully erosion. Eroded topsoil and subsoil wind up contributing to increased sedimentation of area streams and wetlands. Sedimentation adversely affects water quality and aquatic life.

Some areas of two soil mapping units (Torriorthents-Camborthids-Rock outcrop complex, steep and Torriorthents-Rock outcrop complex, steep) have shallow soils, i.e., depth to bedrock less than 60 inches. Depending on bedrock hardness and cohesion, blasting may be needed in order to excavate a trench through these soil mapping units. Even if blasting is not required, standard excavation with a trenching machine or excavator can be slowed considerably. Furthermore, there is the potential for mixing of soil horizons which could reduce soil fertility and hinder revegetation potential.

A minority of soils disturbed by the proposed action have a poor potential for plant growth. As a result, revegetation in these areas following construction will be challenging and may take several years and repeated seeding to achieve success. None of the soils within the HGMDP boundary has a high water table or is subject to frequent flooding.

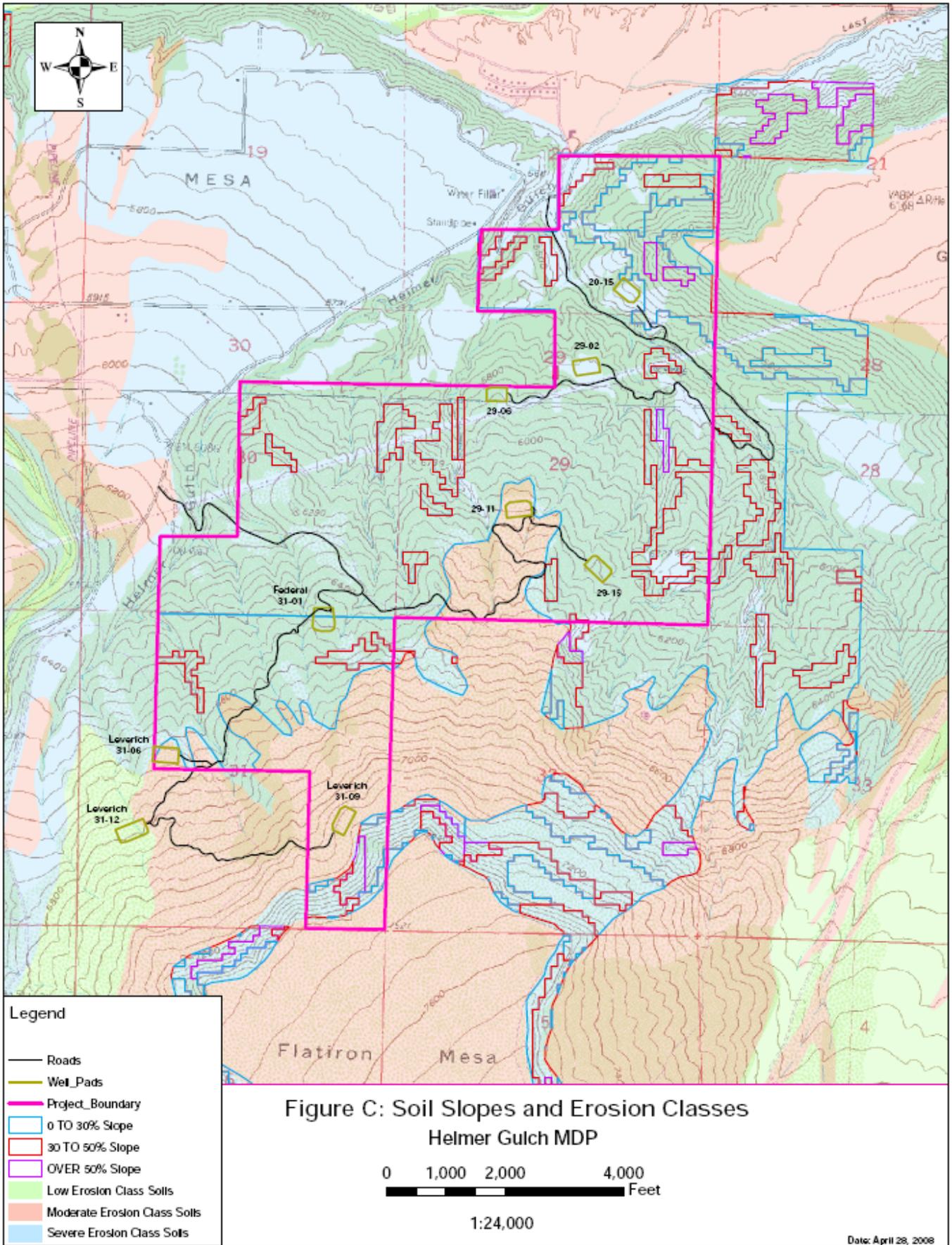
Throughout the proposed project area, there will be the potential for accidental spills or leaks of petroleum products and hazardous materials during construction. These events will cause soil contamination and an associated decrease in soil fertility and revegetation potential.

Environmental Consequences:

No Action Alternative

Under the no action alternative, the proposed action would not be approved. The existing environment would remain in its current condition and there would be no new impacts on the area under this alternative.

Mitigation: Impacts of the project on soil resources would be minimized by implementing measures for handling topsoil and subsoil, erosion control, compaction, spill control, and reclamation. These measures include:



- Topsoil would be stripped to a depth of 6 to 12 inches depending on its depth. Trench spoil and other subsoil stripped during grading would be stored separately from topsoil to prevent mixing. During reclamation, soils would be returned to their pre-construction locations.
- Temporary erosion and sediment controls including silt fences and slope breakers would be installed immediately following clearing and grading of the ROW. These structures would be maintained and would be removed during reclamation, as appropriate.
- Following construction, compacted soils would be loosened using a tractor-pulled ripper or similar device. The ROW would be returned to its pre-construction contours. All disturbed areas would be seeded with mixes consistent with BLM's current reclamation guidelines (see Appendix C, Number 7). Permanent erosion control measures such as slope breakers, mulch, and erosion-control netting would be installed where needed.
- Effects of leaks and spills of petroleum products and hazardous materials would be minimized by implementation of the project Spill Prevention, Control, and Countermeasures Plan. Measures would include use of containment structures, regular inspection of machinery and storage containers, over-excavation of spill-impacted soils, and disposal of impacted soils and cleanup material at authorized facilities.
- Stockpiled topsoil segregated from spoil piles will be replaced during reclamation in its respective original position (last out, first in) to minimize mixing of soil horizons.
- The operator will ensure stockpiled topsoil is evenly distributed over the top of spoil used in re-contouring efforts.
- The operator will be required to monitor all reclaimed areas for signs of erosion and the presence of noxious and invasive plant species. If problems arise, the operator will consult with the BLM for further assistance.

It is the responsibility of the operator to continue revegetation/reclamation efforts until vegetation communities on all disturbed surfaces are composed of desirable seeded vegetation (as determined by the BLM).

Finding on the Public Land Health Standard for Upland Soils: Soils within the HGMDP boundary predominantly meet the public land health standard. With successful topsoil handling procedures, erosion control methods, and restoration measures during construction and restoration activities, the Proposed Project would not change this status.

Vegetation (includes analysis on Standard 3)

Affected Environment:

The primary vegetation types in the HGMDP include pinyon-juniper (*Pinus edulis- Juniperus osteosperma*) woodland, big sagebrush (*Artemisia tridentata*) shrubland and Gambel oak (*Quercus gambelii*)-mixed montane shrublands. A small component of the HGMDP in the southwest portion of Section 29 was historically pinyon-juniper woodland which was burned in 1987.

Pinyon-Juniper Woodland – Pinyon-juniper woodlands in the project area generally consist of scattered Utah juniper interspersed with big sagebrush. Pinyon pine is a minor component. Several other shrub species also occur in this community, including bitterbrush (*Purshia tridentata*), snakeweed (*Gutierrezia sarothrae*), skunkbrush (*Rhus trilobata*) and serviceberry (*Amelanchier alnifolia*). In general, the sparse

herbaceous layer consists of graminoids such as cheatgrass (*Anisantha tectorum*), Kentucky bluegrass (*Poa pratensis*), western wheatgrass (*Pascopyrum smithii*), Indian ricegrass (*Achnatherum hymenoides*), and squirreltail (*Elymus elymoides*). Forbs are a minor component.

Gambel Oak-Mixed Montane Shrubland – This vegetation type is found at higher elevations in the HGMDP than pinyon-juniper woodlands. The vegetation is typically dominated by Gambel oak (*Quercus gambelii*) alone or codominant with serviceberry, mountain big sagebrush (*A. t. var. pauciflora*), mountain mahogany (*Cercocarpus montanus*), chokecherry (*Prunus virginiana*), and snowberry (*Symphoricarpos rotundifolius*) with numerous forbs such as tailcup lupine (*Lupinus caudatus*), Rocky Mountain penstemon (*Penstemon strictus*), Watson’s penstemon (*Penstemon watsonii*), aspen daisy (*Erigeron speciosus*), running fleabane (*Erigeron flagellaris*), Drummond’s rockcress (*Boechera drummondii*), Nuttall’s larkspur (*Delphinium nuttallianum*), small-leaf pussytoes (*Antennaria parviflora*), lambs-tongue groundsel (*Senecio integerrimus*), longleaf phlox (*Phlox longifolia*), sticky false starwort (*Pseudostellaria jamesii*), and narrowleaf mountain trumpet (*Collomia linearis*). Elk sedge (*Carex geyeri*), a native perennial graminoid, is also common.

Mountain Big Sagebrush Shrubland – These shrublands are composed primarily of mountain big sagebrush with less dominant shrubs like Wyoming big sagebrush (*A. t. subsp. wyomingensis*), bitterbrush, snowberry, and green rabbitbrush (*Chrysothamnus viscidiflorus*). Mountain big sagebrush shrublands typically occur where the pinyon-juniper and Gambel oak-mixed montane shrublands intergrade. There is usually a dense herbaceous component consisting of grasses and forbs. Common graminoid species include Indian ricegrass, squirreltail, western wheatgrass, junegrass (*Koeleria macrantha*), slender wheatgrass (*Elymus trachycaulus*) and muttongrass (*Poa fendleriana*). Common forbs include tapertip onion (*Allium acuminatum*), running fleabane, mariposa lily (*Calochortus nuttallii*), lobe-leaf groundsel (*Packera multilobata*), tailcup lupine, death camas (*Toxicoscordion venenosum*), coppermallow (*Sphaeralcea coccinea*), balsamroot (*Balsamorhiza sagittata*), and Indian paintbrush (*Castilleja sp.*). Brittle prickly pear (*Opuntia fragilis*), a cactus, is also common. Harrington’s penstemon in the HGMDP occurs most frequently in this habitat type.

Basin Big Sagebrush Shrubland – This ecological system occurs at lower elevations than mountain big sagebrush shrublands. These shrublands are dominated by basin big sagebrush (*A. t. subsp. tridentata*) and/or Wyoming big sagebrush. Scattered juniper, greasewood (*Sarcobatus vermiculatus*), 4-wing saltbush (*Atriplex canescens*) and rubber rabbitbrush (*Chrysothamnus nauseosus*) may be present in some stands. Common graminoid species include Indian ricegrass, galleta grass (*Pleuraphis jamesii*), thickspike wheatgrass (*Elymus lanceolatus*), needle-and-thread grass (*Hesperostipa comata*), western wheatgrass, Sandberg’s bluegrass (*Poa secunda*) and bluebunch wheatgrass (*Pseudoroegneria spicata*). Coppermallow and tapertip onion are common forbs.

Burned Area (Historically Pinyon-Juniper Woodland) – Native grasses are dominant over most of this area. Winterfat (*Krascheninnikovia lanata*) and rubber rabbitbrush, native shrubs, occur sporadically. Common grasses include non-native cheatgrass, junegrass, ricegrass and slender wheatgrass. Non-native forbs like prickly lettuce, tumble mustard and filaree invaded after the fire, but are not a dominant component. Harrington’s penstemon is found in this vegetation type also, but less frequently than in the mountain big sagebrush community.

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 48.4 acres of vegetation, or 45.5 acres of BLM land. Of the 48.4 acres of physical disturbance, approximately 16.2 acres would not be reclaimed during the life of the wells. With implementation of standard COAs (Appendix C, Number 7), 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 well bores in the future, it is likely that vegetation would remain in an early seral stage for the life of the wells.

Although Gambel oak and sagebrush shrublands would regenerate over time, this process could take several decades, depending on the growth and persistence of seeded species and the intensity of grazing by livestock or wildlife. Pinyon-juniper woodlands could take hundreds of years to return to predisturbance conditions. 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.

The wildlife habitat mitigation will impact 70 acres of vegetation, with only young juniper directly affected. Native plant species could be crushed under equipment tires and there is an increased chance of weed invasion if soil disturbance occurs during juniper thinning.

No Action Alternative:

Under the no action alternative, none of the proposed 45.5 acres of ground disturbance on BLM land (plus 70 acres of wildlife habitat mitigation) would occur; therefore, the impacts to vegetation would be much less than under the proposed action.

Analysis on the Public Land Health Standard for Plant and Animal Communities (partial, see also **Wildlife, Aquatic and Wildlife, Terrestrial**): Three sites in the project area were evaluated during the Rifle-West watershed land health assessment (USDI 2005). One site was located in the Spruce Gulch allotment and two were situated in the Porcupine Creek allotment. Although all three sites were meeting the standard, problems were noted: decadent stands of sagebrush with poor recruitment, encroaching juniper, and widespread invasion of cheatgrass with a corresponding loss of other functional groups such as native perennial grasses and forbs. Surface disturbance associated with the proposed action has the potential to encourage expansion and dominance of the site by cheatgrass and other invasive weeds, while the wildlife habitat enhancement would reduce encroachment of junipers. Appendix C includes provisions to revegetate the disturbances with native species and to control noxious weeds. If successfully revegetated, the proposed action should not contribute to the failure of the area to meet Standard 3.

The no action alternative would have no bearing on the ability of the area to meet the public land health standard for plant and animal communities because no new development would occur on BLM land.

Visual Resources

Affected Environment:

The HGMDP analysis area for visual resources is contained in the valley and hillsides southwest of Rifle, Colorado, up to three miles south of I-70, as part of the I-70 viewshed. The topography is rolling and varied as it climbs out of the river valley. Steeper pinyon and juniper hillsides, with a mixed understory

of shrubs, forbs, and graminoid species, open up to sage-meadow benches as they continue up and out of the valley. The top of the hillsides to the south are lacking large upright woody vegetation due to a past burn.

The HGMDP is dominated visually by native plant communities, but there are also some modifications to the natural environment due to human activities. These modifications include roads, homes, fences and gates for livestock management, and oil and gas production facilities (e.g., pads, wellheads, separator/dehydration tanks, product storage tanks, pipelines, and access roads) scattered throughout the area.

Lands with high visual sensitivity are those within five miles of I-70, of moderate to very high visual exposure, where details of vegetation and landform are readily discernible and changes in visual contrast can be easily noticed by the casual observer on I-70 (BLM 1999a).

The proposed actions on BLM lands will all be located on Visual Resource Management (VRM) Class IV areas, as defined by the Glenwood Springs Resource Area 1984 Resource Management Plan. VRM Classes represent the relative value of the visual resource, providing a basis for considering the visual objectives and defining how the visual resource is to be managed. The objective for VRM Class IV land is to:

“Provide for management activities that require major modification of the landscape. Level of change to landscape can be high. Management activities may dominate the view and be the major focus of attention; i.e., apparent to the casual observer. However, best management practices shall still be used and impacts shall still be minimized through proper location and the repetition of the form line, color and texture of the adjacent landscapes.”

VRM objectives do not apply to non-BLM lands, but visual concerns may be addressed on split estate where Federal minerals occur. VRM classes shown for non-public lands are an indication of the visual values for those lands, and those values are only protected by landowner discretion. The management of VRM classes, landscape character and scenic quality of private and public lands and split estate, and visual impacts associated with well pad development and operation are discussed in the Oil & Gas Leasing and Development FSEIS (USDA 1998a: 3-41–3-45, 4-49–4-54). The portion of the HGMDP that is split estate where Federal minerals occur, Section 31, is classified as VRM Class 4 and was not analyzed for this report.

The Proposed Action would be located in the viewer foreground to middle ground. The landforms in the area have rolling, steadily rising forms, with drainages leading diagonally back down to the flat river valley. Organic patterns of olive and light and dark green vegetation are draped on the hillsides with the occasional light tan color of the landform appearing through. Horizontal and geometric forms of structures dot the immediate foreground landscape adjacent to the I-70 corridor.

Figure D shows the VRM Classes and proximity to viewers for the location of the Proposed Action.

The BLM utilizes the VRM system to manage and protect visual/scenic resources. The BLM’s VRM emphasis has been generally to protect the scenery visible from roads, residences, and areas with high sensitivity. The viewshed for the Helmer Gulch project area has a large number of viewers from the I-70 corridor, the community of Rifle, and homes located in the Grass Mesa area. Two Key Observation Points (KOPs) for the HGMDP have been selected and are outlined below. In addition to the KOPs, proposed disturbance and associated mitigation should consider potential views from surrounding homes.

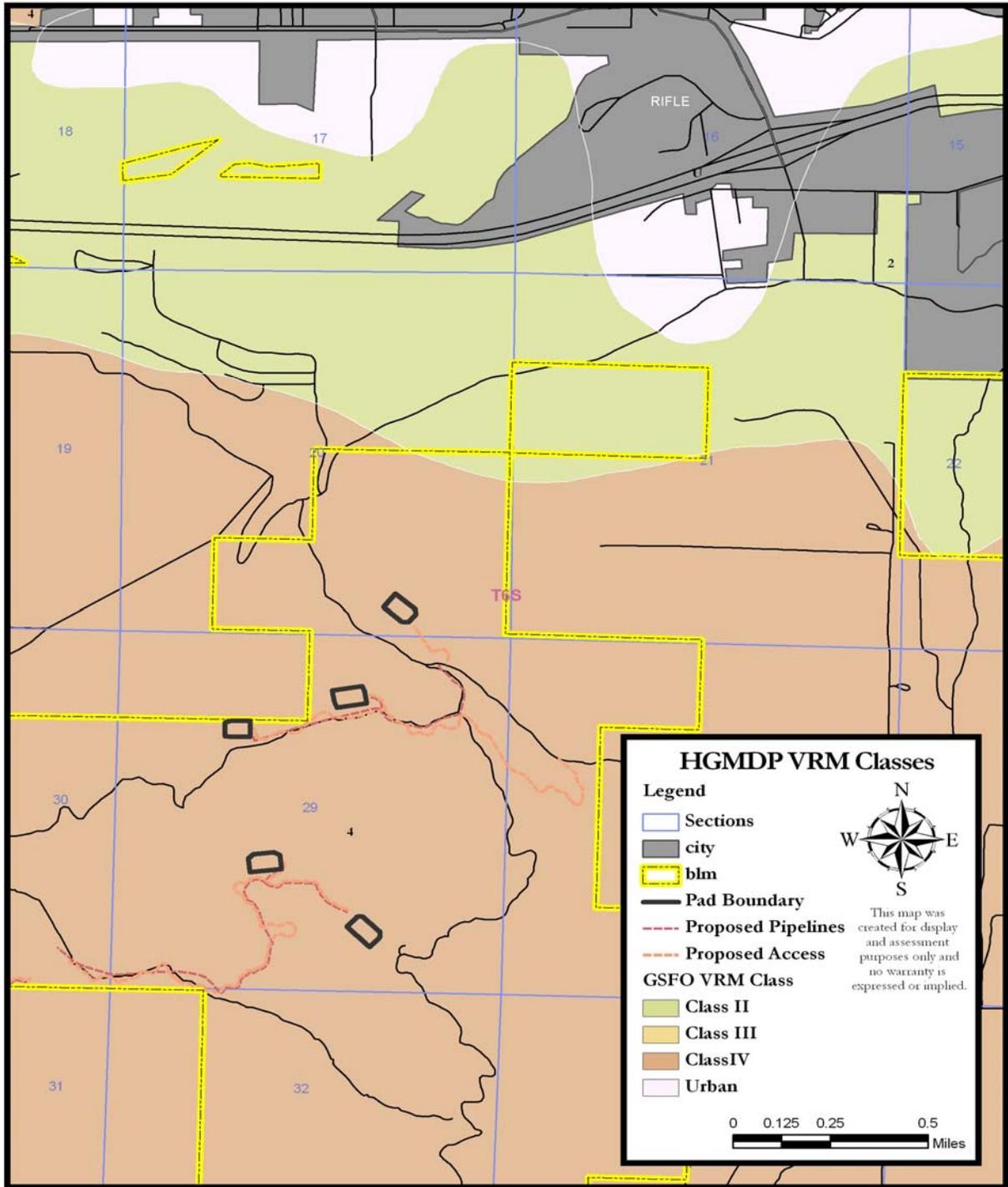


Figure D. Helmer Gulch VRM Classes

- **KOP 1** is located at the rest area off Exit 90 in Rifle, CO. KOP-1 looks to the south and represents the views from the I-70 corridor. The foreground is comprised of the highway, the Colorado River, and development along the interstate. The middle ground is comprised of the rising benches and hills up out of the valley floor.



- **KOP 2** is located on Tripp Drive in Rifle, Colorado, and represents the view of the proposed development from the community. The foreground is comprised of portions of the community of Rifle, ponds, and roads. The middle ground holds the I-70 corridor, agricultural properties, and rolling hills that rise up out of the valley.



Environmental Consequences:

Proposed Action

Short-term visual impacts from construction, drilling, and completion activities would occur on all pads. The existing landscape would be changed by the introduction of new elements of line, color, and texture. New pads, roads, pipelines, surface facilities, drilling rigs, heavy equipment (e.g., dozers, graders, etc.), would increase the presence of vehicular traffic with an associated increase in dust, light pollution, and well flaring

Long-term impacts of the Proposed Action would consist of reduced visual character within portions of the landscape where new pads, facilities, pipelines, and roads cannot be screened from sight. Interim reclamation and site-specific mitigation, as well as the use of natural colors such as shale green and shadow gray on production equipment, would largely mitigate long-term impacts.

Care should be taken during pad construction to preserve as much of the downhill upright woody vegetation as possible to provide screening. During interim reclamation and final reclamation woody and lithic material shall be placed on the cut-and-fill slopes to break up the texture of the disturbed surface and encourage vegetation growth. Where access roads cross sage meadows, particularly the access roads to reach 29-11 and 29-15, care should be taken during construction to design cut-and-fill slopes to mimic existing grades. This may require disturbing slightly more area in order to lay them back further. A steep portion of existing BLM Road 8185 that cuts south and up in the northeast corner of Section 29 will be reclaimed after the pipeline has been installed in the road bed. This will remove an existing visible disturbance in the landscape.

No Action Alternative:

Environmental Consequences: Under the No Action alternative, the Proposed Actions on BLM property would not be approved. Activities located on private property would still be conducted resulting in the addition of new pads and access roads. The existing environment would remain close to its current condition, the distance from which the private property actions would be viewed would limit the amount of change noticeable to the casual observer from the KOP locations. The view of BLM lands would be maintained with the existing landscape being retained. The existing line in the landscape from BLM Road 8185 would remain.

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

Affected Environment:

Helmer Gulch and its tributaries are considered to be intermittent by the USGS and no fish species are known to exist in the streams of the project area. However, these ephemeral streams drain directly into the Colorado River located approximately 0.5 mile to the north. The Colorado River supports numerous native and non-native fish species and a variety of aquatic macroinvertebrates.

Environmental Consequences:

Proposed Action:

Construction activities associated with the proposed project would initially remove approximately 48.4 acres of upland vegetation. Some areas will be revegetated but total long-term upland habitat loss will total about 16.2 acres. This would result in both short-term and long-term erosion and soil loss. Short-

term losses would result where all soils are disturbed until such time as proper revegetation is in place to stabilize soils. Long-term soil loss and sedimentation would be associated with the new roads which would be in place and in use for several years. Sediment can impact some fish species that prefer clear water and clean gravels for spawning. Sediment can smother fish eggs, reduce water quality, and also reduce aquatic insect productivity. Due to the close proximity of the proposed action to Helmer Gulch, mitigation measures as described for groundwater/soils sections and surface and groundwater quality sections would be implemented. In addition, the following mitigation would be implemented to minimize negative impacts associated with soil loss and sediment transport.

The small amount of sediment anticipated to ultimately reach the Colorado River from this source should have minimal impact on fisheries, because it would likely be well within the background levels for the Colorado River. Minor increases in sediment associated with the proposed action would be undetectable.

No Action Alternative:

The potential for the no action alternative to impact fish would be less than the proposed action because no new surface disturbance would occur. The potential for soil erosion and sedimentation into nearby ephemeral drainages would still exist due to the exposed soil on the two pads and associated access roads. However, it is unlikely that the no action alternative would cause a sediment load increase in the Colorado River above detectable background levels. Consequently, aquatic wildlife are unlikely to be impacted under this alternative.

Mitigation: The proposed access roads would be crowned, ditched, graveled, and include drainage features in accordance with BLM road standards using the *Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development* (BLM and USFS 2006) and BLM Handbook 9113 – *Roads Manual*. In addition, the proposed well pads would be constructed to these standards and include Best Management Practices (BMPs) designed to minimize erosion and offsite sedimentation.

Analysis on the Public Land Health Standard No. 3 for Aquatic Wildlife: Habitat/riparian management are a concern in areas that suffer from intensive natural gas development, and more specifically, poor quality roads and culverts adjacent to each stream, and increases in numbers and miles of well pads, roads, and pipelines that are all contributing increased sediment. High sediment loads also limit aquatic insect productivity. Many aquatic insects require clean gravels and cobbles relatively free of sediment. Standard 3 is presently being met for these species, but the populations are at risk due to increasing natural gas development within their habitat. As natural gas production and development continues to increase, it will be increasingly difficult to maintain Standard 3 for aquatic wildlife. Although the impacts associated with proposed action and no action alternative are not considered substantial, they have the potential, at least minimally, to further move the area away from meeting Standard 3.

Wildlife, Terrestrial (includes analysis on Standard 3)

Affected Environment:

Many terrestrial animals are known to exist in the project area. This summary will focus on those species whose seasonal ranges have been delineated by the Colorado Division of Wildlife (CDOW 2006) and have associated management objectives outlined by the BLM. Portions of the proposed project area are found within elk and mule deer severe winter range (CDOW 2006). The proposed project lies entirely within overall and winter range for elk and winter, winter concentration, and overall range for mule deer. The CDOW monitors and manages these populations in Data Analysis Units (DAU) and Game Management Units (GMU). The site is found in deer DAU D-12, and elk DAU E-14, and in GMU 42.

The population objective in 2005 for elk in DAU E-14 was 10,500 animals. The population estimate was 10,300 animals. The population objective in 2005 for deer in DAU D-12 was 29,500 animals. The population estimate for this DAU was approximately 26,279 animals. Mule deer and elk numbers vary naturally due to a variety of environmental and biological factors, and in response to hunting pressure. As a result, populations have varied dramatically over the past several decades. Mule deer numbers were substantially higher in the early 1960s and have since declined. Elk numbers within the landscape area have varied in response to winter die-offs, and appear to be on the increase. Past use coupled with ongoing current use of limited winter range habitats by both species may at least in part account for the less than desirable range conditions (browse species condition) found in some areas. Mule deer and elk concentration on winter range and repeated heavy use of browse species can reduce plant vigor and productivity over time. Factors related to localized population issues include increasing natural gas development, roads, pipelines, powerlines, residential developments, Interstate 70, and limited winter range among others.

Federal Leases COC 41916, 52583, and 64181 have a Timing Limitation (TL) stipulation for the protection of seasonally important wildlife habitats (big game winter range). The TLs preclude construction, drilling, or completion activities from December 1 through April 30 on COC 64181 and from January 15 through April 30 on COC 41916 and 52583. Activities associated with ongoing production and maintenance of oil and gas wells are not subject to the TL stipulation. The areas with the 5-month TL stipulation represent approximately 640 acres or 47% of the project area. Areas with the 3 1/2-month TL stipulation represent approximately 240 acres or 18% of the project area. The remaining 480 acres (35%) do not contain a TL stipulation and would therefore be subject to a 60-day TL from January 1- March 1 as a Condition of Approval (COA).

Environmental Consequences:

Proposed Action:

The proposed action is estimated to result in the direct loss or fragmentation of 48.4 acres of wildlife habitat in the project area due to construction of new well pads, access roads, and pipelines. Reclamation of pipelines and temporary disturbances associated with road construction and interim reclamation of well pads would reduce this total to approximately 16.2 acres for the remainder of the life of oil and gas production.

A much larger area would be subject to indirect habitat loss as a result of disturbance. Human activity, including vehicular traffic and the operation of heavy equipment, can cause deer, elk, and other species to avoid areas of otherwise suitable habitat. Even when wildlife sensitive to disturbance do not avoid an area altogether, the changes in their movement patterns can result in greater use of less suitable habitats and increased physiological stress. These impacts are more significant during critical seasons such as winter, when cold temperatures, reduced forage quality, and reduced forage availability due to snow cover deplete their energy stores accumulated during summer and fall.

Another adverse impact of indirect habitat loss can occur in winter range that supports both deer and elk. Although these species compete to some extent for the same foods, particularly during winter, elk are generally able to tolerate colder temperatures and deeper snow cover. If disturbance from human activity and infrastructure affects the distribution of elk and causes them to congregate into smaller areas, the elk can out-compete deer for food and cause them to shift their patterns of use even farther.

Assuming that some displacement of deer and elk does occur, winter range adjacent to the project area could also be indirectly affected and decline in quality as a result of increased use of those areas (White

and Bartmann 1998). Another potential impact from greater concentrations of animals in areas to which affected animals are displaced is an increased risk for spread of infectious diseases.

The width of areas of indirect impact, or “effective habitat loss,” due to relative avoidance of otherwise suitable habitats depends on several variables. These include the type of habitat adjacent to the human activity (availability of topographic or vegetation screening), the extent and quality of habitat into which displaced animals might move, the intensity and duration of the disturbance, the seasonality of the disturbance, and the innate sensitivity of the particular wildlife species. The scientific literature contains a number of references to the width of indirect habitat zones along roads and other areas of disturbance. These include the following:

Ward (1976) and Irwin and Peek (1979) reported reductions in use by elk within 400 meters (0.25 mile) of little-used, slow-speed National Forest roads. Hershey and Leege (1976) reported reduced use within 400 meters (0.25 mile) of forest roads in summer range. Lyon (1979) reported that use by elk was reduced by 37% within 0.1 mile of a road and by 57% within 0.2 mile. Pedersen (1979) and Rost and Bailey (1979) reported that use by elk decreased within 250 meters (820 feet) of paved roads. Czech (1991) reported reduced use within 500 meters of a logging road after it was opened to public use. Frederick (1991) found that 73% of use by elk occurred in the 50% of an area more than 400 meters (0.25 mile) from a road.

Both Lyon (1979) and Perry and Overly (1976) noted that the actual extent of reduced habitat use along roads was affected by the amount of vehicular traffic and the density of nearby vegetation cover. Witmer and DeCalesta (1985) found that open spur roads showed a significant reduction up to 250 meters away. Regarding the duration of road impacts, Witmer and DeCalesta (1985) found no reduction in use within 250 meters of spur roads after the roads were closed to vehicles. Edge and Marcum (1985) found that elk avoided logging roads by distances of 500 to 1,000 meters on working days but showed no avoidance of the roads on weekends. Similarly, Johnson et al. (1990) reported that elk returned to areas of both summer range and winter range when construction activities that had caused them to leave an area had ceased. Czech (1991) reported that tolerance of logging roads by elk was correlated with the distance to hiding cover.

In a study of the effects of oil and gas development on elk in southwestern Wyoming, Powell (2003) found reduced use within 500 meters of roads and drill pads during fall, winter, spring, and calving season (early summer). However, he did not collect data for narrower zones, so it is not known whether the overall reduction was uniform or greater in closer proximity to the disturbance, as would be assumed. The habitat type was a sagebrush shrubland with low topographic relief.

More recently, Sawyer and Nielson (2005) reported that elk showed reduced use of areas within 2.8 kilometers (1.7 miles) of roads on summer range. In winter, the zone of reduced use was 1.2 kilometers (0.75 miles), which the authors attributed to reduced human use of the roads.

Regarding the duration of impacts on elk from oil and gas development, Hiatt and Baker (1981) found that an oil well drill pad was temporarily avoided but that the access road was not. Johnson et al. (1990) also found that elk avoided oil and gas activities temporarily but returned to these areas when the activities ceased. Knight (1980) reported that elk showed alarm responses when exposed to a continually shifting seismic exploration line but not in relation to regular activities at an oil and gas well pad and access road. Van Dyke and Klein (1996) reported that elk responses to oil drilling activities were not permanent but instead that “elk compensated for site-specific environmental disturbance by shifts in use of range, centers of activity, and use of habitat rather than abandonment of range.”

Knight et al. (2000) found that use by mule deer was reduced within 200 meters of a road (i.e., a road-effect zone of 200 meters, or 0.125 mile). Lyon (1979) found that the reduction in habitat use was greater in sagebrush than pinyon/juniper, apparently due to difference in the amount of vegetation screening.

In ongoing studies of oil and gas activities on mule deer in southwestern Wyoming, Sawyer et al. (2006) documented increasing avoidance of access roads during the first 3 years of development, with the average distance from wells to areas of highest use increasing from 2.1 to 3.7 kilometers (1.3 to 2.3 miles). However, deer distribution showed the opposite pattern during the fourth year, with greater use near the wells than remote from them. The authors attributed this reversal in deer winter use to the severe winter (the well pads were located farther into the basin, at lower elevations, than the reference area that had no winter drilling). During the fifth year, with a relatively mild winter, deer distribution was the same as prior to drilling, which the authors interpreted as possibly indicating habituation.

As can be seen from the data presented above, the most commonly cited width of reduced use by deer and elk in relation to roads is in the range of 200 to 400 meters (0.125 to 0.25 mile). Note that this is “reduced use” or “relative avoidance” and not “total avoidance.” In reality, the impact zone is likely to differ among the pads and roads, the severity of the winter season, and the timing, duration, and spatial relationship of areas subject to construction, drilling, and completion activities. Because not all areas of the project area would be subject to the maximally anticipated level of activity throughout the project life, BLM has used a buffer width of 0.125 mile around all new well pads and access roads—as well as existing pads and roads that would be subject to project-related activities—to estimate an average width of habitat indirectly affected. This results in a total indirect impact to approximately 1169 acres of big game winter range. Of the 1360 MDP project area, approximately 747 acres would be indirectly affected. Within GMU 42, this represents 0.005% of the elk winter range and 0.006% of deer winter range.

The existing TL stipulations on portions of the Federal leases in the project area would prohibit construction, drilling, and completion activities during a portion of the deer and elk wintering season. For the remaining Federal leases that do not contain special lease stipulations for protecting wintering mule deer and elk, BLM will apply the 60-day TL (January 1 to March 1) as a COA (Appendix C, Number 9). Compliance with the TL lease stipulations and COAs would reduce potential indirect impacts by precluding development during the critical wintering season. As noted above, Sawyer et al. (2006) found that average avoidance distance by mule deer increased during the first 3 years of field development before decreasing in the fourth year and returned to pre-development conditions in the fifth year, suggesting that habituation may have occurred. Effects to wildlife are expected to be greater during construction, drilling, and completion than during production and maintenance due to the higher levels of noise and human activity (see **Noise**).

The TL would not apply to routine production and maintenance activities. Under certain conditions, exceptions to the TL stipulations could be granted at the discretion of the Authorized Officer, upon consultation with CDOW. Exceptions would be granted only if site-specific conditions and/or mitigation measures proposed in conjunction with a request for an exception would ensure that wintering big game are not adversely affected. Compliance with the TLs would reduce impacts to wintering big game by minimizing activity during a portion of the critical winter months.

Other aspects of the proposed action, including best management practices and mitigation measures to which Laramie II has committed, would also tend to reduce the severity of adverse impacts to big game ungulates. These include the following:

- Laramie II has designed the development using directional drilling from multi-well pads to reduce the amount of surface disturbance in relation to the number and spacing of downhole targets. As a result, the surface density of pads would be approximately 3.75 pads per square

mile. The current land use plan for the GSFO (USDI 1991a:16) specifies a density of less than 4.0 pads per square mile as a management goal.

- Historically, operators relied on truck traffic to haul saline water produced with the natural gas. Increasingly, operators are using pipelines to move this water to reduce both the costs and the impacts associated with truck haulage. Laramie II has committed to installing buried lines to collect and convey produced water to centralized collection facilities. Use of pipelines instead of trucks to haul produced water is expected to reduce truck traffic—and associated disturbance—by thousands of trips per year.
- Laramie II has committed to use radiotelemetry to the extent practicable to reduce truck traffic and human activity associated with routine monitoring and inspection of the production facilities.
- A BMP (Appendix D, Number 7) applied by COA to well permits would require that topsoil storage piles, stormwater control features, and cut-and-fill slopes 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 maximum size needed for production shall be completed within 6 months following completion of the last well planned for the pad.

Threshold Analysis for Mitigation of Impacts to Wildlife and Wildlife Habitat. For the GSFO, the current land use plan (USDI 1999a) requires operators to implement measures to reduce impacts to winter range if developments reach a predetermined level:

“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....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 (USDI 1999a:16).”

The GSFO road and well density threshold analysis completed for the proposed and existing developments within the boundaries of the HGMDP show a total of eight (three existing and five proposed) well pads within the HGMDP, for a total of one pad per 170 acres (3.8 pads per 640 acres). Currently, 2.2 miles of roads exist within the HGMDP and 3.0 miles of new road are proposed, totaling 5.2 miles of roads. This yields a road density of 2.4 miles of road per 640 acres. Therefore, both well and road density is below the mitigation threshold.

Although the pad and road density thresholds have not been exceeded for the GSFO under the proposed action, the GSFO routinely works with oil and gas operators to identify and implement voluntary mitigation to minimize or offset the impacts that occur even if the threshold is satisfied. Because of the many variables involved, it is difficult to quantify the amount of compensatory mitigation needed to offset the impacts remaining despite the components of the proposed action specifically included to address big game. Consequently, the GSFO, under its current land use plan (USDI 1991) has identified a mitigation calculation methodology. This methodology consists of working with the operator and CDOW to identify mitigation equivalent to 24 acres per pad.

With a total of five new pads under the proposed action, this totals 125 acres of mitigation for indirect impacts. An additional 16 acres of long-term direct impacts brings the total to 141 acres of mitigation. As a result, a wildlife habitat mitigation plan would be required upon approval of the MDP (see Appendix E, Wildlife Habitat Mitigation Plan).

Environmental Consequences:

No Action Alternative:

For the purposes of comparison, the no action alternative is associated with the drilling and development of 15 wells on two fee pads, but the development of up to 116 wells from five new federal pads would not occur and associated access roads and pipelines involving Federal surface would not be installed or constructed. Access to the 15 fee wells would follow the route defined for the southern project area as presented in the proposed action.

Under this alternative, the BLM would have no authority to institute mitigation measures designed to minimize impacts to terrestrial wildlife. Any such measures would come under the jurisdiction of the Colorado Oil and Gas Conservation Commission (COGCC). In addition, none of the proposed habitat modifications would take place. If the plan area went untreated, eventually the sagebrush openings would be replaced by juniper and overall value of the area to big game and some other species of wildlife would be diminished. In the areas where development and use are already present, the potential for effects to wildlife would still exist, and in the areas with a limited amount of activity, a relatively low potential for direct impacts would be maintained.

Analysis on the Public Land Health Standard No. 3 for plant and animal communities (partial, see also **Vegetation and Wildlife, Aquatic**): The Rifle West Land Health Assessment (BLM 2005) determined that Standard 3 was being met with regard to habitat condition related to vegetation structure and species composition. However, the assessment found that 38,373 acres of land within this watershed are not meeting Standard 3 for some wildlife species, most notably mule deer. Of this acreage, 12,549 acres are located on BLM land. The primary concern is habitat fragmentation due to natural gas exploration and development which has resulted in increased road, well pad, and pipeline densities. This physical loss of habitat is exacerbated when combined with increasing human use.

Other factors contributing to the failure to achieve Standard 3 for wildlife include: the encroachment of juniper into sagebrush habitats, a lack of forb production, poor condition of sagebrush, and poor understory conditions. Some individual sagebrush stands are hedged and some stands are decadent with poor age class diversity and limited regeneration or recruitment.

The proposed action would result in direct and indirect losses of habitat and result in increased human use in the area. Given the level of activity in the greater area, the proposed action may further trend the watershed away from meeting Standard 3 for some terrestrial wildlife species.

The no action alternative would contribute to indirect habitat losses in ways comparable to the proposed action but on a smaller scale. As such, the no action alternative may contribute to the trend away from meeting Standard 3 for some terrestrial wildlife species.

CUMULATIVE IMPACTS SUMMARY:

The following cumulative impact assessment is for Laramie II's proposed action for a 4 to 7 year program of oil and gas development on approximately 1360 acres of public, split estate, and private lands located in the Piceance Basin near Rifle, Garfield County, Colorado.

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

- Past, present, and reasonably foreseeable 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 interact with, or intensify the impacts of the other actions;
- Identify any potentially significant cumulative impacts.

For the last five years, the Piceance Basin has experienced an increase in natural gas development, particularly as a result of the passage of the Energy Bill of 2005, authorizing the opening of natural 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 fifty years. Currently within the county, 3,200 wells have been drilled within the county, most within the last five years. It is projected that the number of wells to be drilled will increase to 8,000 by 2010. In Garfield County, 600 wells have been drilled within the last two years. Nationwide, there are 36,827 permits to drill, issued across the western US, which is an increase of 82% from 2002.

These past, present and projected future actions are located in the project area and are considered within the allowable regulatory right of access. However, the actions proposed are associated with more recent actions included in the overall increased exploration.

Laramie II is proposing to drill a total of 131 gas wells on 12 pads within an area of 1,360 acres, placed in an effort to reduce visual and environmental impacts. Laramie II's proposed action is a small percentage of the projected activity within the county and certainly within the next several years of production. 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.

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 Laramie II on locating and screening the wells from known observation points. 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.

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 usage 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. Best management practices would be employed in all situations and considerations, reducing overall cumulative impacts significantly.

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, are considered less than significant.

PERSONS AND AGENCIES CONSULTED

The following organizations were consulted in the development of this EA:

- Laramie II , LLC
- Petrogulf Corporation, et al.
- Colorado Division of Wildlife
- Northern Ute Tribe
- Southern Ute Tribe
- Ute Mountain Ute Tribe
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- Geosurv Land Surveying and Mapping
- Bookcliffs Survey Services
- Alpine Archaeological Consultants, Inc. (cultural resource inventory)

LIST OF PREPARERS AND INTERDISCIPLINARY REVIEW

This EA was prepared by O&G Environmental Consulting, LLC, serving as a third-party NEPA contractor to the BLM. **Table 28** lists the O&G team members who prepared the EA.

Table 28. O&G Environmental Team Members who Prepared the EA	
Name	EA Section
Mike Stanley Project Manager	Proposed Action and Alternatives
William Mahoney	Cumulative Impacts Summary Farmlands, Prime and Unique Geology and Minerals Wastes, Hazardous or Solid Soils Transportation, Travel/Access Water Quality, Surface and Groundwater Hydrology and Water Rights
David Herrington	Affected Environment / Environmental Consequences / Mitigation Measures Cumulative Impacts Summary Realty Authorizations
JoDell Mizoue	Air Quality
Kim Redman	Cultural Resources
Daniel Padilla	Areas of Critical Environmental Concern Wild and Scenic Rivers Wilderness Recreation Noise Visual Resources
Chris Hines	Floodplains, Wetlands & Riparian Zones Invasive, Non-Native Species Migratory Birds Threatened, Endangered, and Sensitive Species Range Management Vegetation Wildlife, Aquatic Wildlife, Terrestrial
Barb Neary	Transportation and Access Socioeconomics

Resource management direction and final EA review was provided by BLM resource specialists as noted in **Table 29**.

Table 29. List of BLM Interdisciplinary Reviewers	
<i>Resource Parameter / Area of Responsibility</i>	<i>Responsible IDT Member</i>
CRITICAL ELEMENTS	
Air Quality	Jeff O’Connell
Cultural Resources	John Brogan
Environmental Justice	Rick Haskins
Invasive Non-native species	Beth Brenneman
Migratory Birds	Jeff Cook
Native American Religious Concerns	John Brogan
Special Status Species	Jeff Cook and Beth Brenneman
Wastes, Hazardous or Solid	Rick Haskins
Water Quality, Surface and Ground	Jeff O’Connell
Wetlands and Riparian Zones	Jeff O’Connell
NON-CRITICAL ELEMENTS	
Access and Transportation	Rick Haskins
Geology and Minerals	Fred Conrath
Noise	Rick Haskins
Paleontology	Fred Conrath
Range Management	Isaac Pittman
Realty Authorizations	Rick Haskins / DJ Beaupeurt
Recreation	Brian Hopkins
Socio-economics	Brian Hopkins
Soils	Jeff O’Connell
Vegetation	Beth Brenneman
Visual Resources	Lindsey Utter, OTAK
Wildlife, Aquatic	Jeff Cook
Wildlife, Terrestrial	Jeff Cook

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Appendix A

Public Comments

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PUBLIC COMMENTS ON HGMDP AND BLM REPSONSES

A Public Notice addressing the HGMDP (HGGGAP) Proposed Action was published in the Glenwood Springs *Post Independent* on June 19, 2007, and in the Rifle *Citizen Telegram* on June 21, 2007. Additionally, a letter containing the public notice information was mailed directly to multiple Federal, State, and local/county government agencies, other organizations, adjacent landowners, and BLM Permit holders. The 30-day public comment period ended on July 18, 2007.

In response to the solicitation for comment identified in the Public Notice, BLM received comments from the Colorado Division of Wildlife (CDOW), City of Rifle Planning and Development Colorado Mule Deer Association, Wilderness Workshop, Georgiana Hertzke, Bobby & Genevie Hooker, Norm and Virginia Hunt, Robert Meisner, and Reed F. Morris, Esq., on behalf of the owners of the Dorrell Ranch (David Hutzley, William Hutzley, and Chris Leverich). The written comments are summarized below, along with BLM's responses.

Colorado Division of Wildlife (CDOW)

In its letter to the BLM, the Colorado Division of Wildlife provided the following comments based on their review of Laramie's GAP proposal, which did not include impact identification or mitigation:

1) *Minimize impacts on wildlife to the maximum extent possible, and encourage evaluation of cumulative impacts;*

Response: In addition to Timing Limitation (TL) stipulations included on two of the three leases to protect winter wildlife habitat, impacts to wildlife will be minimized through various best management practices (BMPs) and timing limitations (TLs) applied as conditions of approval (COAs) to the individual applications for permit to drill (COAs). In addition to BMPs and COAs, the voluntary habitat enhancement measures (see Appendix E Wildlife Habitat Mitigation Plan), which were developed in concert with CDOW, are believed to be suitable mitigation of the direct and indirect impacts to wildlife habitat.

2) *GAP should detail the specific activity involved with the drilling plan (i.e., the number of and anticipated location of drill rigs, the company's abilities to do simultaneous drilling and completions, etc.). The CDOW would suggest that this information should be included in the GAP in order for a complete analysis to be performed;*

Response: The BLM does not have the authority to dictate to leaseholders how developments will be sequenced, what drilling technologies will be used, or that a given area be drilled out at the maximum allowable downhole spacing. These decisions are made by the operator based on a variety of economic and technical considerations.

3) *Development should use a phased approach by completing activities in one discrete area at a time before moving to the next area;*

Response: The BLM does not have the authority on existing leases to require phased or clustered development. These decisions are made by the operator based on a variety of economic and technical considerations.

4) *Gather fluids in more centralized locations via pipeline;*

Response: The plan calls for piping produced water to a centralized tank battery. See the section on Proposed Gas Gathering and Water Pipelines in the proposed action.

5) *Culverts should be properly installed to not impede the flow of spring/water, and mitigate erosion and sedimentation;*

Response: The COAs include specifications on the installation of culverts.

6) *There should be effective reclamation and diligent weed control and monitoring on a regular basis by the BLM and operator;*

Response: Reclamation goals, objectives, timelines, measures, and monitoring methods for interim and final reclamation for oil and gas-related disturbances are presented in the 1998 *Oil and Gas Leasing and Development Draft Supplemental EIS* in Appendix I, *Surface Reclamation*. Additionally, the GSEO sent out updated reclamation standards and seed mixes to all operators on April 16, 2007. The operator would be responsible for providing monitoring reports for temporary and interim reclamation of pads following completion of wells and reclamation of buried pipeline corridors. Monitoring reports must be submitted to the BLM annually, and these activities are subject to BLM oversight and verification.

Current reclamation standards in the 1998 Supplemental EIS include the following reclamation objectives: 1) No noxious weeds are present; 2) Undesirable vegetation comprises little (less than 5%) of the species composition on sites with three or more growing seasons; 3) Desirable vegetation appears vigorous and self-sustaining; and 4) Adequate diverse vegetation is present. Ideally, a good grass cover with an estimated 10% forbs and 5% to 10% shrubs would be present and the canopy cover of the reclaimed site should be equal to or greater than similar sites on the adjacent undisturbed area.

Also included in the 1998 Supplemental EIS are the monitoring methods to be used to evaluate achievement of reclamation objectives. Canopy cover by species will be measured or estimated and a 3 foot x 3 foot grid will be photographed at representative locations on the site and adjacent disturbed areas. Canopy cover provides quantifiable data that can be used to determine if reclamation objectives have been met. The operator is responsible for providing annual monitoring reports to the GSEO regarding the reclamation status of pads, pipelines, and rights of ways.

The GSEO sent out a *Noxious and Invasive Weed Management Plan for Oil and Gas Operators* in March 2007. This document contains requirements for prevention, monitoring, mapping, controlling and providing annual reports on noxious and invasive weeds for all BLM lands disturbed during oil and gas activities. These objectives, methods, and responsibilities apply to all Federal leaseholders in the Glenwood Springs Resource Area and will be attached as Conditions of Approval (COAs) to permits for oil and gas development associated with the Helmer Gulch GAP.

GSEO personnel frequently conduct environmental inspections of pads, pipelines, and roads on an annual basis. Environmental inspections include weed and reclamation surveys. If weeds are present and/or reclamation is poor the operator is informed and expected to take corrective actions by controlling weeds or reseeding.

7) *Forage improvements to the surrounding hay fields;*

Response: The BLM does not have the authority to dictate to leaseholders what activities take place on private property in regard to improvements to surrounding hay fields. However Laramie has expressed interest in attempting to reestablish irrigated pasture lands owned by them (approximately 40 acres) in the NWSE of Section 29, T6S, R93W, for the benefit of wintering wildlife.

8) *Remove pinyon-juniper to improve wildlife habitat;*

Response: Laramie will promote the maintenance of sagebrush openings on approximately 70 acres of the HGMDP project area by mechanically chipping and/or shredding encroaching juniper within these openings.

9) *Opportunity to develop several springs in the area for the benefit of wildlife through stock pond developments and guzzler installations;*

Response: Installations of new water features or improvements to existing stock ponds would be made and may include lining existing stock ponds with bentonite clay or installing a single big game guzzler. This activity would slow infiltration rates and leave water available to animals for longer periods following runoff or periodic rain events or provide an additional source of water within the project area.

10) *Pits should be fenced and netted and escape ramps available for wildlife;*

Response: The BLM requires placement of netting or other features across pits with liquids that could be a risk to migratory waterfowl as well as most other wildlife. Regarding pits that are lined with plastic or other “slippery” material, these typically contain liquids, and thus are required by the BLM to be fenced or netted. To date, BLM has not found that this poses a substantial hazard to wildlife.

11) *CDOW has attached some suggested best management practices (BMPs) designed to reduce wildlife impacts.*

Response: The BLM appreciates CDOW’s continued participation in our public scoping process. Many of the recommendations presented in CDOW’s draft document, *Methods to Reduce Oil and Gas Impacts to Wildlife* have been either incorporated into the proposed action or are presented in Appendix C, Surface Use Conditions of Approval.

City of Rifle Planning and Development Department

In its letter to the BLM (dated July 6, 2007), the City of Rifle Planning and Development Department provided comments that support the access route described in the proposed action and that the BLM should attach a COA reflecting the use of this route.

Response: The BLM lacks the authority to specify use of an access route. However, we have no reason to believe that Laramie II will deviate from the route planned and described in the proposed action.

Colorado Mule Deer Association

In its letter to the BLM, the Colorado Mule Deer Association provided the following comments:

1) *Consolidation of well pads with better use of directional drilling;*

Response: A total of 116 Federal wells and 15 Private Wells would be directionally drilled from five new BLM locations, two existing split estate locations, one existing BLM location, and four existing Fee locations; see Introduction to EA.

2) *Require that all wells needed to adequately recover the gas be drilled before the rig is moved to another pad;*

Response: The BLM does not have the authority to dictate how developments will be sequenced or that a given area be drilled out at the maximum allowable downhole spacing.

3) *Industry must be required to start interim reclamation within 15 days of completion of all surface disturbances.*

Response: A COA concerning the timeline for completion of temporary, interim and final reclamation will be attached to all permits for oil and gas development associated with the HGMDP. Temporary reclamation is to be completed within 30 days following pad construction. The COA for reclamation timing is the following:

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 pad 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.

4) *The company must be required to report all additives to drilling fluids and the quantities to the BLM;*

Response: Please see the EA section on Wastes, Hazardous and Solid. Onshore Order #2, Mud Program Requirement, states "The characteristics, use, and testing of drilling mud and the implementation of related drilling procedures shall be designed to prevent the loss of well control. Sufficient quantities of mud materials shall be maintained or readily available for the purpose of assuring well control." All mud additives are biodegradable and Material Safety Data Sheets will be kept on location at all times. No chrome constituent additives will be used in the mud system on Federal and Indian lands without prior BLM approval to ensure adequate protection of fresh water aquifers. Of course, WL (water loss), mud weights, and viscosities will vary depending on the well conditions.

5) *Company should be required to plan the pipelining of drilling fluids to each pad to reduce truck traffic;*

Response: The BLM has no authority to require Laramie II to pipe drilling fluids.

6) *Require the use of frac tank trucks to store water during workover operations;*

Response: Laramie II has stated that it is their intent to use tank trucks for this purpose.

7) *Reclamation objectives are not quantifiable and require monitoring to a level that shows reclamation objectives have been met;*

Response: Reclamation goals, objectives, timelines, measures, and monitoring methods for interim and final reclamation for oil and gas-related disturbances are presented in the 1998 *Oil and Gas Leasing and Development Draft Supplemental EIS* in Appendix I, *Surface Reclamation*. These objectives, methods, and responsibilities, along with some updates established subsequently by the BLM, apply to all Federal

leaseholders in the Glenwood Springs Resource Area and will be attached as COAs to permits for oil and gas development associated with the HGMDP.

Current reclamation standards in the 1998 Supplemental EIS include the following reclamation objectives: 1) No noxious weeds are present; 2) Undesirable vegetation comprises little (less than 5%) of the species composition on sites with three or more growing seasons; 3) Desirable vegetation appears vigorous and self-sustaining; and 4) Adequate diverse vegetation is present. Ideally, a good grass cover with an estimated 10% forbs and 5% to 10% shrubs would be present and the canopy cover of the reclaimed site should be equal to or greater than similar sites on the adjacent undisturbed area.

Also included in the 1998 Supplemental EIS are the monitoring methods to be used to evaluate achievement of reclamation objectives. Canopy cover by species will be measured or estimated and a 3 foot x 3 foot grid will be photographed at representative locations on the site and adjacent disturbed areas. Canopy cover provides quantifiable data that can be used to determine if reclamation objectives have been met. The operator is responsible for conducting their reclamation monitoring and providing annual monitoring reports to the GSEO regarding the reclamation status of pads, pipelines, and rights of ways and corrective actions they will take if reclamation does not meet BLM objectives.

8) *GAP does not discuss what damage will occur to county roads from all the heavy truck traffic.*

Response: Impacts of heavy truck traffic on roads is addressed in the EA (see section on Access and Transportation). BLM has no authority to require Laramie II to address damage to county roads.

Wilderness Workshop, Peter Hart

1) *Need a reasonable range of alternative: “NEPA requires the BLM to consider and evaluate a reasonable range of alternatives for oil and gas development – this plan mentions only two.”*

Response: The commenter provided several cases that discuss range of alternatives for NEPA. One citation refers to the need to evaluate an alternative that discusses minimal adverse impacts, which is true. The BLM accomplished this by evaluating the “No Action” alternative. The commenter also used the term broad to define what a range of alternatives. CEQ – 40 CFR defines the need for alternatives to represent a “reasonable” range that must meet the purpose and need, that provides a “clear basis for choice among options by the decision-maker” §1502.14. The basic requirement is that a no action and preferred action alternative be presented. Beyond that other alternatives are developed for comparison only if they are reasonable and *meet the purpose and need*, Lee v. U.S. Air Force (10th Circuit 2004).

The commenter stated other alternatives needed to be presented to evaluate other mitigations. Mitigation measures can be added to any action alternative and therefore another alternative does not necessarily have to be presented.

2) *If mowing or the proposed action results in lost habitat for this species [Harrington’s penstemon] we recommend the BLM deny the proposal. BLM must analyze the cumulative impacts to the Penstemon on a larger scale. The BLM should not pursue this action without a determination that the impacts associated with similar oil and gas development in the area will not jeopardize the viability of this species.*

Response: There will be no mowing of sagebrush. Habitat mitigation will consist of thinning young junipers encroaching in sagebrush stands. There will be no juniper thinning in habitat occupied by Harrington’s penstemon.

The proposed action will result in the loss of 658 penstemon, or 1% of Harrington's penstemon on BLM lands within the HGMDP area. These losses are cumulative with loss of an additional 8,938 plants on private land. The impacts to Harrington's penstemon on private land within the HGMDP are analyzed under the no action alternative. The BLM has no jurisdiction over BLM sensitive plants on private land. However, cumulative impacts and losses of Harrington's penstemon are recognized. Currently, Harrington's penstemon is known to occur as far west as Spruce Creek, just west of Rifle, as far east as Edwards and as far south as Snowmass. The core population of Harrington's penstemon is considered to occur in Eagle County.

Each time the BLM considers proposed oil and gas development in sensitive plant habitat, sensitive plants are avoided to the extent topography allows. The GSFO has never lost more than 1% of a Harrington's penstemon population from the effects of oil and gas development. Because Harrington's penstemon has a wide range in western Colorado, and because Eagle County is considered the core population for this species, losses of 1% of a population on the edge of known occupied habitat has not to date caused concern that viability of this species is reduced, or that this species is in jeopardy or that there is a need for Federal listing of this species.

3) *Habitat concerns related to the Colorado River Potential Conservation Area and the Colorado River Cutthroat Trout Watershed above and below Rifle. This project has the potential to cause significant water quantity depletions and water quality degradation.*

Response: The EA includes an analysis of water depletions and water quality.

4) *Supports the adoption of the No Action alternative to allow for the private land to be developed first;*

“Adoption of the No Action alternative would bolster understanding of impacts associated with the proposed development and may provide important insight related to the sustainability/profitability of drilling in the area.”

Response: The decision-maker evaluates the No Action alternative, including whether staging or delaying the action is reasonable and will meet the purpose and need. The BLM recognizes the opinion from the commenter as supporting the No Action alternative.

5) *Replacement of sagebrush from encroachment of pinyon-juniper.*

“Before we will endorse proposed mitigation efforts, we would like affirmation that removal of pinyon-juniper is supported by sound science. We endorse such efforts if young pinyon-juniper has become a dominant and encroaching feature in the area”

Response: Only young juniper would be removed from existing sagebrush parks. Older and more structurally diverse stands within the parks would not be removed.

6) *Use of species in seed mixes that are native to Colorado, but not local, may result in genetic problems. The BLM should mandate the use of local seed.*

Response: We agree that collecting seed locally is a good way to ensure the seed is adapted to the local area and genetically similar. However, because of the scale of oil and gas in this area and the need for hundreds of pounds of seed for use in reclamation, this alternative is not viable. Currently, the GSEO mandates the use of species that are found in the local area and of varieties that are adapted to the elevation and moisture regime of the local area. We do not envision any “genetic problems.”

7) *How do the proposed mitigations comply with the “Revisions to BLM Energy Office Revegetation Requirements?” We are concerned the operator can choose their own seed mixes and use up to 50% nonnative sterile hybrids.*

Response: It is unclear which mitigations the commenter is referring to, although we assume they are wildlife mitigations. There will be no seeding for the wildlife habitat mitigations. Young juniper that is encroaching into sagebrush stands will be thinned, with negligible or no damage to the herbaceous stratum.

With respect to allowing the operator to choose its own seed mixes, this approach allows each operator to design a custom mix selected from a list of acceptable native perennial grasses, including both bunchgrasses and rhizomatous species and, for lower and middle-elevation habitats, both cool-season and warm-season species. The operator can use a seed mix containing up to 50% nonnative sterile hybrids for temporary seeding only. Temporary seed mixes can be used for topsoil piles, stormwater drainage features and pad cuts and fills. Once the pad is reclaimed and the soil recontoured, the operator must choose one of the interim reclamation seed mixes containing native perennial grasses.

8) *Need to include cumulative impacts and effects into the EA. Particular concerns are cumulative impacts to air quality, global warming, and social-economic.*

“NEPA requires BLM to take a ‘hard look’ at cumulative impacts.”

“Cumulative impact analysis...include water quality, global warming, and socioeconomic impacts.”

Response: The commenter would like a “wide geographical” area to be studied for cumulative impacts. Cumulative impacts, however, are required to be evaluated for a project when they overlap in both time and space, and their contribution to effects can be cumulated with the effects of the project. These effects, when added together, are analyzed based on thresholds. Impacts on air quality and socio-economics for the HGMDP are well within the range of cumulative impacts addressed in the Roan Plateau Resource Management Plan and Environmental Impact Statement, which disclosed cumulative impacts associated with both Federal and fee fluid mineral developments within the entire GSEO area. Global warming was not addressed in the Roan Plateau RMPA/EIS, but the EA for the HGMDP includes a statement regarding this topic.

Georgiana Hertzke

In her letter to the BLM, Ms. Hertzke provided the following comments:

1) *Drilling on higher land may affect storm water runoff and mud slides. Any construction of roads and well pads may interfere with water diversion and protection of my home.*

Response: This comment has been addressed in the EA.

2) *Concern about erosion, health threats, noise, pollution, and dust from construction and traffic.*

Response: This comment has been addressed in the EA.

3) *Concern about the amount of traffic on County Road 320.*

Response: This county road is open for public use and is also considered by the county as the preferred haul route for use by drilling, construction, and operations traffic. Impacts of traffic on roads is addressed in the EA, see section on Access and Transportation.

4) *Concern that removing “encroaching young junipers” will have a negative effect on bird species that utilize these trees.*

Response: The project would occur outside the migratory bird nesting season and would not impact nesting birds. The young junipers do not provide sufficient structure for nesting by most species of birds present in the area—including Birds of Conservation Concern—and bear negligible amounts of fruits due to their young age.

5) *Concern over the effects the proposal will have on deer and elk in the area.*

Response: In addition to lease Timing Limitation (TL) stipulations, impacts to wildlife would be minimized through various BMPs and TLs applied as COAs to individual APDs. Additionally, the voluntary habitat enhancement measures (see Appendix E Wildlife Habitat Mitigation Plan), which were developed in concert with CDOW, are believed to be suitable mitigation of the direct and indirect impacts to wildlife habitat.

6) *Concern that Laramie II will not follow the proposal as stated.*

Response: A variety of stipulations, onshore orders, State and Federal regulations, and COAs would govern the company’s activities.

Bobby and Genevie Hooker

In their letter to the BLM, Mr. & Mrs. Hooker provided the following comments:

1) *BLM plans to remove approximately 160 acres of (encroaching juniper) trees and reseeded with a mixture of sagebrush grasses and [forbs]. Concern that this will not work and that the only thing that grows under sage brush is cheat grass, and is only available for a short period during the spring. The rest of the year, the sagebrush sucks the moisture out of the soil and the remaining grasses die.*

Response: The habitat mitigation plan has been revised from 160 acres to 70 acres. Only young juniper would be removed from existing sagebrush parks (Figure 1). Older and more structurally diverse juniper within the parks would not be removed. Seeding will not occur under the revised plan.

2) *BLM plans to allow certain roads and pipelines to be constructed in this area. We have a stipulation in our lease with Laramie [II] that clearly indicates that no roads and/or pipelines will exit our property and enter onto BLM property.*

Response: The planned access roads and pipelines for the HGMDP do not include accessing the BLM-administered lands from the Hooker property.

3) *BLM should insist Laramie [II] utilize the closed loop method when drilling and prevent any water pit from becoming an evaporation pit.*

Response: Drilling and water disposal would occur in accordance with applicable lease stipulations/notices or COAs. A closed loop drilling method is planned for use in this area.

4) *BLM should listen to the individuals regarding best uses for the land.*

Response: Comment noted. We always attempt to balance the property rights and quality of life considerations of neighbors and other affected parties with the property rights obtained by an oil and gas operator through the Federal leasing process. Federal regulations provide some tools for BLM to use in shaping how an operator designs and implements an oil and gas project but do not give us blanket authority to regulate every aspect of a project. This recognizes differences in equipment and approaches used by the various companies, as well as differences associated with economic and technical considerations that vary among companies and project locations .

5) *Concern with the impacts this proposal will have to elk and deer winter range.*

Response: In addition to lease Timing Limitation (TL) stipulations, impacts to wildlife will be minimized through various BMPs and TLs applied as COAs to individual APDs. Additionally, the voluntary habitat enhancement measures (see Appendix E Wildlife Habitat Mitigation Plan), which were developed in concert with CDOW, are believed to be suitable mitigation of the direct and indirect impacts to wildlife habitat.

Norm and Virginia Hunt

1) *In a phone conversation on 6-27-2007, Norm expressed concern that the proposed action didn't show any drilling in the northeast quarter of section 31.*

Response: The wells to be drilled in the northeast quarter of section 31 have been approved under an earlier decision.

Robert L. Meisner

In his letter, Mr. Meisner had the following comments.

1) *Objects to dumping water in pits at Mead Well Pad "A" and Mead Well Pad "C." There is no agreement for this certain pipeline on the property nor is there an agreement to dump other well owner [e]ffluents into the mud pits on the Mead property.*

Response: A surface use agreement is in place between Laramie Energy II, LLC and Mr. Meisner that address his concerns.

2) *There will be a large increase of truck traffic not affiliated with Mead Well Pads "A" and "C."*

Response: A surface use agreement is in place between Laramie Energy II, LLC and Mr. Meisner that address his concerns.

Reed F. Morris, Esq.

In his letter on behalf of the owners of the Dorrell Ranch, and for the Law Offices of Ralph A. Cantafio, P.C., Mr. Morris provided the following comments:

1) *HGMDP [HGGAP] is not ripe for BLM review. BLM should not analyze or in any way permit the HGMDP, or any portion thereof, until Petrogulf [Laramie II] and [the Dorrell Ranch] resolve issues and limitations on split-estate development...."*

Response: A surface use agreement between Laramie II and the Dorrell Ranch is in place.

2) *BLM must analyze an adequate range of alternatives, mitigation measures, and a true “no action” alternative.*

Response: CEQ – 40 CFR defines the need for alternatives to represent a “reasonable” range that must meet the purpose and need, that provides a “clear basis for choice among options by the decision-maker” §1502.14. The basic requirement is that a no action and preferred action alternative be presented. Beyond that other alternatives are developed for comparison only if they are reasonable and *meet the purpose and need*, Lee v. U.S. Air Force (10th Circuit 2004). A true no action alternative—denial of any Federal permits associated with the project—was considered. Mitigation measures also were considered and either incorporated into the HGMDP as part of the proposed action or applied as COAs.

3) *BLM must analyze socioeconomic impacts including property values.*

Response: Impacts on socio-economics for the HGMDP are well within the range of cumulative impacts addressed in the Roan Plateau Resource Management Plan and Environmental Impact Statement, which disclosed cumulative impacts associated with both Federal and fee fluid mineral developments within the entire GSEO area. Regarding impacts to property values, the BLM does not normally consider such impacts associated with development on Federal lands adjacent to private lands, or to private surface of split-estate lands, in its oil and gas EAs. Additionally, the BLM does not believe that the intensity of development typical of coalbed methane developments is necessarily analogous to the impacts on property value associated with the type of oil and gas development proposed by Laramie II. Presumably, impacts on property values are among the considerations by private property owners when negotiating a surface use agreement for oil and gas development on split-estate lands.

Chris Leverich

Separate from the other owners of the Dorrell Ranch, Mr. Leverich provided the following comments:

1) *“It seems...that it would be a very poor trade off to clearcut 200 and 300 year old trees and substitute what most old timers consider a weed. If the oil company really wanted to do something good that would be a benefit to all wildlife and humans included they would clear cut 160 acres of tamarisk along the Colorado River between Glenwood and Rifle.”*

Response: Only young juniper would be removed from existing sagebrush parks. Older and more structurally diverse juniper would not be removed. We agree that treating tamarisk along the Colorado River would be beneficial to wildlife and humans. Unfortunately, this type of project is not supported by the Colorado Division of Wildlife as means to mitigate wildlife habitat impacts resulting from oil and gas developments, and BLM has therefore decided not to pursue tamarisk removal for that purpose.

2) *The BLM must analyze an adequate range of alternatives, mitigation measures, and a true “No Action” alternative.*

Response: See response to Dorrell Ranch owners, above.

Appendix B

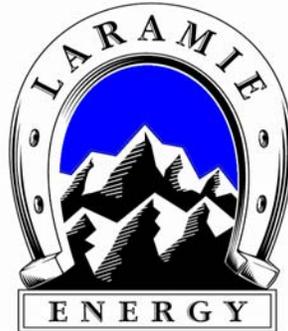
Master Application for Permit to Drill And Surface Use Plan of Operations

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MASTER APPLICATION FOR PERMIT TO DRILL

And

SURFACE USE PLAN OF OPERATIONS



Helmer Gulch Master Development Plan (HGMDP)
Garfield County, CO

Includes

10-Point Drilling Program
13-Point Surface Use Plan

Laramie Energy II, LLC

Laramie Energy II, LLC

Helmer Gulch Master 10-Point Drilling Plan

For All Federal Wells Drilled in:
Township 6 South, Range 93 West, 6th PM
Garfield County, CO

Including but not limited to:

Leases:
COC64181
COC41916

**10-Point Drilling Plan
Helmer Gulch Project**

1 & 2 Estimated Tops of Geological Markers and Formations Expected to Contain Water, Oil and Gas and Other Minerals:

**Will be submitted for site specific Applications for Permit to Drill.

* The top of the Mesa Verde Group and the Williams Fork Formation is interpreted to be one and the same.

Any sources water and prospectively valuable minerals encountered during drilling will be recorded by depth and adequately protected. A sample will be taken of any water flow and furnished to the Glenwood Springs Energy Office for analysis, if requested.

3. Pressure Control and Auxiliary Equipment

After setting surface casing to the specified depth (section 5), 3,000-psi equipment will be used. Equipment will be installed per **Attachment A**. Test pressures will be as follows:

11" – 3,000-psi ram type BOP's	3,000 psi
11" – 3,000-psi annual BOP's	1,500 psi
Ancillary equipment and choke manifold	3,000 psi
Surface casing	1,500 psi

Pressure tests will be conducted after installation of equipment and prior to drilling out casing float equipment and every 30 days thereafter. A certified tester will perform pressure testing and charts will be made available from Laramie upon request.

BOP, choke manifold, and accumulator equipment installation will be consistent with 43 CFR Part 3164.1 Onshore Oil and Gas Order No. 2.

Auxiliary equipment:

- a) Manually operated kelly cocks.
- b) Full opening floor valves capable of fitting all drill-string connections will be kept on the floor in the open position.

4 & 5. Casing and Cementing Program

Hole Info		Setting Depth			Casing Information						
<u>Hole</u>	<u>Size</u>	<u>MD</u>	<u>TVD</u>	<u>Size</u>	<u>Grade</u>	<u>Weight</u>	<u>Type</u>		<u>Collapse</u>	<u>Burst</u>	<u>Yield</u>
Cond.						Thick Wall			psi	psi	Klbs
Surf.	12 1/4	TBD	TBD	8 5/8"	J-55	32.0 lb	STC	New	2530	3930	372
Prod.	7 7/8	TBD	TBD	4 1/2"	I-80	11.6 lb	LTC	New	6350	7780	267

TBD- Casing setting depths will be submitted for each Application for Permit to Drill

Surface Casing Setting Depth: Surface Casing will be set at a minimum of 1500' MD or 100' past the End of Build for Directional wells.

<u>Casing</u>	<u>Stage</u>	<u>Sx.</u>	<u>Yield</u>	Cementing Program		<u>~TOC</u>
				<u>Weight</u>	<u>Type</u>	
Conductor					Redi-mix	
Surface	Lead	**	2.37	12.3 ppg	Rockies LT, 0.125#/sk Polyflake + additives	
	Tail	**	1.44	14.2 ppg	Rockies HE, 0.125#/sk Polyflake +additives	Surface
Production	Lead	**	2.40	11.0 ppg	25/75 Poz G with 10% lime, 8% gel, 0.125 #/sk Polyflake	200' Above
	Tail	**	1.46	13.6 ppg	50/50 Poz G 2% Gel, 0.3% Halad-322, 0.3% Versaset, 0.2% Super CBL, 0.4% HR-601, 0.13#/sk Polyflake, 7#/sx Gilsonite, 3#/sx Silicate, 0.6% Halad-23	WS/MV Contact

** Sacks of cement will be submitted for each Application for Permit to Drill.

Area Fracture Gradient: 0.65 psi 1 foot

Surface Casing Full cement returns back to surface will be attempted, calculation for hole size and pipe size are used with a 50 to 100% excess volume. If full returns are not seen or fallback occurs, 1" injection of remedial cement down the backside will be performed and topped to surface.

Production Lead Cement to tie cement to bottom of surface casing (volumes to be calculated from caliper log +10%). Volumes on APD are based on a 9" hole to compensate for washout. Tail Cement from well total depth and tie to bottom of lead cement 200' above top of Mesa Verde gas as determined from porosity log (volume to be calculated from caliper log).

Conductor pipe and surface casing is cemented back to surface. Placement of production casing cement on all wells is attempted to isolate the casing from all formations. If cement cannot be circulated back to surface casing, the minimum TOC will be 200 feet above the Wasatch / Mesa Verde Contact.

6. Mud Program:

<u>From (md)</u>	<u>To (md)</u>	<u>Mud Type</u>	<u>Weight ppg</u>	<u>Vis.</u>	<u>Water Loss</u>	<u>Chemicals</u>
0/0	1500	Spud	9.0-9.5	40-50		
1500	TD	LSND	9.0-10.0	40-60	8-12	Visease & 507

Spud mud will be used to drill surface (gel and lime). System will be converted to a low solids non-dispersed gel polymer system with WL of 6 to 10 from under surface, weight of 9.0 – 9.8 and Vis of 40-45 will be maintained until more weight is needed (possibly preparing logs) then will be 9.5 – 13.0 ppg as needed. Sufficient mud materials to maintain mud properties, control lost circulation and to contain blowout will be available at the wellsite.

Mud reports will be kept on location at all times. No chrome constituent additives will be used in the mud system on Federal and Indian lands without prior BLM approval to ensure adequate protection of fresh water aquifers.

7. Testing, Logging and Core Programs:

Cores: None
DST's: As needed; none anticipated
Sampling: None
Surveys: Run every 100' on surface hole and on trips
Mud logger: one-man or computer unit with at least total gas and drill rate from base of surface casing to TD.
Logging Open-hole logs: An attempt will be made to obtain open-hole logs for each well. Logs and intervals include HRI with SP, GR, and CALIPER from TD to surface casing, Spectral Density/Dual Spaced Neutron from TD to top of Williams Fork and over other selected zone of interest. Logs will be submitted to the BLM in .LAS format along with Form 3160-4 "Well Completion and Recompletion Report."

Cased-hole logs: Cased-hole logging tools will be run in the case the well cannot be logged open-hole. Logs and intervals include a cased-hole pulsed neutron log from TD to 100' above top of Williams Fork and GR from TD to surface casing.

As Field Development progresses and knowledge of the reservoir increases, fewer open-hole logs will be run and replaced with cased hole.

8. Anticipated Pressures and Temperatures:

No over pressured formation is anticipated. A BHT of 170-190 degrees F is expected. A BHP of 2922 psi is expected.

Proper mud weight will be maintained to drill at a balanced or slightly over-balanced condition.

Notification will be made if planned drilling practices deviate from this.

9 & 10. Drilling Schedule

Anticipated starting date: To be Determined for each well
Duration of operation: 15-20 days per well.

No location will be moved, no well will be plugged and no drilling or work-over equipment will be removed from a well to be placed in a suspended status without prior approval of the Authorized Officer. If operations are to be suspended, prior approval of the Authorized Officer will be obtained and notification given before resumption of operations.

The spud date will be reported orally to the Authorized Officer within a minimum of twenty-four (24) hours prior to spudding. Written notification in the form of a Sundry Notice (Form 3160-5) will be submitted to the Field Office within twenty-four (24) hours after spudding. If the spudding occurs on a weekend or holiday, the written report will be submitted on the following regular workday.

In accordance with Onshore Oil and Gas Order No. 1, this well will be reported on Form 9-329, "Monthly Report of Operations," starting with the month in which operations commence and continue each month until the well is physically plugged and abandoned. This report will be filed directly with the Minerals Management Office, Production Accounting Division, P. O. Box 17110, Denver, Colorado 80217.

Immediate Report: Spills, blowouts, fires, leaks, accidents or any other unusual occurrences shall be promptly reported to the Field Office in accordance with requirement of NTL-3A.

If a replacement rig is contemplated for completion operations, a Sundry Notice (Form 3160-5) to that effect will be filed for prior approval of the Authorized Officer and all conditions of this approved plan are applicable during all operations conducted with the replacement rig. In emergency situations, verbal approval to bring on a replacement rig will be obtained from the Authorized Officer.

Should the well be successfully completed for production, the Authorized Officer will be notified when the well is placed in a producing status. Such notification will be sent by telegram or other written communication not later than five (5) business days following the date the well is placed on production.

A first production conference will be scheduled within fifteen (15) days after receipt of the first production report. The BLM Field Office will coordinate the field conference.

No well abandonment operations will be commenced without 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 Authorized Officer. A "Subsequent Report of Abandonment" (Form 3160-5) will be filed with the Field Office within thirty (30) days following completion of the well for abandonment. This report will indicate where plugs were placed and the current status of surface restoration. Final abandonment notice will be completed to the satisfaction of the Authorized Officer or his representative, or the appropriate surface managing agency.

Approval to vent/flare gas during initial well evaluation will be obtained from the Field Office. The preliminary approval will not exceed 30 days or 50 MMCF gas. Approval to vent/flare beyond this initial test period will require Field Office approval pursuant to guidelines in NTL-4A.

Upon completion of approved plugging, a regulation marker will be erected in accordance with 43 CFR 3162.6. The marker will be constructed after contouring. The top of the marker will be closed or capped and the following minimum information will be permanently placed on the marker with a plate, cap or beaded-on with a welding torch: "Well name," as applicable; "well number, location by quarter/quarter section, township and range"; and "lease number."

Laramie Energy II, LLC will be operating under its Colorado Bond # COB000206.

Laramie Energy II, LLC

Helmer Gulch Master Development Plan (HGMDP)

13- Point Surface Use Plan

For Wells Drilled On:

<u>Pad</u>	<u>Wells</u>	<u>Qtrqtr</u>	<u>Sec.</u>	<u>Twn.</u>	<u>Rng.</u>	<u>PM</u>	<u>Lease</u>
Federal 20-15	15	SWSE	20	6 S	93W	6 th	COC-41916
Federal 29-02	16	NWNE	29	6 S	93 W	6 th	COC-64181
Federal 29-06	5	SENE	29	6 S	93W	6 th	COC-64181
Federal 29-11	18	NESW	29	6 S	93 W	6 th	COC-64181
Federal 29-15	16	SWSE	29	6 S	93W	6 th	COC-64181

And to a Certain Extent for Federal Wells Drilled on Private Lands:

<u>Pad</u>	<u>Wells</u>	<u>Qtrqtr</u>	<u>Sec.</u>	<u>Twn.</u>	<u>Rng.</u>	<u>PM</u>	<u>Lease</u>
Leverich 31-01*	6	NENE	31	6 S	93W	6 th	COC-64181
Leverich 31-06*	6	SENE	31	6 S	93 W	6 th	COC-64181
Leverich 31-09*	12	NESE	31	6 S	93W	6 th	COC-64181
Hooker 30-02*	8	NWNE	30	6 S	93 W	6 th	COC-64181
Mead 30-11*	8	NESW	30	6 S	93W	6 th	COC-64181
Mead 30-13*	3	SWSW	30	6S	93W	6 th	COC-64181
Overacker 29-04*	3	NWNW	29	6 S	93 W	6 th	COC-41916

* Existing Pad

Garfield County, CO

Leases:

COC41916

COC64181

13-Point Surface Use Plan

LARAMIE ENERGY II LLC

Garfield County, Colorado

Lease No. COC64181 & COC41916

(Note: All Exhibits and Figures referred to below will be submitted with each Application for Permit to Drill).

1. Existing Roads:

For Access Roads and proposed Access Road refer to the Vicinity Map.

- A. To access the Helmer Gulch Northeasterly Project Area, travel south from the East Rifle, CO exit on Interstate-70, turn right on 7th street south. Continue on 7th street south until it turns into the Rifle-Rulison Road (CR-320). Continue on CR-320 for approximately 1.57 miles to the intersection of an improved graveled road (BLM 8185) on the left. Turn left on this road and travel approximately 1.08 miles to the beginning of a proposed new access onto BLM lands.
- B. To access the Helmer Gulch Southern Project Area, travel south from the East Rifle, CO exit on Interstate-70, turn right on 7th street south. Continue on 7th street south until it turns into the Rifle-Rulison Road (CR-320). Continue on CR-320 for approximately 2.81 miles to the Y-intersection of CR-320 and CR-317. Continue on CR-317 approximately 0.85 miles to Laramie Energy's existing access road to the Leverich Fed. 31-01 (31-41) pad.
- C. Haul route for heavy loads will access the Helmer Gulch Project area from the Rulison Exit on Interstate-70 and follow the Rifle to Rulison road to the project area as identified in Garfield County's "Road Haul Route Map" on the Garfield County website.

2. Planned Access Roads:

- A. Any new road construction will conform to recommended standards outlined in The Oil and Gas Gold Book-**Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development** (BLM and USFS, 2006) and BLM Handbook 9113 (Roads Manual).
- B. All new access roads will be designed and constructed by the crown and ditch method. The roads will have a 16 to 24 foot running surface with 4 feet on each side for borrow ditch. The road disturbed width will be determined by the topography. Construction will be accomplished to minimize any disturbance yet construct a travel way that is both safe and structurally sound. The travel way will be topped with an initial minimum gravel application of 6" of 3" minus gravel. Re-surfacing will be applied with the onset of road damage (displaced or rutted roadbed).
- C. Laramie's policy is to implement the use of the existing vegetation and topography to minimize the visual and surface disturbance impacts to the environment. Any vegetation that will require removal will be stored and be redistributed over the cut and fill slopes after re-seeding. Some of the vegetation debris will be placed at the toe of the fill slopes to be used for stormwater

management. Any pinyon trees removed during construction will be chipped and used for mulch, or will be cut and removed from the area.

- D. The topsoil will be stripped to minimum depth of 6 inches. Or lacking top soil, the top 6” of soil will be stripped and stockpiled separate from other spoils to ensure soil horizons are not blended and the fertility of the topsoil layer is not compromised. Under no circumstances, will the topsoil be used for construction purposes.
- E. Culverts will be installed at drainage crossings and will pass a 25-year or greater storm event. Laramie will submit an ACOE 404 permit under Laramie’s nationwide bond for any crossings that are determined to be navigable waters. Best Management Practices as outlined in Laramie Energy’s Helmer Gulch Stormwater Management Plan (CDPHE Certification Number COR-03C798) will be implemented at each drainage crossing and for the entire length of the road where deemed necessary to comply with State of Colorado Stormwater requirements.
- F. Laramie will be responsible for continuous inspection and maintenance of the access road. Laramie will conform to a schedule of preventive maintenance, which at a minimum, provides for the following corrective measures on as needed basis. (Problem areas will be corrected as needed.)
 - 1. Road surface grading and surface aggregate replacement.
 - 2. Relief ditch, culvert cleaning and cattle guard cleaning and sign maintenance.
 - 3. Erosion control measures for cut and fill slopes and all other disturbed areas.
 - 4. Road and slope stabilization measures as required. The road will be maintained to the standards required for the construction of the road until final abandonment and rehabilitation takes place.
 - 5. Stormwater BMP maintenance.
 - 6. Dust abatement will be applied as needed or if requested by the BLM. Level and type of abatement (watering, application of various dust suppression agents, surfacing) will depend on the conditions. Laramie will incorporate sufficient dust abatement to prevent any heavy plumes of dust from construction or road use.
 - 7. Weed Control. Weed monitoring and reclamation measures will be continued on an annual basis, or more frequently, if necessary, throughout the life of the project.
- G. All equipment and vehicles will be confined to the access roads, pads and areas specified in the site specific APDs. The proposed new access and footages are included in Table 1.

Table 1. Proposed Well Pads, Roads, and Pipelines						
Well Pad	Lease	Legal Description T6S, R 93W	Surface	Short-term Acres	Long-term Acres	
Federal 20-15	COC41916	SWSE Sec.20	BLM	4.5	1.0	
Federal 29-02	COC64181	NENE Sec. 29	BLM	4.3	1.1	
Federal 29-06	COC64181	SENE Sec. 29	BLM	3.3	0.7	
Federal 29-11	COC64181	NESW Sec. 29	BLM	4.5	1.3	
Federal 29-15	COC64181	SWSE Sec. 29	BLM	4.3	1.2	
Subtotal			BLM	20.9	5.3	
Roads *	Length		Location	Surface	Short-term Acres	Long-term acres
	miles	feet				
20-15	0.1	875	See Figure A	BLM	1.0	0.6
29-02	1.0	5,240	See Figure A	BLM	6.0	3.6
29-06	0.4	2,040	See Figure A	BLM	2.3	1.4
29-11 + Main	1.2	6,420	See Figure A	BLM	7.4	4.4
29-15	0.3	1,370	See Figure A	BLM	1.6	0.9
Subtotal	3.0	15,945		BLM	18.3	10.9
Pipelines**	Length		Location	Surface	Short-term Acres	Long-term acres
	miles	feet				
29-06 to 29-04	0.5	2,510	See Figure A	private	2.9	0
20-15 to 29-06***	1.0	5,080	See Figure A	BLM	3.5	0
29-02 spur	< 0.1	350	See Figure A	BLM	0	0
29-11 spur	< 0.1	260	See Figure A	BLM	0	0
Existing Encana PL	0.5	2,450	See Figure A	BLM	2.8	0
Existing PL to 29-15	1.0	5,070	See Figure A	BLM	0	0
Subtotal BLM	2.5	13,210		BLM	6.3	0
Subtotal private	0.5	2,510		private	2.9	0
TOTAL	3.0	15,720			9.2	0
TOTAL (Pads + Roads + Pipelines)				BLM	45.5	16.2
				private	2.9	0
GRAND TOTAL (All Disturbances, BLM + Private)					48.4	16.2
Notes: *Disturbance estimated to average 50 ft from toe of fill to top of cut. Long-term disturbance estimated at 30 ft (16 -24 ft running surface, 4 ft borrow ditches, and 6 ft for water and gathering line). **Pipelines to be installed within 50 ft disturbance corridor of access roads so not reflected here except where pipelines deviate from road, with associated 50 ft short-term disturbance. Permanent right-of-way width 30 feet. ***Pipeline route from 20-15 to 29-06 would be installed utilizing existing roads (average 20 ft) before reclaiming. For this calculation short term acres of disturbance uses 30' of new disturbance.						

3. Location of Existing Wells:

The Colorado Oil and Gas Conservation (COGCC) identified 263 oil and gas wells in various states of activity within one mile of the HGMDP boundary as of April 7, 2008. Figure A2 illustrates the location of individual well sites as well as multi-well locations.

There is an undetermined number of domestic water sources within one mile of the Helmer Gulch Project area. However, as part of the Colorado Oil and Gas Conservation Commission hearing files for Cause Order 139-47 (June 6, 2005), a ground-water sampling and monitoring program is in place to conduct pre-drill and post-drill sampling of any wells within one-half mile of any drilling activity. The purpose of the program is to delineate the existing or background ground-water quality and quantities in areas of upcoming Laramie Energy II operations within the Helmer Gulch project area. The water samples are gathered by an independent contractor, analyzed, and the results submitted to the Colorado Oil and Gas conservation Commission as well as the owners of the wells. If requested, this data may be supplied to the BLM.

4. Location of Existing and/or Proposed Production Facilities and Production Gathering and Service Lines:

A. Existing Production Facilities and Gathering Lines

1. Existing Production Facilities (Tanks, Separators, and Meters) were installed by the previous Operator on those sites that have producing wells. Currently, four sites have facilities located on them sufficient for the wells producing. The Hooker 30-02, Mead 30-13, Overacker 29-04, and the Federal 31-01, have facilities installed.
2. Gathering lines are installed to each facility. These lines are 6" welded steel and tie into Energy Transfers (formerly Canyon Gas) wet gas gathering system. See Exhibit "A" for existing and proposed gathering line routes.

B. Production Facilities

1. See Exhibit "C4" for a production facilities schematic. All permanent (onsite for six (6) months or longer) structures constructed or installed will be painted a flat, non-reflective, earth tone color to match the standard environmental colors or colors requested by the surface owner. Facilities required to comply with the Occupational Safety and Health Act (OSHA) may be excluded. Production facilities will be placed to allow maximum reshaping of cuts and fills.
2. If a tank battery is constructed, a metal containment ring of sufficient capacity to contain 1 ½ times the storage capacity of the largest tank will surround it. All load lines and valves will be placed inside the metal containment ring surrounding the tank battery. Guards will be installed around the well head(s) for protection of wild life and livestock.
3. All site security guidelines identified in 43 CFR 3162.7 regulations will be adhered to.
4. All off-lease storage, off-lease measurement or commingling on-lease or off-lease will have prior written approval from the Authorized Officer.
5. All product lines entering and leaving hydrocarbon storage tanks will be effectively sealed in accordance with 43 CFR 3164.1 Onshore Oil and Gas Orders No. 3 (Site Security).

6. Gas meter runs for each well will be located within one hundred (100) feet of the wellhead. The gas flowline will be buried from the wellhead to the meter and downstream for the remainder of the pad. Meter runs will be housed and/or fenced.
7. The oil and gas measurement facilities will be installed on the well locations. The oil and gas meters will be calibrated in place prior to any deliveries. Tests for meter accuracy will be conducted monthly for the first three (3) months on new meter installations and at least quarterly thereafter. The Authorized Officer will be provided with a date and times for the initial meter calibration and all future meter proving schedules. A copy of the meter calibration report will be submitted to the Field Office. All meter measurement facilities will conform to the API standards for liquid hydrocarbons and the AGA standard for natural gas measurement.
8. To minimize the amount of vehicular traffic to and from the project site, remote telemetry equipment will be installed at each multi-well pad.

C. Gathering Lines

1. All new lines installed will be fusion bonded welded steel with a diameter up to 12". All lines will follow the new or existing road access routes in order to minimize disturbance as much as possible.
2. Energy Transfer will prepare a Right of Way (SF-299) request for the gathering line with a permanent width of 30' and a temporary use area of 20'. Energy Transfer will operate and maintain the line for the life of the project.
3. Laramie's policy is to install gathering lines in the cut edge of the access road just above the borrow ditch or in the access road prior to the access road being contoured, final graded and graveled. By initially "pioneering" the road in to its disturbance area and then burying the pipe, Laramie can contour the cut and fill slopes over the lines and interim reclaim. By using this method Laramie reduces any other disturbance both visually and surface wise that might occur if the line is buried outside the road corridor. This procedure has worked successfully in other areas, including the White River National Forest.
4. Instead of crossing the Encana 24" line in the SW of Section 29, Energy Transfer will parallel the 24" (~2450') in the existing ROW corridor to the tie-in point at the existing gathering line from Federal 31-01 adjacent to the existing access road. The existing corridor will be used with no additional disturbance outside the original pipeline ROW.
5. The pipeline from the 20-15 access road will be buried in the existing BLM access to the power line ROW and in the power line ROW access to the 29-06. Approximately 4050' of the access will be reclaimed once the pipeline is in place and the new access for the 29-02 and 29-06 pads will take its place.
6. Other than the Encana ROW corridor and the powerline access, the gathering lines will be buried within the road corridor disturbance. Lines will be buried to a depth up to 60 inches (below frost level) in the roadway and at road crossings. These are minimum depths and the pipe will be installed to a depth which can safely accommodate existing land and road uses. The access road disturbance will be used as part of or the entire disturbance for the pipeline and will be the working side of pipeline construction. Compaction of the trench will take

place by roller compacting the backfill in the trench in lifts. Once the pipeline is in place, the road shoulder ditch will be shaped, and lined with gravel.

The maximum disturbed width for pipeline construction will be between 30' and 50'. All of the above will be used for pipeline construction unless otherwise approved by the authorized officer in writing.

7. Open trenches will be maintained in a safe condition. As necessary to maintain safety, trenches adjacent to roads will be covered and/or warning barriers erected upon completion of daily construction or at anytime personnel are not present at the construction site.
 8. Pipeline warning signs will be installed along the Right-of-Way within ninety days of construction completion and prior to use of the pipeline for transportation of product. Pipeline warning signs will be installed at all road crossings. For safety purposes each sign will be visible from marker to marker, permanently marked with the right-of-way serial number and will clearly identify the underground location, owner and purpose (product) of the pipeline.
 9. Pipeline right-of-ways that deviate from the road will be constructed in a manner to preclude vehicular travel upon said right-of-way, except for access to pipeline drips and valves.
 10. In addition to the installation of the gas gathering lines, Laramie intends to install 4" flex-pipe in the common trench to allow for the capability to move produced water, completion water, or drilling water throughout the field. The lines will be laid parallel to the gas lines separated by sand bags or some other adequate means of separation. Laramie's initial estimates show two water transfer pumps will be needed to move the water where gravity flow may need assistance. The initial locations of these pumps are planned at each production site. Laramie will submit a ROW request for the installation of the water line. Once installed, Laramie will operate and maintain the lines for the life of the project.
- D. Laramie will protect all survey monuments, witness corners, reference monuments and bearing trees in the affected areas against disturbance during construction, operations, maintenance and termination of the facilities authorized herein.

Laramie will immediately notify the Authorized Officer (Glenwood Springs Energy Office) in the event that any corners, monuments or markers are disturbed or are anticipated to be disturbed. If any monuments, corner or accessories are destroyed, obliterated or damaged during construction, operation or maintenance, Laramie will secure the services of a Registered Land Surveyor to restore the disturbed monuments, corner or accessories, at the same location, using surveying procedures found in the Manual of Surveying Instructions for the Survey of public Lands of the United States, latest edition. Laramie will ensure the Registered Land Surveyor properly records the survey in compliance with Colorado Revised Statutes 38-53-101 through 38-53-112 (1973) and Laramie will send a copy to the Authorized Officer.

- E. During drilling and subsequent operations, all equipment and vehicles will be confined to the access road right-of-way and any additional areas as specified in the approved Application for Permit to Drill.
- F. Topsoil will be stripped to a minimum depth of 6". Topsoil storage will be no deeper (higher) than the minimum height needed for storage without creating a large feature. If topsoil is less

than 6", then the top 6" of surface material will be stripped and piled as described. The topsoil piles will be seeded within 48 hours of completed pad construction.

G. The cut and fill slopes will be protected against riling and erosion with measures such as water bars, lateral furrows, or other measures approved by the Authorized Officer. Weed free straw bales or a fabric silt fence will be used at the toe of the fill slopes with brush/slash incorporated below the fence.

H. Laramie or its successors will be responsible for road maintenance for the life of the project.

5. Location and Type of Water Supply:

Water for the wells will be trucked over the roads described in 1 and 2 or pumped from Laramie's water collection sites.

Water will be purchased from a private entity from their water well. The Colorado Division of Water Resources requires the owner to meter the volume pumped and augment all diversions with industrial contracts with the Bureau of Reclamation.

Drilling, completion, and produced water will be recycled and used.

Approximately 10,000 bbl's would be needed for the drilling of each well. Drilling and produced water will be recycled and used on subsequent wells.

6. Source of Construction Materials:

No construction materials are needed for drilling operations. Surface and subsoil materials within the proposed construction areas will be used. Gravel for the access roads, facilities site and well pad will be obtained from private sources at the time of construction. The surface disturbance for the new access roads, facilities, and well pads are on Bureau of Land Management Lands (BLM) and some private surface. Surface Use and Authorization Agreements, or letters of agreement, are on file for any new disturbances on private lands adjacent to the project boundaries.

7. Methods of Handling Waste Disposal:

A. All unattended pits, will be fenced (stock tight) while drilling with three (3) sides fenced. Once drilling is completed the fourth side of the pit will be fenced. When it has been determined to backfill the cuttings pit, the pit will be reclaimed.

B. Laramie is currently implementing a de-watering system in its drilling operations in Helmer Gulch. The system uses a series of centrifuges to remove the cuttings from the drilling fluid and returns the fluid to tanks while the cuttings (~300 cubic yards per well) are disposed of in a cuttings pit on location. By using this method eliminates the need for a separate reserve pit. The system has proved successful on the current drilling operations within Helmer Gulch. The cuttings pits will be constructed to the size anticipated for the number of wells to be drilled each drilling season. If time allows, the pits will be reclaimed prior to the end of the drilling season to eliminate any wildlife concerns.

C. Produced waste water and drilling fluids including salts and chemicals will be contained in tanks and will be recycled and used in other drilling operations after completion of the well. If the cuttings pit is needed for a second season of drilling, the pit will be fenced on all sides. After completion of all drilling and completion operations, the cuttings pit will be reclaimed.

D. Produced Water Management

General:

Completion Phase: All “frac” flowback water will be contained in temporary tanks during completion operations and re-cycled and re-used or trucked offsite to approved commercial disposal facilities.

Production Phase: Permanent 300- 400 bbl steel tanks, or where needed for visual mitigation, 250 barrel low-profile steel storage tank(s) will be installed on the well pad or offsite facilities to capture produced water. These tanks will be onsite for the life of the wells. Produced water contained in the storage tanks will be transferred to centralized tank batteries (Mead collection site SWSW Sec. 30, Twn. 6S, Rng. 93W or Laramie 20-12 pad) pads by one of two methods. The primary method is by buried pipelines utilizing gravity flow and assisted by natural gas powered diaphragm pumps if required. The secondary method is by trucking when the pipeline system is not operational. Once collected at a central site, the produced water will be re-cycled for use in drilling and completion operations, or processed into freshwater by the use of a distillation system for a variety of local uses such as dust suppression, irrigation, or ponding for wildlife use, 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) will be acquired. Condensate will be captured at the well site in steel storage tank(s) and transported to market by tanker trucks.

Site Specifics:

For Section 31, the water from the Leverich 31-09 pad will be piped to the existing Leverich 31-12 (private pad outside the HGMDP boundaries) pad. The water will then be piped to the Leverich 31-06 pad. The produced water will continue via pipe to the Federal 31-01 pad. Finally, the produced water from all four pads will be piped to the central collection facility adjacent to the existing Mead 30-13 pad in the SWSW Sec. 30, T6S, R93W (Mead collection site). Four to six 250 barrel low profile tanks will store the produced water. The produced water will then be re-cycled for use in drilling and completion operations, processed into freshwater for various uses, or trucked offsite to approved commercial disposal facilities.

For Section 29, produced water from the proposed Federal 29-15 pad will be piped to the Federal 29-11 pad. The produced water will then continue via pipe to and tied-in to the existing water line from the Federal 31-01 pad and then continue on to the Mead collection site for storage and disposal as described above.

Produced water from the northern pads located in Sections 29 (Federal 29-02 and Federal 29-06) and 20 (Federal 20-15) will be piped to the existing Overacker 29-04 pad, then across Helmer Gulch to the Laramie 20-12 pad through existing buried lines. Collection and disposal by the same means previously described will occur on the Laramie 20-12 pad.

Laramie anticipates most of the water management will be accomplished by gravity flow. To facilitate the flow of the water, small natural gas diaphragm (Exhibit 2) pumps may be needed at each of the well pads. These pumps are pneumatic in nature and use the pressure from natural gas as the source of power. After use, the residual gas will be piped to the VOC’s incinerator to be burned-off.

Produced water not re-cycled will be disposed of at one of the following approved disposal facilities:

- a. Black Mountain Disposal Facility- Southeast of Debeque, CO
- b. RNI (Dalbo) Evaporation Facility – Rangely, CO
- c. Danish Flats Evaporation Facility – Cisco, Utah (22 miles west of Colorado on Interstate 70).

Condensate will be measured and sold in compliance with Onshore Oil and Gas Order No. 4 (Measurement of Oil) and Oil and Gas Order No.3(Site Security).

- E. All drilling fluids and chemicals will be contained in tanks through the de-watering system.. Because of the volume of cuttings generated per well (~300 cubic yards) pits will be constructed eventually to manage the cuttings.
- F. Sewage: Chemical toilets or an enclosed sewer system will be used. Contents will be disposed of at an approved disposal facility. No bore holes will be used for disposal of waste materials. Human waste will be contained and will be disposed of at an approved sanitary landfill.
- G. Garbage and other waste materials: Garbage will be managed to avoid conflict with wildlife, including black bears. All garbage and trash will be stored in a totally enclosed trash container and removed and deposited in an approved sanitary landfill within one week following termination of drilling operations. No garbage or trash will be disposed of in the cuttings pit. The wellsite and access road will be kept free of trash and debris at all times.
- H. Laramie Energy II complies with those standards set forth by CERCLA and RICRA for the disposal of hazardous waste materials from oil and gas development. Also, hazardous substances specifically listed by the EPA as a hazardous waste or demonstrating a characteristic of a hazardous waste will not be used in drilling, testing, or completion operations.

8. Ancillary Facilities:

There are no ancillary facilities planned beyond the standard drilling operations equipment at this time.

Standard Drilling Operation Equipment on location includes: Drilling rig with associated equipment; living facilities for company representative, tool pusher, mud logger, directional driller; toilet facilities; and trash container(s).

9. Wellsite Layout:

Surface locations were surveyed and oriented to accommodate the topography of the project area as well as to maximize the number of wells that could be drilled. Originally, 14 (14) locations were surveyed and onsite by the previous operator. By increasing pad size slightly, using existing pads, and increasing the number of wells per pad, Laramie has reduced the number of new sites.

Laramie intends to test the limits of the directional drilling capabilities within the Helmer Gulch Project area by attempting to directionally drill some wells with a horizontal distance of up to 3000'. Torque and differential sticking(drag) of the drillstring becomes a serious concern drilling this distance. Also, completion of the well becomes an issue when installing the production string (2 3/8" steel pipe) in the 4 1/2" casing. Running the production string through the bends in the casing becomes increasingly more difficult as the angles increase. The difficulty arises when the production string and tools will not bend enough to get past the angle of the casing at the top of the producing zone.

The following applies to all surface locations:

- A. The working surface of each well pad will be about 250 feet by 440 feet (2.5 acres). The total disturbed area for each pad is estimated to be 3.1 to 5.1 acres or less and includes cut and fill slopes, soil stockpile, and surface water diversions/BMPs.
- B. The topsoil will be stripped to minimum depth of 6 inches. Or lacking top soil, the top 6” of soil will be stripped and stockpiled separate from other spoils to ensure soil horizons are not blended and the fertility of the topsoil layer is not compromised. Under no circumstances, will the topsoil be used for construction purposes.
- C. Fill slopes will be armored with excavated rock and/or slash vegetation as well as having silt fences installed to reduce the velocity of rain drops and subsequent erosion along the toe of the well pad fill slope. Also, if needed, aspen matting will be lain down to allow for erosion mitigation as well as enhancing reestablishment of vegetation.
- E. Prior to commencement of drilling operations, the cuttings pit will be fenced on three (3) sides using three strands of barbed wire according to the following minimum standards:
 - o Corner posts shall be cemented and/or braced in such a manner to keep the fence tight at all times.
 - o Standard steel, wood, or pipe posts shall be used between the corner braces. The maximum distance between any two (2) posts shall be no greater than sixteen (16) feet.
 - o All wire shall be stretched using a stretching device before it is attached to the corner posts.
 - o The fourth side of the cuttings pit will be fenced immediately upon removal of the drilling rig and the fencing will be maintained until the pit is backfilled.
- F. Cut slopes, associated with pad construction, will be left rough to provide a seed catchment surface, and may require ‘step cutting’ when heights exceed 15 feet.
- G. The attached exhibits for each surface location are complete sets of surveys for each well that the pad is named for (e.g. Well 20-15 for the 20-15 Surface Pad). Each exhibit includes a location map, topo map, vicinity map, pad layout, existing contours, rig layout, production layout including reclaimed area, and cut and fill cross-sections. Multiple wellheads and production equipment are identified and the surface location is designed to accomplish the multi-well program with no expansion beyond what is identified in the exhibits.

1. Federal 20-15 (15 Wells)

Surface vegetation on the 20-15 pad is predominantly sagebrush intermingled with mature juniper trees. The Natural Resource Conservation Service identifies the soil properties at the pad location and surrounding area as “Torriorthents-Camborthids, Rock Outcrops Complex, Steep” (NRCS Map Unit 66). Visual inspection of the surface material on location appears to be a boulder field intermingled with some soils. Due to the steep nature of the proposed area and the anticipated cuts and fills, Laramie will consult with a Professional Engineer as well as the BLM Engineers in the Grand Junction Field Office of the BLM to determine if any mitigation measures are necessary prior to construction of the pad.

875’ of access road (Figure A) will need to be constructed from the main access road (BLM 8185) starting in the NENE of Sec. 29, Twn. 6 S, Rng. 93 W.

The south and southeast corners of the pad are rounded to reduce the disturbance from the cut and fill. Initial disturbance area of the pad will be 4.5 acres with an interim reclamation area of 1.0 acres once all wells are drilled and completed. Also, to reduce the visual impacts, and to increase the amount of interim reclamation of the pad, an offsite facility will be constructed.

Upon review of the proposal by the previous operator, operation issues became apparent with the location of the proposed offsite facilities for the Federal 20-15 pad and the Federal 29-11 pad. Each well from a multi-well pad must have a flowline (2" diameter) from the wellhead to the separator. The standard practice is to bury the flowlines to the separators. When a common trench is used the flowlines are buried 8-12" apart to allow for locating, maintenance, and repairs if needed. Burying the flowlines adjacent to the road to the offsite facility for the 15 wells proposed for the 20-15 pad would require a trench excavation of roughly 12 feet in width to bury the lines. In addition to the additional disturbance required to bury the lines as well as the disturbance for the proposed offsite facility roughly 900 feet from the well pad, Laramie feels it would be more prudent and practical to leave the production facilities on the well pad and eliminate the additional disturbance.

Stormwater BMP's including berming the working area of the pad and a stormwater control ditch around the pad will be constructed to manage sediment and stormwater run-off.

2. Federal 29-02(16 Wells)

Surface Vegetation on the 29-02 pad is predominantly sagebrush and grasses intermingled with Juniper.

Approximately 5240 feet of access road (Figure A) will need to be constructed from the main access road (BLM 8185) in the SWNW of section 28, Twn. 6S, Rng. 93W. to the location. 4900 feet of the access road will be use as the main access road to the Federal 29-06.

Approximately 2480 feet of the proposed new access road is located off lease. Laramie will submit a ROW request for authorization to build and construct the new road as well as the use of BLM 8185. The road ROW request will be for a permanent 24' foot width and a temporary use area of 26 feet. Due to the topography, Laramie anticipates an average disturbance area for this portion of road construction to be 50' from the toe of fill to the top of cut. Only the disturbance necessary for a safe and well-constructed route for the period of use and traffic will be used. The final road running surface will be 16 -24 feet with 4 foot borrow ditches for a total of 24'.

The northeast, and southwest corners of the pad are tapered to reduce the disturbance and fill. Due to COGGC Rule 603 a. (1), which requires a well to be at least 150' or 1 ½ times the derrick height from any major above ground utility line, the pad was surveyed to allow the first row of wells to be located 214'(1.5 times 138' derrick height) from a powerline to the south. Initial disturbance area of the pad will be 4.3 acres with an interim reclamation area of 1.1 acres once all wells are drilled and completed.

Stormwater BMP's including but not limited to berming the working area of the pad and a stormwater control ditch around the pad will be constructed to manage sediment and stormwater run-off.

3. Federal 29-06 (5 Wells)

Surface Vegetation on the 29-06 pad is a predominantly Juniper with intermingled sagebrush and grasses.

2040 feet of access road (see Figure A) will be constructed from the main access road (outlined above in the 29-02 pad description) in the NWNE of section 29, to the location. The northwest, northeast and southwest corners of the pad are rounded to reduce disturbance in these areas. Initial disturbance area of the pad will be 3.3 acres with an interim reclamation area of 0.7 acres once all wells are drilled and completed.

Stormwater BMP's including but not limited to berming the working area of the pad and a stormwater control ditch around the pad will be constructed to manage sediment and stormwater run-off.

4. Federal 29-11(18 Wells)

Surface vegetation for the 29-11 pad is pre-dominantly Juniper (Cedar) intermingled with sagebrush.

Approximately 6420 feet (including main and 29-11) of access road (Figure A) will need to be constructed from the existing access road to the Federal 31-01 pad in the SESE of section 30, Twn. 6S, Rng. 93W to the location. 6180 feet of the access road will be used as the main access to the Federal 29-11 as well as to the Federal 29-15 pad.

To reduce the amount of fill on both the northwest and northeast corners of the pad the corners were rounded and pulled back. Initial disturbance area of the pad will be 4.5 acres with an interim reclamation area of 1.3 acres once all wells are drilled and completed.

Originally, separators were initially planned to remain on location and an offsite produced water/ condensate tank facility was proposed across a drainage. In order to move the produced water and condensate to the tanks, 9 "dump" lines would have to be buried across the drainage for every two wells on location (18 wells planned). Laramie feels it would be beneficial to move the production tanks on location to eliminate the need for multiple crossings of the drainage as well as reduce the overall surface disturbance. In addition, if a rupture of the lines were ever to occur (i.e. corrosion, etc), the spill control and containment would remain on location and would not approach the drainage, reducing any potential impacts.

Stormwater BMP's including but not limited to berming the working area of the pad and a stormwater control ditch around the pad will be constructed to manage sediment and stormwater run-off.

5. Federal 29-15 (16 Wells)

Surface vegetation for the 29-15 pad is pre-dominantly juniper (cedar) intermingled with sagebrush and grasses.

1370 feet of access road and pipeline will be constructed from the main access (figure A) identified in the Federal 29-11 description. To limit the encroachment of the pad in a drainage to the north, the pad was moved south and the north and northeast corners were pulled back to limit the amount of disturbance. Initial disturbance area of the pad will be 4.3 acres with an interim reclamation area of 1.2 acres once all wells are drilled and completed.

Stormwater BMP's including but not limited to berming the working area of the pad and a stormwater control ditch around the pad will be constructed to manage sediment and stormwater run-off.

6. Existing Leverich 31-06 (6 Federal Wells on Private Surface)

The Leverich 31-06 is accessed off the main access to the Leverich 31-12 which is a fee pad on fee mineral estate in the NWSW of Sec. 31, Twn. 6 S, Rng. 93 W. A ROW authorization and request for 431' (106' new construction) for accessing the private lands and subsequently the Leverich 31-12 from the existing Federal 31-01 pad was submitted to the BLM for approval. The ROW (COC-72164) was issued February 27, 2008.

The location of the pad site reflect the results of on-site exams conducted by Laramie and the private landowner as well as addressing the concerns submitted by the landowner to the BLM during the Petrogulf Helmer Gulch GAP proposed action comment period. Revisions to the proposed pad layout and orientation as well as access was adjusted based on the landowner's requests and recommendations. Laramie Energy II, LLC has negotiated and recorded a Surface Use and Right of Way Agreement with the Landowner.

In addition to the Federal wells proposed on the Leverich 31-06, Laramie intends to develop the private mineral estate to the west of the pad. Seven fee wells will be permitted and subsequently drilled and completed. Two private well permits were submitted to the COGCC and subsequently approved April 3, 2008. Laramie began construction of the well pad in mid- April , 2008.

7. Existing Leverich 31-09 (12 Federal Wells on Private Surface)

The Leverich 31-09 is accessed off the main access to the Leverich 31-12 which is a fee pad on fee mineral estate in the NWSW of Sec. 31, Twn. 6 S, Rng. 93 W. A ROW authorization and request for 431' (106' new construction) for accessing the private lands and subsequently the Leverich 31-12 from the existing Federal 31-01 pad was submitted to the BLM for approval. The ROW (COC-72164) was issued February 27, 2008.

The location of the pad site reflects the results of on-site exams conducted by Laramie and the private landowner as well as addressing the concerns submitted by the landowner to the BLM during the Petrogulf Helmer Gulch GAP proposed action comment period. Revisions to the proposed pad layout and orientation as well as the access were adjusted based on the landowner's requests and recommendations. Laramie Energy II, LLC has negotiated and recorded a Surface Use and Right of Way Agreement with the Landowner.

In addition to the Federal wells proposed on the Leverich 31-09, Laramie intends to develop the private mineral estate to the west of the pad. Eight fee wells will be permitted and subsequently drilled and completed. Two private well permits were submitted to the COGCC and subsequently approved April 3, 2008. Laramie began construction of the well pad mid- April, 2008.

8. Existing Locations with Drilled or Producing Wells(Figure A)

A. Federal 31-01 (5-6 wells)

Combination of Federal and Private Surface
Previously analyzed under CO-140-2006-084EA
No additional disturbance anticipated.

B. Overacker 29-04 (3 wells)

Private Surface/ Private Minerals
Previously analyzed under CO-140-2006-084EA
No additional disturbance anticipated.

C. Mead 30-11 (8 wells)

Private Surface/Private Minerals
Previously analyzed under CO-140-2006-062EA
No additional disturbance anticipated.

D. Mead 30-13 (3 wells)
Private Surface / Private Minerals

E. Hooker 30-02 (8 wells)
Private Surface/Private Minerals

10. Plans for Restoration of the Surface:

- A. If the well is a Producer, Laramie Energy will conduct Interim Reclamation with the following:
1. The Bureau of Land Management, Glenwood Springs Energy Office, (970) 947-5200, will be notified at least forty-eight (48) hours before starting reclamation work that involves earth-moving equipment and upon completion of restoration measures.
 2. Immediately upon completion of drilling and completion operations, the location and surrounding area will be cleared of all remaining debris, materials, trash and junk not required for production, and hauled to the nearest legal landfill.
 3. The backfilling of the cuttings pit will be done in such a manner that the cuttings will be confined to the pit and not squeezed out and incorporated in the surface materials. There will be a minimum of three feet of cover (overburden) on the pit. When work is complete, the pit area will support the weight of heavy equipment without sinking.
 4. After completion activities, Laramie Energy will reduce the size of the well pad to the minimum surface area needed for production operations, while providing for reshaping and stabilization of cut and fill slopes. Slopes will be re-contoured to minimize areas that exceed a 3:1 slope. Any areas exceeding the 3:1 slope criteria or high walls shall be reclaimed using enhanced stabilization and erosion prevention methods.
 5. Upon completion of backfilling, leveling and re-contouring, the stockpiled topsoil will be evenly spread over the reclaimed area(s). Prior to reseeding, all disturbed surfaces will be scarified and left with a rough surface. No depressions will be left that would trap water and form ponds. Any stockpiled ground cover will be evenly distributed over the disturbed areas.
 6. The recommended BLM seed mix will be used on all disturbed areas or as required by the Private Surface Owner. The recommended seed mixes identified in attachments 1 and 2 of the Notice to Lessee (Revisions to BLM Energy Office Revegetation Requirements) dated May 1, 2008, will be complied with. If the seeding is unsuccessful, subsequent seeding may be required.

- B. After the Last Well on a Location is Abandoned, Laramie Will:

Ensure the well site, roads or other disturbed areas will be restored to near their original condition. This procedure will include:

1. Ensuring re-vegetation of the disturbed areas to the specifications of the landowner or BLM at the time of abandonment.
2. All disturbed surfaces will be re-contoured to the approximate natural contours (Exhibit "C5") and reseeded according to landowner or BLM specifications. Reclamation of the well pad and access road will be performed as soon as practical after final abandonment and reseeding operations will be performed in the fall or spring following completion of reclamation operations. During reclamation of the site, fill material will be pushed into cuts and up over the back slope. Topsoil will be distributed evenly over the location and seeded according to the recommended seed mixture.

3. The access road and location will be re-contoured and ripped or disked prior to seeding. Prior to reclamation of the access road, the BLM or landowner will be consulted to determine any road portions that might remain.
4. All cut slopes from access roads and well pad construction will be reseeded within 48 hours after construction is completed.
5. Immediately upon abandonment of all the wells on the pad, all equipment will be removed from the location and surrounding area(s) will be cleared of all debris, materials, trash and junk that may have collected. Pipelines will be cut and abandoned at the location.
6. The recommended BLM seed mix will be used on all disturbed areas or as required by the private surface owner. The recommended seed mixes identified in attachments 1 and 2 of the Notice to Lessee (Revisions to BLM Energy Office Revegetation Requirements) dated May 1, 2008, will be complied with.
7. Those disturbed areas around locations that are being reclaimed may require fencing after seeding to keep wildlife and livestock out until the vegetation gets established. Where fencing is needed, Laramie Energy will consider the needs of the wildlife during the design of the fencing. The CDOW will be contacted for recommendations for appropriate fencing in each area. Once vegetation has been established, the fencing will be removed or reduced in size as required by the Authorized Officer.

11. Surface and Mineral Ownership:

- A. The access roads and surface locations are on Bureau of Land Management lands as well as some Private Lands. Mineral estate within the HGMDP boundary include Federal (COC-64181 and COC-41916) and some private mineral estate. Surface Use and Right of Way Authorizations or letters of agreement are signed for the access crossing private lands.

12. Other Information:

- A. A cultural resource inventory report is part of the environmental assessment process.
- B. Laramie Energy is responsible for informing all persons in the area who are associated with this project that they will be subject to prosecution for knowingly disturbing historic or archaeological sites, or for collecting artifacts or fossils. Laramie Energy will immediately bring to the attention of the Authorized Officer (BLM Glenwood Springs Energy Office) any and all antiquities or other objects of historic or scientific interest including, but not limited to, historic or prehistoric ruins, artifacts, or fossils discovered as a result of operations under this permit. Laramie Energy will immediately suspend all activities in the area of the object and will leave such discoveries intact until told to proceed by the Authorized Officer. Notice to proceed will be based upon evaluation of the cultural significance of the object.
- C. Laramie Energy implements Best Management Practices (BMP's) to minimize or eliminate the nature and degree of specific impacts which may occur from oil and gas exploration and development. These could include but are not limited to:
 1. Erosion Control- seeding, mulching, fertilizing, and netting.
 2. Slope Stabilization - buttresses, retaining structures, rip-rap, etc.
 3. Velocity Control - slope drains, spreaders, energy dissipaters, check dams, drop structures, and diversion berms.
 4. Sediment Control - straw bales, filter fence, inlet protection, siltation berms, traps, and basins.
 5. Sediment Basins - will be maintained and disposed of at approved sites.

D. Sediment will be trapped before it reaches lakes, wetlands/riparian areas, intermittent drainage channels, and streams.

E. Army Corp. of Engineer 404 permits will be submitted for any drainages determined to be navigable waters.

G. Miscellaneous Information.

1. There will be no deviation from the proposed drilling and/or workover program without prior approval from the Authorized Officer. Safe drilling and operating practices will be observed.
2. Sundry Notice and Report on Wells (Form 3160-5) will be filed for approval for all changes or plans and other operations in accordance with 43 CFR 3164.
3. The dirt contractor will be provided with an approved copy of the surface use plan.

13. Lessee's or Operator's Representative and Certification:

Representative: Laramie Energy II, LLC
Wayne P. Bankert
601 28 ¼ Rd No. D
Grand Junction, CO
(970) 683-5419 Office
(970) 985-5383 Cell
(970) 683-5499 Fax

Operator: Same as above.

Certification: I hereby certify that I, or persons under my direct supervision, have inspected the proposed drill sites and access routes; that I am familiar with the conditions which currently exist; that the statements made in the plan are, to the best of my knowledge, true and correct; and that the work associated with the operations proposed herein will be performed by Laramie Energy LLC and its contractors and subcontractors in conformity with this plan and the terms and conditions under which it is approved. This statement is subject to the provisions of 18 U.S.C. 1001 for the filing of false statements.

Signature : **Wayne P. Bankert**
Digitally signed by Wayne P. Bankert
DN: cn=Wayne P. Bankert,
o=Laramie Energy II, LLC, ou,
email=wbankert@laramie-
energy.com, c=US
Date: 2008.05.15 14:14:56 -06'00'

Wayne P. Bankert
Senior Regulatory and Environmental Coordinator
Laramie Energy II, LLC

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Appendix C

Standard Conditions of Approval and Regulatory Reminders

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STANDARD SURFACE USE CONDITIONS OF APPROVAL

STANDARD COAs APPLICABLE TO ALL ACTIVITIES WITHIN THE HELMER GULCH MASTER DEVELOPMENT PLAN

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 [GAP, EA, etc.]. In cases of discrepancies, the following COAs supersede earlier versions.

1. Administrative Notification. The operator shall notify the BLM representative at least 48 hours prior to initiation of construction.
2. Road Design, Construction, and Maintenance. Road construction/reconstruction plans prepared by or under the supervision of a Registered Professional Engineer, licensed in the State of Colorado, shall be submitted for approval by the authorized officer. These plans shall be signed and stamped prior to submittal to the BLM for final review.

Roads shall be crowned, ditched, surfaced, drained with culverts and/or water dips, and constructed to BLM Gold Book standards. Initial gravel application shall be a minimum of 4 inches. The operator shall provide timely year-round road maintenance and cleanup on the access roads. A regular schedule for maintenance shall include, but not be limited to, blading, ditch and culvert cleaning, road surface replacement, and dust abatement. When rutting within the traveled way becomes greater than 6 inches, blading, and/or gravelling shall be conducted as approved by the authorized officer.

3. Dust Abatement. The operator shall implement dust abatement measures as needed or directed by the BLM 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 BLM authorized officer.
4. Drainage Crossings and Culverts. Construction activities at perennial, intermittent, and ephemeral drainage crossings (e.g. burying pipelines, installing culverts) shall be timed to avoid high flow conditions and shall consist of either a piped stream diversion or the use of 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. Contact Jeff O'Connell, Glenwood Springs Energy Office Hydrologist, at 970-947-5215 or jeffrey_o'connell@blm.gov. 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 recommends designing drainage crossings for the 100-year event. Contact Sue Nall at 970-243-1199 x16 or susan.nall@usace.army.mil.

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

5. Jurisdictional Waters of the U.S. The operator shall obtain appropriate permits from the U.S. Army Corps of Engineers 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 Sue Nall, Regulatory Specialist, Colorado/Gunnison Basin Regulatory Office, U.S. Army Corps of Engineers, at 970-243-1199 x16 or susan.nall@usace.army.mil.
6. Wetlands and Riparian Zones. The operator shall restore temporarily disturbed wetlands or riparian areas. The operator shall consult with the BLM Glenwood Springs Energy Office to determine appropriate mitigation, including verification of native plant species to be used in restoration. Contact Jeff O'Connell, Glenwood Springs Energy Office Hydrologist, at 970-947-5215 or jeffrey_o'connell@blm.gov.
7. Reclamation. The goals, objectives, timelines, measures, and monitoring methods for final reclamation of oil and gas disturbances are described in Appendix I (Surface Reclamation) of the 1998 Draft Supplemental EIS (DSEIS). Specific measures to follow during interim and temporary (pre-interim) reclamation are described below.

- a. 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 pad 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 April 30, 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 supplied to the BLM Glenwood Springs Energy Office Ecologist (Beth Brenneman, 970-947-5232 or beth_brenneman@blm.gov) 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 may 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 straw 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 reclaimed areas and shall submit an annual monitoring report 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.
8. Weed Control. The operator shall regularly monitor and promptly control noxious weeds or other undesirable plant species as set forth in the Glenwood Springs Energy 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 by **December 31**. Contact Beth Brenneman, Glenwood Springs Energy Office Ecologist, at 970-947-5232 or beth_brenneman@blm.gov.
9. Big Game Winter Range Timing Limitation. In addition to existing lease Timing Limitation (TL) stipulations included on lease COC64181 (December 1 to April 30), lease COC41916 (January 16 to April 29), and lease COC52583 (January 15 through April 30), a 60-day TL prohibiting construction, drilling or completion activities shall occur from January 1 through March 1 annually. To reduce impacts to wintering big game, remote sensing should be used for production monitoring, and unavoidable monitoring or maintenance activities should be conducted between 9 a.m. and 3 p.m., to the extent practicable. These additional recommendations apply to the period from December 1 to April 30. Contact Jeff Cook, Glenwood Springs Energy Office Wildlife Biologist, at 970-947-5231 or jeffrey_cook@blm.gov.
10. Raptor Nesting. Raptor nest surveys conducted in May and June, 2007 for the Helmer Gulch MDP 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 APD. 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 or drilling 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. Contact Jeff Cook, Glenwood Springs Energy Office Wildlife Biologist, at 970-947-5231 or jeffrey_cook@blm.gov.
11. 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. Contact Creed Clayton, USFWS Biologist assigned to the Glenwood Springs Energy Office, at 970-947-5219 or creed_clayton@fws.gov. Under the MBTA, “take” means to harass, harm, 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 reserve pits, produced water pits, and evaporation pits, that store or are expected to store fluids which may pose a risk to such birds (e.g., migratory waterfowl, shorebirds, wading birds, and raptors) during completion and after completion activities have ceased. Several established methods to prevent bird access are known to work. Methods may include but are not limited to netting, the use of bird-balls, or other alternative methods that effectively prevent bird access/use. Regardless of the method used, it should be applied within 24 hours after completion

activities have begun. All mortality or injury to species protected by the Migratory Bird Treaty Act shall be reported immediately to the BLM project lead.

12. Birds of Conservation Concern. Pursuant to BLM Instruction Memorandum 2008-050, all surface-disturbing activities are prohibited from May 1 to June 30 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 auidial 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. Contact Jeff Cook, Glenwood Springs Energy Office Wildlife Biologist, at 970-947-5231 or jeffrey_cook@blm.gov).
13. 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.
14. Ips Beetle. To avoid mortality of pinyon pines due to infestations of the *Ips* beetle, any pinyon trees damaged during road, pad, or pipeline construction shall be chipped after being severed from the stump or grubbed from the ground, buried in the toe of fill slopes (if feasible), or cut and removed from the site within 24 hours to a location approved by the Colorado State Forest Service.
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. All applications for permit to drill (APDs) shall include a detailed, site-specific description outlining how the proposed action will meet the VRM Class of the area where the action is proposed. The specific location of the proposed action, including pads, roads, and pipelines, shall be shown on a map and shall include associated cut-and-fill data (location, horizontal and vertical extent, slope length, and steepness).

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.

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.

Above-ground facilities shall be painted a natural color selected to minimize contrast with adjacent vegetation or rock outcrops. The color shall "Shadow Gray" unless a different color is specified by the authorized officer as a COA attached to individual APDs. Contact Rick Haskins, GSEO Natural Resource Specialists, at 970-947-5214 for a color swatch.

18. Wastes, Hazardous or Solid. Laramie II and its contractors would be required to collect and properly dispose of any solid wastes generated by this project. Any release (leaks or spills) of hazardous substances in excess of the reportable quantity, as established by 40 CFR, Part 117, would be reported as required by the CERCLA of 1980, as amended. If the release of a hazardous substance in a reportable quantity would occur, a copy of a report would be furnished to the BLM and all other appropriate Federal and State agencies. In addition, all releases to soil or water of 10 gallons or more of any substance would be immediately reported verbally to the BLM and COGCC compliance officers and proof of cleanup provided for the project record. This mitigation would be applied at all stages of the project including drilling, completion, operation, and abandonment of the wells.

Protection of sensitive environments in the drilling area would be accomplished through the use of a liner in the reserve pit and the construction or installation of secondary containment facilities. All cuttings, drilling fluids and chemicals are to be contained in the lined pit. Any hydrocarbons in the reserve pit would be removed as soon as possible and processed or disposed of at a permitted offsite facility, and excess liquids in the reserve pit evaporated. The cuttings would then be buried in place. Backfilling of the pit would be performed in a manner to confine the mud in the pit and avoid incorporating the mud with surface soils.

No chromate additives would be used in the mud system without prior BLM approval. No hazardous substances specifically listed by EPA as a hazardous waste or demonstrating a characteristic of hazardous waste will be used in drilling, testing, or completion operations.

Tank batteries for the storage of produced water and condensate would be placed in secondary containment to prevent migration offsite. These may consist of either corrugated steel surrounds, earthen berms, or both. In the event of an accidental release, produced water and condensate would be confined for clean-up in the containment area and would not migrate to surrounding soils and water.

Under the proposed drilling plan, fuel and lubricants would be temporarily stored in transportable containment trailers or tanks on the proposed well pads. Laramie II would implement a Spill Prevention, Control, and Countermeasure (SPCC) Plan to minimize potential impacts from unintentional releases. The SPCC Plan would include accidental discharge reporting procedures, spill response, and cleanup measures. All potentially hazardous materials and substances would be handled in an appropriate manner that minimizes the risk of accidental contamination of soil and water resources.

19. Noise. During drilling and completion, the operator will angle the exhaust muffler stacks on the power units or generators away from private homes. The operator will encourage commuting of construction and drilling crews to mitigate vehicle noise impacts. Operator will use telemetry equipment at all gas well meters to reduce pumper-truck traffic within the HGMDP area.

20. Transportation. Commuting construction and drilling crews would be encouraged to car pool to reduce the number of vehicle trips on local area roads and associated wear and tear. The operator would encourage commuting construction and drilling crews to comply with posted speed limits on public roads and limit driving speeds to 20 mph on more primitive access roads to reduce the potential for vehicle collisions. By complying with posted speed limit along County Roads, traffic-related noise would also be reduced at nearby residences.
21. Haul Route. Heavy loads shall access the Helmer Gulch Project area from the Rulison Exit on I-70 and follow the Rifle-Rulison road to the project area as identified in Garfield County's "Preferred County Road Haul Route" map (Revision 11, 1/14/2008) on the Garfield County website.

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 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 COAs 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 drill site whenever active construction or drilling operations are underway.

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.

A. DRILLING PROGRAM

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

1. Estimated Depth at Which Oil, Gas, Water, or Other Mineral Bearing Zones are Expected to be Encountered

Any usable water zones encountered below the surface casing shall be isolated and or protected by cementing across the zone. The minimum requirement is to cement from 50 feet above to 50 feet below each usable water zone encountered.

If gas is found to be present in the Wasatch formation, then the zone will need to be isolated either by the primary cement job or remedial cementing.

2. Pressure Control Equipment

The BOP and related equipment shall meet the minimum requirements of Onshore Oil and Gas Order No. 2 for equipment and testing requirements, procedures, etc., for a 3M system and individual components shall be operable as designed. Chart recorders shall be used for all pressure tests.

3. Casing Program and Auxiliary Equipment

The surface casing **shall** be cemented back to surface either during the primary cement job or by remedial cementing. Leak-off tests of the casing shoe will be performed and recorded for all wells.

4. Mud Program and Circulating Medium

Hazardous substances specifically listed by the EPA as a hazardous waste or demonstrating a characteristic of a hazardous waste will not be used in drilling, testing, or completion operations.

No chromate additives will be used in the mud system on Federal and Indian lands without prior BLM approval to ensure adequate protection of fresh water aquifers.

5. Coring, Logging and Testing Program

Daily drilling and completion progress reports shall be submitted to this office on a weekly basis.

All Drill Stem tests (DST) shall be accomplished during daylight hours, unless specific approval to start during other hours is obtained from the AO. However, DSTs may be allowed to continue at night if the test was initiated during daylight hours and the rate of flow is stabilized and if adequate lighting is available (i.e., lighting which is adequate for visibility and vapor proof for safe operations). Packers can be released, but tripping should not begin before daylight unless prior approval is obtained from the AO.

A cement bond log (CBL) will be run from the production casing shoe to **TOC** and shall be utilized to determine the bond quality for the production casing.

Whether the well is completed as a dry hole or as a producer, "Well Completion and Recompletion Report and Log" (Form 3160-4) will be submitted not later than 30 days after completion of the well or after completion of operations being performed, in accordance with 43 CFR 3164. **One** copy of all logs, core descriptions, core analyses, well-test data, geologic summaries, sample description, 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 AO.

6. Notifications of Operations

No location will be constructed or moved, no well will be plugged, and no drilling or workover equipment will be removed from a well to be placed in a suspended status without prior approval of the AO. If operations are to be suspended, prior approval of the AO will be obtained and notification given before resumption of operations.

The Glenwood Springs Energy Office shall be notified, during regular work hours (7:45 a.m.- 4:30 p.m., Monday through Friday except holidays), at least 24 hours **prior** to spudding the well.

Operator shall report production data to MMS pursuant to 30 CFR 216.5 using form MMS/3160.

The date on which production is commenced or resumed will be construed for oil wells as the date on which liquid hydrocarbons are first sold or shipped from a temporary storage facility, such as a test tank, and for which a run ticket is required to be generated or, the date on which liquid hydrocarbons are first produced into a permanent storage facility, whichever first occurs; and, for gas wells as the date on which associated liquid hydrocarbons are first sold or shipped from a temporary storage facility, such as a test tank, and for which a run ticket is required to be generated or, the date on which gas is first measured through permanent metering facilities, whichever first occurs.

Should the well be successfully completed for production, the AO will be notified when the well is placed in a producing status. Such notification will be sent by telegram or other written communication, not later than five (5) days following the date on which the well is placed on production.

A schematic facilities diagram as required by 43 CFR 3162.7-5 (b.9. d.), and shall be submitted to the appropriate District Office within sixty (60) days of installation or first production, whichever occurs first. All site security regulations as specified in Onshore Oil & Gas Order No. 3 shall be adhered to. All product lines entering and leaving hydrocarbon storage tanks will be effectively sealed in accordance with 43 CFR 3162.7-5 (b. 4).

No well abandonment operations will be commenced without the prior approval of the AO. In the case of newly drilled dry holes or failures, and in emergency situations, oral approval will be obtained from the AO. A "Subsequent Report of Abandonment" Form 3160-5, will be filed with the AO within thirty (30) days following completion of the well for abandonment. This report will indicate where plugs were placed and the current status of surface restoration. Final abandonment will not be approved until the surface reclamation work required by the approved APD or approved abandonment notice has been completed to the satisfaction of the AO or his representative, or the appropriate Surface Managing Agency.

7. Other Information

All loading lines will be placed inside the berm surrounding the tank battery.

All off-lease storage, off-lease measurement, or commingling on-lease or off-lease will have prior written approval from the AO.

All open-vent exhaust stacks associated with heater-treater, separator, and dehydrator units must be constructed to prevent birds and bats from entering them and to the extent practical to discourage perching and nesting.

The oil and gas measurement facilities will be installed on the well location. The oil and gas meters will be calibrated in place prior to any deliveries. Tests for meter accuracy will be conducted following initial installation and at least quarterly thereafter. The AO will be provided with a date and time for the initial meter calibration and all future meter-proving schedules. A copy of the meter calibration reports will be submitted to the Grand Junction Field Office. All meter measurement facilities will conform to Onshore Oil & Gas Order No. 4 for liquid hydrocarbons and Onshore Oil & Gas Order No. 5 for natural gas measurement.

The use of materials under BLM jurisdiction will conform to 43 CFR 3610.2-3.

There will be no deviation from the proposed drilling and/or workover program without prior approval from the AO. Safe drilling and operating practices must be observed. All wells, whether drilling, producing, suspended, or abandoned will be identified in accordance with 43 CFR 3162.

"Sundry Notice and Report on Wells" (Form 3160-5) will be filed for approval for all changes of plans and other operations in accordance with 43 CFR 3162.3-2.

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).

In the event after-hours approval or notification is necessary, please contact one of the following individuals:

Marty O'Mara
Petroleum Engineer

Work: 970-947-2825
Cell: 970-319-5837

Todd Sieber
Petroleum Engineering Tech.

W: 970.947.5220

Julie King
Petroleum Engineering Tech.

W: 970.947.5239

Steve Ficklin
Lead Petroleum Eng Tech.

W: 970.947.5213
C: 970.319.2509

BLM Fax: 970.947.5267

Appendix D

Site-Specific and Downhole Conditions of Approval

SITE-SPECIFIC COAS

The following site-specific surface use COAs are in addition to the standard COAs applicable to all wells within the Helmer Gulch Master Development Plan and all stipulations attached to the respective Federal leases.

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Federal 29-11 Well Pad

New Wells: (Federal) 29-05D, 29-06D, 29-11A, 29-11B, 29-11C, 29-11D, 29-12A, 29-12B, 29-12C, 29-12D, 29-13A, 29-13B, 29-13C, 29-13D, 29-14A, 29-14B, 29-14C, 29-14D

1. Standard Conditions of Approval outlined in Appendix C of the Helmer Gulch MDP will apply and remain in full force and effect.

Federal 29-15 Well Pad

New Wells: (Federal) 29-09A, 29-09B, 29-09C, 29-09D, 29-10A, 29-10B, 29-10C, 29-10D, 29-15A, 29-15B, 29-15C, 29-15D, 29-16A, 29-16B, 29-16C, 29-16D

1. Standard Conditions of Approval outlined in Appendix C of the Helmer Gulch MDP will apply and remain in full force and effect.
2. Fencing. A fence may be required between the BLM 8185 road and the 29-15 pad and access road to keep the public from accessing the HGMDP road system. The need for this fence will be made after the pad and access road are constructed and as determined by the authorized officer.

Federal 29-02 Well Pad

New Wells: (Federal) 29-01A, 29-01B, 29-01C, 29-01D, 29-02A, 29-02B, 29-02C, 29-02D, 29-07A, 29-07B, 29-07C, 29-07D, 29-08A, 29-08B, 29-08C, 29-08D

1. Standard Conditions of Approval outlined in Appendix C of the Helmer Gulch MDP will apply and remain in full force and effect.

Federal 29-06 Well Pad

New Wells: (Federal) 29-05A, 29-05C, 29-06A, 29-06B, 29-06C

1. Standard Conditions of Approval outlined in Appendix C of the Helmer Gulch MDP will apply and remain in full force and effect.

Federal 20-15 Well Pad

New Wells: (Federal) 20-09A, 20-09B, 20-09C, 20-09D, 20-10A, 20-10B, 20-10C, 20-10D, 20-15A, 20-15C, 20-15D, 20-16A, 20-16B, 20-16C, 20-16D

1. Standard Conditions of Approval outlined in Appendix C of the Helmer Gulch MDP will apply and remain in full force and effect.

Federal 31-01 Well Pad

New Wells: (Federal) 30-15C, 30-15D, 30-16B, 30-16C, Leverich Federal 31-01A, Leverich Federal 31-01B

1. Standard Conditions of Approval outlined in Appendix C of the Helmer Gulch MDP will apply and remain in full force and effect.

Leverich 31-06 Well Pad

New Wells: Leverich (Federal) 31-03C, 31-03D, 31-06A, 31-06B, 31-06C, 31-06D

1. Standard Conditions of Approval outlined in Appendix C of the Helmer Gulch MDP will apply and remain in full force and effect.

Leverich 31-09 Well Pad

New Wells: Leverich (Federal) 31-07C, 31-07D, 31-08C, 31-08D, 31-09A, 31-09B, 31-09C, 31-09D, 31-16A, 31-16B, 31-16C, 31-16D

1. Standard Conditions of Approval outlined in Appendix C of the Helmer Gulch MDP will apply and remain in full force and effect.

Overacker 29-04 Well Pad

New Wells: Overacker (Federal) 20-14A, 20-14B, 20-14C

1. Standard Conditions of Approval outlined in Appendix C of the Helmer Gulch MDP will apply and remain in full force and effect.

Hooker 30-02 Well Pad

New Wells: Hooker (Federal) 30-07A, 30-07B, 30-07C, 30-07D, 30-08A, 30-08B, 30-08C, 30-08D

1. Standard Conditions of Approval outlined in Appendix C of the Helmer Gulch MDP will apply and remain in full force and effect.

Mead 30-11 Well Pad

New Wells: Mead (Federal) 30-09A, 30-09B, 30-09C, 30-10A, 30-10C, 30-10D, 30-15A, 30-16A

1. Standard Conditions of Approval outlined in Appendix C of the Helmer Gulch MDP will apply and remain in full force and effect.

Mead 30-13 Well Pad

New Wells: Mead (Federal) 30-14C, 31-03A, 31-03B

1. Standard Conditions of Approval outlined in Appendix C of the Helmer Gulch MDP will apply and remain in full force and effect.

Downhole – Standard Conditions of Approval

NOTIFICATION REQUIREMENTS

- | | |
|---------------------------------|---|
| Location Construction | - At le at 48 hours prior to construction of location and access roads. |
| Spud Notice | - At least 24 hours prior to spudding the well. |
| Casing String and Cementing | - At least 24 hours prior to running casing and cementing all casing strings. |
| BOP and Related Equipment Tests | - At least 24 hours prior to initiating pressure tests. |
| First Production Notice | - Within 5 business days after new well begins, or production resumes after well has been off production for more than 90 days. |
| Reclamation | - At least 24 hours prior to reshaping the well pad. |

For more specific details on notification requirements, please check the Conditions of Approval for Notice to Drill and Surface Use Program.

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Appendix E

Habitat Mitigation Plan

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HABITAT MITIGATION PLAN
for the
Helmer Gulch Master Development Plan (MDP)
Laramie II , LLC

Prepared by:

**O&G Environmental Consulting, BLM Glenwood Springs Energy Office,
and the Colorado Division of Wildlife**



May 2008

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INTRODUCTION

Laramie II, LLC (Laramie) has developed a Master Development Plan (MDP) for oil and gas production south of Rifle and north of Flat Iron Mesa in Garfield County, Colorado. This wildlife habitat mitigation plan was developed as part of the MDP and is meant to serve as mitigation for project related impacts to wildlife habitat. The MDP area is considered elk and deer winter range by the Colorado Division of Wildlife (CDOW). Energy developments proposed in the MDP are expected to impact winter range through direct loss of habitat, habitat fragmentation, disturbance, and displacement.

The following habitat mitigation plan was developed to mitigate impacts by improving and expanding winter habitat conditions and water availability within a portion of the MDP.

Project Description: Sagebrush provides forage for deer and elk in the MDP during winter months. This forage source is slowly being replaced by juniper woodlands and is expected to eventually replace the sagebrush habitat type. Because juniper out-competes forbs, grasses and shrubs for light and below ground resources (Vaitkus and Eddleman 1987, McPherson and Wright 1990), burning, mechanical treatments, or other measures that eliminate tree competition are necessary for associated species to persist and remain available as forage. (Fairchild 1999; Monsen 2005). The objective of this project is to maintain the winter forage resource over the long-term by removing young juniper within sagebrush openings. Within Sections 29 and 30, young juniper within approximately 70 acres of sagebrush openings would be mechanically chipped/shredded to accomplish objectives.

Installations of new water features or improvements to existing stock ponds would also be made. These efforts would include lining existing stock ponds with bentonite clay or installing a single big game guzzler. This activity would slow infiltration rates and leave water available to animals for longer periods following runoff or periodic rain events or would provide an additional source of water within the project area.

Project Location: The project is located on U.S. Bureau of Land Management (BLM) lands in T6S, R93W, Sections 29 and 30 (Figure A). These sections occur in Garfield County, Colorado approximately 2.5 miles south of the town of Rifle. The project area can be accessed through an existing road currently used to access oil and gas developments.

Site History: Cultural resource surveys identified Native American artifacts within the MDP project area but habitat treatment units did not contain sites eligible for inclusion to the National Register of Historic Places. Livestock grazing has likely occurred in the area at various levels for more than 150 years. The treatment units are within the 4,100 acre Beaver Mamm BLM grazing allotment which currently permits 120 cow/calf pairs (628 AUMs) from 5/-10/15 2nd permitte has 45 cows for same dates (228 AUMs) A high voltage electrical power transmission system and a natural gas pipeline traverse both Section 29 and 30.

Site Description: Juniper and sagebrush are the two dominant forms of vegetation found within the MDP boundary and proposed habitat treatment units. Juniper encroachment is occurring at various densities in areas dominated by sagebrush with the majority of trees being in a young age class. The composition of juniper stands vary with some areas containing little understory vegetation and other containing sagebrush at varying densities. There are several unnamed, intermittent drainages that flow north into Helmer Gulch. Elevations range from about 6,000 to 6,500 feet. Generally, elevations increase from north to south. The prevailing aspect of the project area is to the north. Average annual precipitation ranges from 14 to 18 inches (http://waterknowledge.colostate.edu/prcp_map.htm). Proposed energy developments in proximity to treatment units include one well pad and approximately 0.5 mile of road.

Sensitive Timing Issues: To minimize negative impacts to wildlife populations, treatments would not occur during the big game wintering season (December 1 –April 30) or during the migratory bird nesting season (March 1 – August 15).

PROJECT DESIGN AND IMPLEMENTATION

Habitat Improvement Treatments

In May 2007, a field survey was conducted by personnel from the BLM, CDOW and O&G Environmental Consulting to select sites suitable for habitat enhancement treatments. Sites were selected based on the observed condition of the vegetation, potential for treatment, distribution in the project area and relationship to proposed natural gas access roads and well pads.

Juniper encroachment is reducing the amount of available forage by out-competing and replacing sagebrush communities. Reducing juniper in these areas would favorably affect shrub and herbaceous understory species.

- Juniper would be removed where encroachment is occurring. Small groups of trees may be retained to serve as wildlife cover. Older and structurally diverse trees within treatment units may also be retained. Edges would be feathered in an irregular pattern.
- Juniper removal would be accomplished with a Hydro-Ax or Fecon Bullhog brush and tree shredder attached to either a rubber-tired or tracked vehicle. Rubber, flotation-type tires are preferred to minimize ground disturbance.

Installations of new water features and/or improvements to existing stock ponds will be made. These efforts would provide water to area wildlife and would include:

- Lining existing stock ponds with bentonite clay. This activity will slow infiltration rates and leave water available to wildlife for longer periods following runoff or periodic rain events.
- Install a single big game guzzler to provide additional water resources for wildlife.

Implementation

The project would be implemented in the fall of 2008.

REFERENCES

- Fairchild, J. A. 1999. Pinyon-juniper chaining design guidelines for big game winter range enhancement projects. *In*: Monsen, S. B.; Stevens, R., comps. 1999. Proceedings: ecology and management of pinyon-juniper communities within the Interior West; 1997 Sept. 15-18; Provo, UT. Proc. RMRS_P-9. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.
- G. R. McPherson and H. A. Wright. 1990. Effects of cattle grazing and juniperus pinchotii canopy cover on herb cover and production in Western Texas. *American Midland Naturalist*, Vol. 123, No. 1 (Jan. 1990), pp. 144-151
- McPherson and Wright.
- Monsen, S.B. 2005. Restoration manual for Colorado sagebrush and associated shrubland communities. Colorado Division of Wildlife, Department of Natural Resources, Denver, CO.
- Vaitkus and Eddleman. 1987. Composition and productivity of western juniper understory and its response to canopy removal. Gen. Tech. Rep., Intermt. Res. Stn. pp. 456-460.

Appendix F

Water Transfer Pump Data

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Kaylee Barthel

01/15/08

Laramie II – 20-09 PAD

Diaphragm pump design

<u>Manufacturer</u>	<u>Model</u>	<u>Capacity</u>	<u>Max Op Pressure</u>	<u>Fuel Use</u>	<u>Noise</u>
Warren Rupp	G05	0-15 GPM	125 psi	9 SCFM	
Ingersoll Rand	PG05	0-12 GPM	100 psi	14 SCFM	75.0 db
Wilden	PX1	0-16.6 GPM	100 psi		

Requirements:

Flow of 100 bbl/day (3 GPM)

Want 200-300 psi discharge

Run from Jonsson A to 20-09 PAD

Notes:

Diaphragm pumps are only good up to 100 psi

Wilden just released their PX1 and there is not a data sheet available

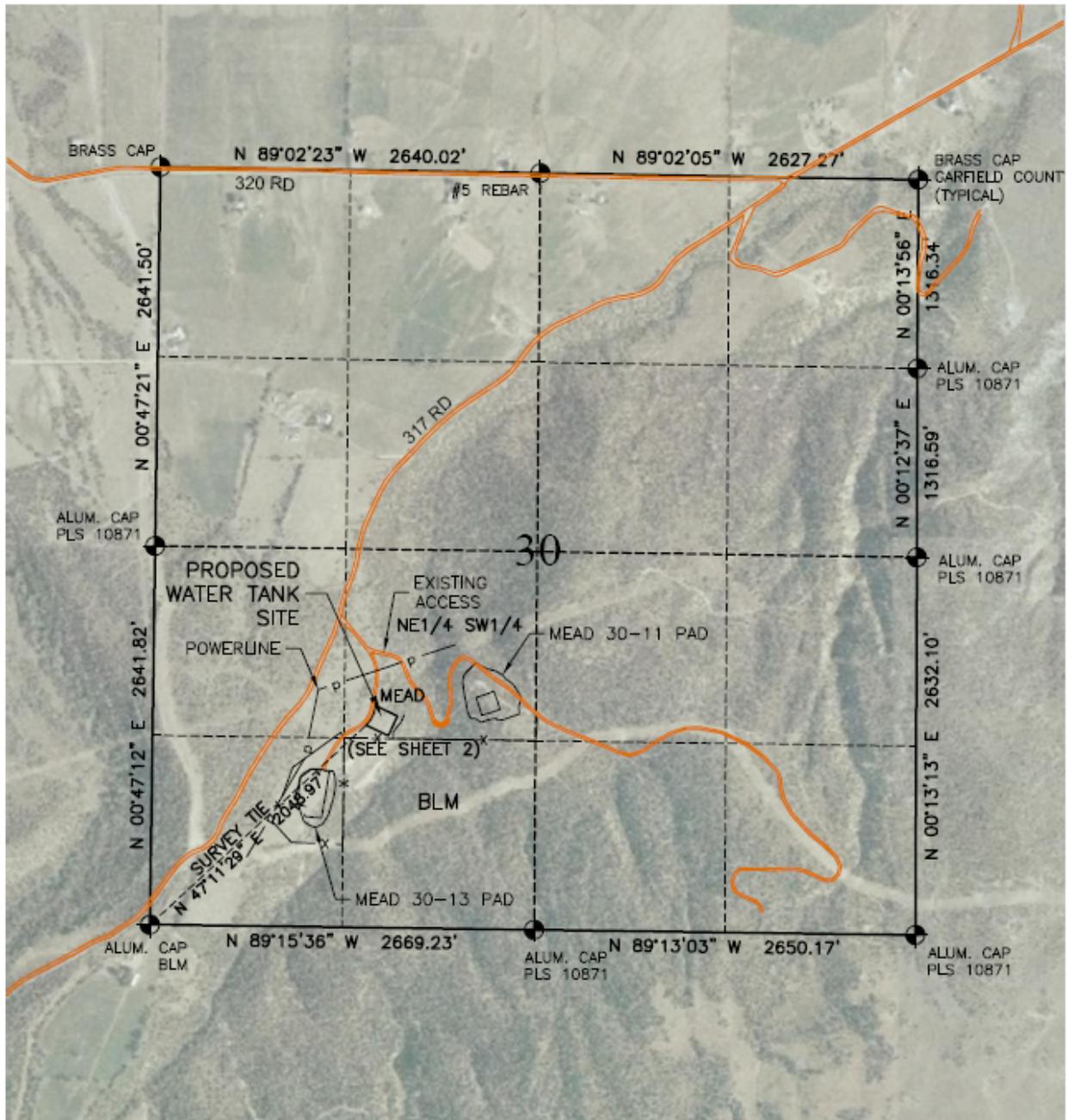
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Appendix G

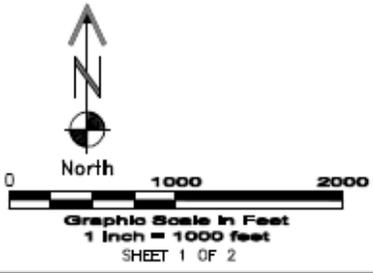
Mead Water Facility

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VICINITY MAP EXHIBIT "A"



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 USER: jm
 DATE: Fri, 05, 2008 10:35am

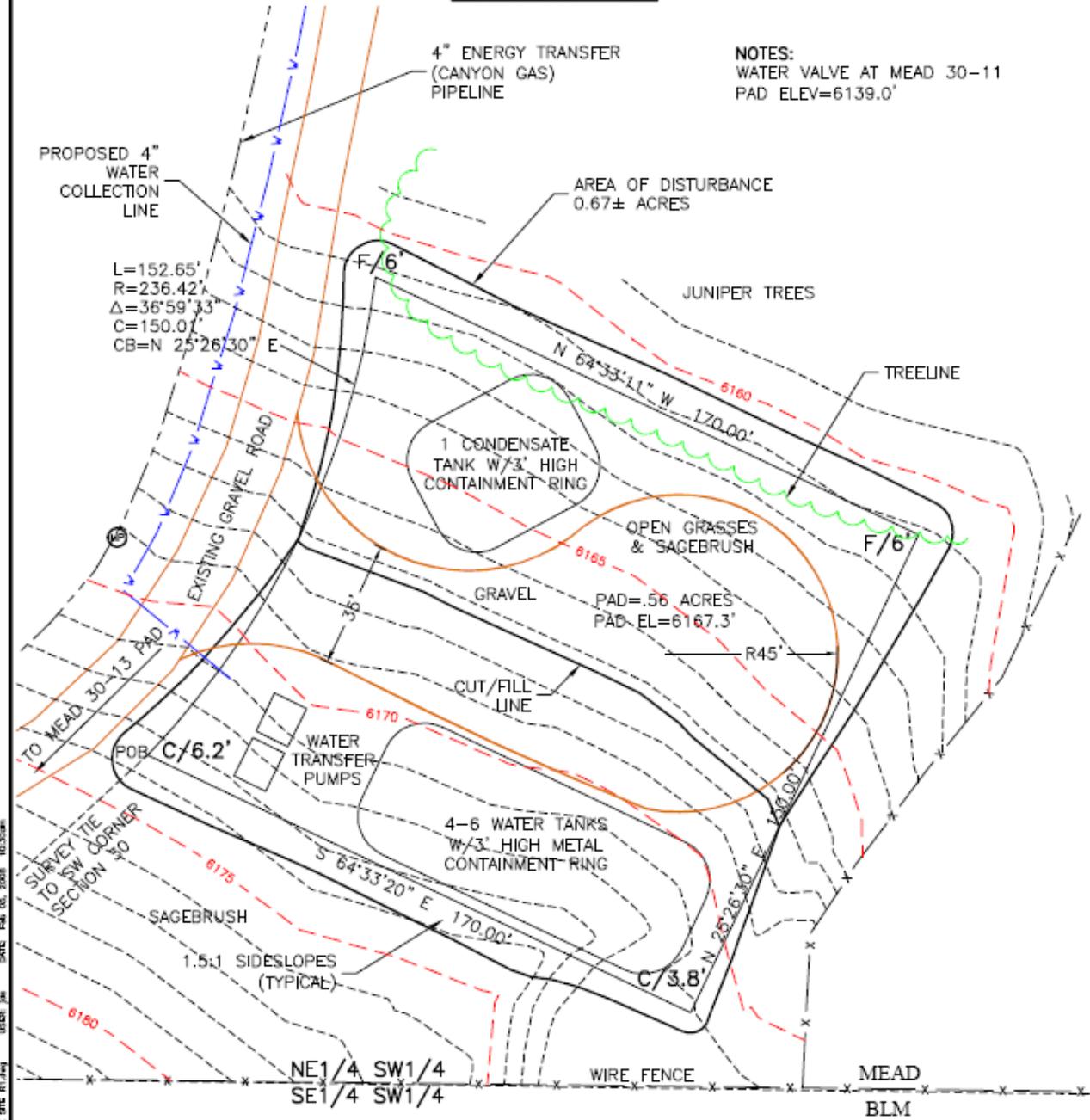


DATE: 1/29/08

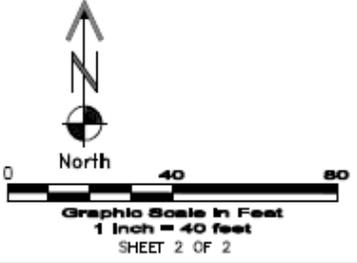
GEO SURV
LAND SURVEYING AND MAPPING
LAFAYETTE - WINTER PARK
Ph 303 666 0379 Fx 303 665 6320

LARAMIE ENERGY II LLC
MEAD WATER TANK SITE
NE1/4 SW1/4 SEC. 30 T6S R93W
6th PM GARFIELD COUNTY COLORADO

TANK & PAD LAYOUT EXHIBIT "B"



DATE: 1/29/08 10:30am USER: jm



DATE: 1/29/08

GEO SURV

LAND SURVEYING AND MAPPING
LAFAYETTE - WINTER PARK
Ph 303 666 0379 Fx 303 665 6320

LARAMIE ENERGY II LLC
MEAD WATER TANK SITE

NE1/4 SW1/4 SEC. 30 T6S R93W
6th PM GARFIELD COUNTY COLORADO

Appendix H

Plat Packages

**SURVEY PLAT INFORMATION & CUT/FILL DIAGRAMS for
the HELMER GULCH MASTER DEVELOPMENT PLAN**

Detailed survey plat information for the 5 proposed well pads and associated wells requiring Federal authorization is available for review from the BLM, Glenwood Springs Energy Office upon request.

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