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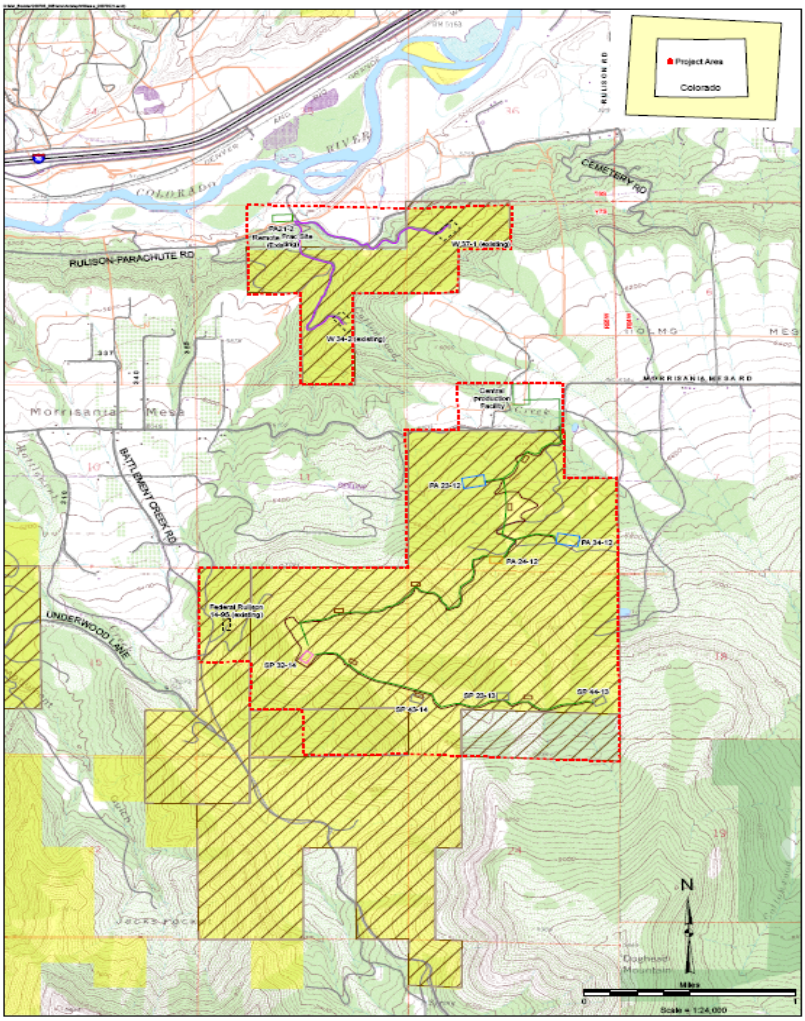
The Proposed Doghead Mountain Geographic Area Plan for Natural Gas Exploration and Development



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1.0 INTRODUCTION

Williams Production RMT Company (Williams), a natural gas company, is proposing a 4-year program of natural gas exploration[1] and development[1] on approximately 2,120 acres of public, split estate, and private lands located in the Piceance Basin about 5 miles east of the town of Parachute, Garfield County, Colorado (**Figure 1**). This proposal is referred to as the Doghead Mountain Geographic Area Plan (DMGAP), and it includes portions of Sections 1, 2, 12, 13, and 14, Township (T) 7 South (S), Range (R) 95 West (W), 6th Principal Meridian.

The proposal consists of constructing, drilling[1], completing[1], and operating up to 82 new wells[1] from up to three existing and seven new surface locations. Ancillary facilities connected to the project that would be constructed or upgraded include access roads, gathering[1] pipelines, and a variety of surface production[1] equipment locations. Included in the proposal are mitigation measures designed to minimize or eliminate impacts to surface and downhole[1] resources.

1.1 Purpose and Need for Action

Exploration and development of Federal oil and gas leases by private industry is an integral part of the BLM's oil and gas leasing program under authority of the Mineral Leasing Act of 1920 as amended, the Mining and Minerals Policy Act of 1970, the Federal Land Policy and Management Act of 1976, the National Materials and Minerals Policy, Research and Development Act of 1980, and the Federal Onshore Oil and Gas Leasing Reform Act of 1987.

The purpose of the action is to develop natural gas resources on Federal leases COC 06934, COC 01524, COC 05173, and COC 06266B consistent with existing Federal lease rights. Lease holders retain rights to drill for, extract, remove, and market gas products. National mineral leasing policies and the regulations by which they are enforced recognize the statutory right of lease holders to develop federal mineral resources to meet continuing national needs and economic demands so long as undue and unnecessary environmental degradation does not occur. Also included is the right of the lease holder to build and maintain necessary improvements, subject to renewal or extension of the lease or leases in accordance with the appropriate authority. The proposed project would allow the lease holder, Williams, to determine through natural gas exploration if and where, additional development and production is feasible.

The purpose and need for action would have been met by structuring the development of the leases as a series of individual proposals. However, the current Glenwood Springs Resource Area Resource Management Plan[1] (RMP, USDI 1999a), in addition to more recent BLM policy, specifies the use of multiple well development plan proposals as a means to more effectively manage Federal lease development.

2.0 PROPOSED ACTION

2.1 How to Read Section 2.0

This section includes the following subsections:

[1] *Term is defined in the Glossary, Section 9.0.*

- Section 2.2 Project Overview
- Section 2.3 Phased Development
    - Section 2.3.1 Exploration Phase: Conventional Drilling, which includes exploratory wells using conventional drilling technology
    - Section 2.3.2 Development Phase: Efficiency Drilling, which includes development wells using efficiency drilling technology
    - Section 2.3.3 DMGAP Comprehensive Plan, which includes the overall plan for well development in the DMGAP. This section presents the specific temporal and spatial employment of the exploration phase and the development phase in the DMGAP and a summary of the estimated surface disturbances that would result from implementation of the proposed action.
- Sections 2.4 through 2.9 provide a description of the activities under the proposed action. Details of these components are differentiated for the exploration phase and the development phase, where necessary. These sections include:
    - Section 2.4 Construction, maintenance, and use of access roads
    - Section 2.5 Pad design, construction, restoration, and abandonment
    - Section 2.6 Drilling operations
    - Section 2.7 Completion operations
    - Section 2.8 Well production facilities
    - Section 2.9 Production operations and maintenance
- Section 2.10 Best Management Practices and Design Features presents the Best Management Practices (BMPs)[1] and design features that would be incorporated during implementation of the proposed action to minimize impacts to environmental or natural resources.

Mitigation measures would be determined in accordance with the Master APD (Williams 2006) and site-specific COAs as determined by BLM.

2.2 Project Overview

The life of the proposed project in its entirety could extend up to 35 years because the reasonable productive life of a gas well completed in the Mesaverde Group is estimated to be 30 to 35 years.

Figure 1 and **Table 1** present the locations of the proposed drilling activities and the property ownership in those areas. The area identified in the DMGAP encompasses the areas within which surface and subsurface activities are proposed on Federal property and the areas within which surface activities are proposed on private (fee) property. The DMGAP includes:

- A northern area which consists of portions of Sections 1 and 2, T7S, R95W

[1] *Term is defined in the Glossary, Section 9.0.*

- A southern area which consists of portions of Sections 12, 13, and 14, T7S, R95W

Table 1. Proposed Action Well Pads and Wells

Well Pad	Well Pad Surface Location (Lease)*	Well Pad Surface Location (Legal)**	Proposed Number of Wells	Downhole Location (Legal)**	Downhole Location (Lease)*
W 37-1 (existing)	Federal COC 05173	NWNW Section 1	13	NW Section 1	Federal COC 05173 and fee lease
W 34-2 (existing)		NWSE Section 2	16	SE and NW Section 2	
PA 23-12		SENW Section 12	16	SW Section 12	Federal COC 05173
PA 24-12		SESW Section 12	3	NE and NW Section 13	
PA 34-12		SESE Section 12	22	SE Section 12 and NE Section 13	
SP 32-14		SWNE Section 14	2	NE Section 14	
SP 43-14		SESE Section 14	2	SE Section 14	Federal COC 05173 and Federal COC 06934
SP 44-13		NESE Section 13	2	SE Section 13	Federal COC 05173 and Federal COC 06266B
SP 23-13		NESW Section 13	2	SW Section 13	
Federal Rulison 14-95 (existing)	Federal COC 01524	SWNW Section 14	4	NW Section 14	Federal COC 01524 and Federal COC 05173

*All Federal surface and subsurface property ownership in the DMGAP is BLM.
**All of the DMGAP area is within T7S, R95W.

The proposed action includes the following components, as illustrated in **Figure 1**:

- New well pads[1] and expansions of existing well pads
- New roads and upgrades to existing roads
- New pipelines and upgrades to existing pipelines
- Staging areas[1] for use in construction of pipelines and associated facilities
- Remote frac pad[1] at existing site
- New centralized production facilities[1]

The DMGAP is intended to describe a future development strategy given current market conditions and company constraints. If fully implemented, this proposal would result in up to 82 downhole locations drilled over the course of 4 years (2007 through 2010) at 10 surface locations, including three existing well pads and seven new well pads (**Figure 1** and **Table 1**). The total number of wells drilled would depend largely on factors out of Williams' control, such as geologic success, engineering technology, economic factors, availability of commodity markets, and lease notices. Implementation of the full proposed drilling schedule is anticipated to take 4 years; however, potential timing limitations, rig availability, and natural gas prices (economics) may extend this timeline.

[1] *Term is defined in the Glossary, Section 9.0.*

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

The proposed action would be structured as phased development in which each well pad would undergo one or both of two distinct phases: 1) exploration phase using a conventional[1] drilling rig, and 2) development phase using an efficiency[1] drilling rig. Phasing would be conducted on a per well pad basis such that in the DMGAP as a whole, activities associated with the exploration phase would be occurring at some well pads at the same time that activities associated with the development phase would be occurring at other well pads.

A Plan of Development (POD)[1] would be submitted for each well pad when the application for a permit to drill (APD)[1] is submitted. The POD would provide detailed information for the proposed construction, drilling, completions, and operations, and steps taken during planning to minimize impacts to environmental or natural resources.

2.3 Phased Development

This section describes the phased development approach of the project.

2.2.1 Exploration Phase: Conventional Drilling

The primary objective of the proposed exploratory drilling is to evaluate the following aspects of gas development in the DMGAP area:

- Potential productivity of the lease area
- Economics of drilling and completion techniques
- Feasibility of developing, capturing, producing, and transporting natural gas
- Depths or pressure windows that may be preferred as the target for economic gas production

Conventional rigs (designed to drill one to eight wells per well pad) would be used for the exploration phase of the proposed project. Conventional drilling rigs are better suited for exploratory work compared to efficiency drilling rigs because conventional drilling rigs require less space for the drilling operations and are easier to move. Efficiency drilling rigs are designed to drill many wells (up to 22 wells) from a location, and therefore, are typically not used for exploratory work.

2.2.2 Development Phase: Efficiency Drilling

This phase would implement new efficiency drilling rig technology which incorporates off-shore drilling methods with application to on-shore drilling. This technology allows drilling of multiple wells (up to 22) from a single location. Compared to completion operations using conventional drilling rigs, this new technology would allow for simultaneous drilling, completion, and production operations for all wells at a well pad location, thus significantly reducing the timeframe to develop all wells at the well pad location. This is referred to as simultaneous operations[1] (SIMOPS). In general, clustered development using efficiency rigs would be used for the development phase of the proposed project because this approach:

[1] *Term is defined in the Glossary, Section 9.0.*

- Reduces the need for additional well pads, roads, and traffic
- Eliminates the need to reclaim and later re-disturb well pads because wells can be drilled with one rig visit
- Allows an area to be "drilled out" in less time with no need to drill the same number of wells over a several-year period in the same area
- Allows centralized production facilities[1] for collection of produced water and condensate[1]

The concept of multi-well drilling from a single location has been discussed at the local, state, and Federal levels over the past year, including with BLM.

2.2.3 DMGAP Comprehensive Plan

Table 2 presents the overall plan for well development in the DMGAP, identifying the specific temporal and spatial employment of the exploration phase and the development phase. This table presents the proposed drilling schedule for each well pad, as projected for the years 2007 through 2010. Williams proposes the following activities:

- Six well pads - exploration phase only
- Two well pads - exploration phase and development phase
- Two well pads - development phase only

Table 2. Projected Drilling Schedule for the Phased Development Process

Well Pad	Section	2007	2008	2009	2010	
PA 23-12	12	2 exploration		14 development		
PA 34-12	12	2 exploration		20 development		
W 37-1 (existing)	1		13 development			
W 34-2 (existing)	2		16 development			
PA 24-12	12		3 exploration			
Federal Rulison 14-95 (existing)	14		4 exploration			
SP 32-14	14			2 exploration		
SP 44-13	13				2 exploration	
SP 23-13	13				2 exploration	
SP 43-14	14				2 exploration	
Number of Wells Drilled per Year		**4**	**36**	**36**	**6**	**82**

[1] *Term is defined in the Glossary, Section 9.0.*

Table 3 presents a summary of the estimated surface disturbances that would result from implementation of the proposed action. For each project component the table presents:

- The total size of the working area, which is comprehensive in that it includes new long-term disturbance, new short-term disturbance, and further disturbance to areas of existing disturbance. The one exception is the existing pad PA21-2 because it is a facility that is currently in operation and no new construction would occur at this location. Therefore, the actual amount of new disturbance that is proposed is likely to be less than the total amount of disturbance presented in **Table 3**. Furthermore, **Table 3** presents the disturbance for new roads and new pipelines separately, but these components would be collated where practical; therefore, the actual amount of new disturbance that would result from implementation of the proposed action is likely to be less than the total amount of disturbance presented in **Table 3**. **Figure 1** depicts the working area of the pads.
- The long-term disturbance associated with the footprint, which could extend up to 35 years.
- The short-term disturbance that would be reclaimed after completion activities, within 1 to 2 years.

Discussions of the project components are presented in the sections that follow **Table 3**.

2.3 Construction, Maintenance, and Use of Access Roads

The DMGAP area is accessible from Parachute, Colorado by traveling approximately 3 to 4 miles east on Garfield County Roads 301 (Morrisania Mesa Road), 302 (Underwood Lane), and 309 (Rulison-Parachute Road) (**Figure 1**).

Figure 1 and **Table 3** present the road system in the DMGAP area under the proposed action. To the extent feasible, existing roads would be used to access the proposed well pad facilities. Williams proposes to construct 4.9 miles of new road to access the proposed well pad facilities. In addition, approximately 1.8 miles of existing roads may require upgrading or expansion, the extent of which would be determined after additional survey work has been completed.

Road construction would occur in a 50-foot wide easement. The access roads would have a 25-foot running width, including cuts and fills. Switchbacks and turnouts would be wider. All roads would be surfaced with gravel for the duration of production operations. Long-term land conversion would amount to 14.7 acres from the construction of new roads and 5.6 acres from the expansion of the existing 15-foot roads. Short-term disturbance (1 to 2 years) during road construction would be a maximum of 20.2 acres (**Table 3**).

The timing of road work would be dependent upon the drilling schedule (**Table 2**); roads would be constructed or upgraded periodically as needed to access well pads for drilling. Because the proposed action is phased development, for the DMGAP as a whole, road construction and upgrading would occur periodically throughout the 4-year drilling period.

[1] *Term is defined in the Glossary, Section 9.0.*

Table 3. Summary of Estimated Surface Disturbances										
Project Component	**Phase**	**Design and Construction Features**	**Drilling Features**	**Completion Features**	**Production Features**	**Working Area***		**Long-Term/Footprint****		**Short-Term***/ Interim Reclamation**
						Dimensions (feet)	**Disturbance (acres)**	**Dimensions (feet)**	**Disturbance (acres)**	**Disturbance (acres)**
Roads										
New roads and turnouts	Exploration and Development	25-foot average running surface	N/A	N/A	N/A	50 x 25,600	29.4	25 x 25,600	14.7	14.7
Existing road expansions/upgrades	Exploration and Development	Average current road width is 15 feet (4.1 acres)	N/A	N/A	N/A	50 x 9,700	11.1	25 x 9,700	5.6	5.5
Pads										
Existing well pad expansions (Federal Rulison 14-95)	Exploration	Current size: 1.4 acre. wellheads, separators, reserve pit.	10,000 gallons water/well	5-7 fracture stimulation stages/well, 170,000 gallons water/fracture stimulation stage, mobile service rig, pump trucks, sand trucks, frac tanks, mobile wireline trucks	1 separator per well, 1+ condensate tank/mineral interest, 2+ water tanks	200 x 300	1.4	150 x 150	0.5	0.9
Existing well pad expansions (W 34-2, W 37-1)	Development	Current size: 1.5 acre and 1.7 acre. wellheads, separators, cuttings trench	10,000 gallons water/well	SIMOPS, completion at remote frac site, Flowback Units	1 separator per well, 1+ condensate tank/mineral interest. Water to be piped to offsite water processing facility	300 x 560 x 2 pads	7.8	150 x 200 x 2 pads	1.4	6.4
New well pads (PA 24-12, SP 44-13, SP 23-13, SP 43-14, SP 32-14)	Exploration	Wellheads, separators, reserve pit	10,000 gallons water/well	5-7 fracture stimulation stages/well, 170,000 gallons water/fracture stimulation stage, mobile service rig, pump trucks, sand trucks, frac tanks, mobile wireline trucks	1 separator per well, 1+ condensate tank/mineral interest, 2+ water tanks per pad	300 x 200 x 5 pads	6.9	150 x 150 x 5 pads	2.6	4.3
New well pads (PA 23-12, PA 34-12)	Exploration and Development	Wellheads, separators, reserve pit for exploration, cuttings trench for development	10,000 gallons water/well	5-7 fracture stimulation stages/well, 170,000 gallons water/fracture stimulation stage; Exploration: mobile service rig, pump trucks, sand trucks, frac tanks, mobile wireline trucks; Development: SIMOPS, Flowback Units, mobile service rig, pump trucks, sand trucks, frac tanks, mobile wireline trucks;	Exploration: 1 separator per well, 1+ condensate tank/mineral interest, 2+ water tanks per pad; Development: 1 separator per well. Condensate and water to be piped to central production facility	300 x 560 x 2 pads	7.7	150 x 150 x 2 pads	1.0	6.7
Existing remote frac pad (NENW 2)	Development	Fracture stimulation equipment, frac tanks	N/A	Remote frac site servicing multiple well pads, temporary surface or buried high pressure frac pipelines, multiple frac tanks, rig, pump trucks, sand trucks	N/A	250 x 350	0[†]	250 x 350	0[†]	0[†]
New centralized collection facility (NENW 12)	Development	Tankage for condensate and water	N/A	N/A	Condensate tanks and water tanks sufficient to handle volume produced (estimated 8 condensate tanks and 4 water tanks)	400 x 600	5.5	400 x 600	5.5	0
Staging areas (7)	N/A	Reclaimed after construction of pipelines is completed	N/A	N/A	N/A	200 x 100 x 7 staging areas	3.2	0	0	3.2
Pipelines										

[1] *Term is defined in the Glossary, Section 9.0.*

Table 3. Summary of Estimated Surface Disturbances										
Project Component	**Phase**	**Design and Construction Features**	**Drilling Features**	**Completion Features**	**Production Features**	**Working Area***		**Long-Term/Footprint****		**Short-Term***/ Interim Reclamation**
						Dimensions (feet)	**Disturbance (acres)**	**Dimensions (feet)**	**Disturbance (acres)**	**Disturbance (acres)**
New gas pipelines and existing gas pipelines upgrades	Exploration and Development	Located adjacent to new access roads wherever practical; actual disturbance is likely to be less than presented	N/A	N/A	Gas lines installed to each well pad	50 x 22,800	26.2	0	0	26.2
Existing gas pipelines upgrades	Exploration and Development	Located adjacent to existing access roads	N/A	N/A	Gas lines that access pads W 37-1 and W 34-2	Collocated with road ROW; therefore, does not contribute to total acres of disturbance	N/A	N/A	N/A	N/A
Condensate pipelines	Development	Located adjacent to existing access roads; collocated with gas line	N/A	N/A	Condensate lines that terminate at centralized collection facility	Collocated with gas line; therefore, does not contribute to total acres of disturbance	N/A	N/A	N/A	N/A
Produced water pipelines	Development	Located adjacent to existing access roads; collocated with gas line	N/A	N/A	Produced water lines that terminate at centralized collection facility	Collocated with gas line; therefore, does not contribute to total acres of disturbance	N/A	N/A	N/A	N/A
Temporary frac water transfer lines	Exploration and Development	Located adjacent to existing access roads; temporary surface lines	N/A	N/A	Produced water and condensate lines that terminate at centralized collection facility	Collocated with road ROW; therefore, does not contribute to total acres of disturbance	N/A	N/A	N/A	N/A
Total Disturbance							**99.2**		**31.3**	**67.9**

* Working area is comprehensive in that it includes new long-term disturbance, new short-term disturbance, and further disturbance of areas of existing disturbance.

** Long-term disturbance could extend up to 35 years.

*** Short-term disturbance would be reclaimed within 1 to 2 years.

† Estimate includes new disturbance only because this is a facility that is currently in operation and no new construction would occur at this location.

[1] *Term is defined in the Glossary, Section 9.0.*

For well pads where both exploration and development are proposed, the road system used during the exploration phase would also be adequate for the development phase; no additional road work would be required when moving from the exploration phase to the development phase to access a given well pad.

Maintenance of the roads used to access well locations would continue until final abandonment and reclamation of the well locations, at which point the roads would also be reclaimed. A regular road maintenance program would include, but is not limited to blading, ditching, culvert installation and cleanout, weed control, and gravel surfacing where excessive rutting or erosion may occur. Roads would be maintained in a safe and usable condition. Access roads would be reclaimed in accordance with the BLM reclamation COA (Appendix to be completed with EA).

2.3.1 Estimates of Traffic and Work Force

Estimated traffic requirements for drilling and completion operations are shown in **Table 4** for the exploration phase (19 wells) and in **Table 5** for the development phase (63 wells). The "Trip Type" column lists the various service and supply vehicles that would travel to and from the well sites and production facilities. The "Round-Trip Frequency" column lists the number of trips. The figures provided in these tables are estimates. The level of drilling and production activity may vary over time in response to weather and other factors.

2.4 Pad Design, Construction, Restoration, and Abandonment

Figure 1 and **Table 3** present the proposed system of pads in the DMGAP area. The three main pad functions associated with the proposed project include:

- Well pads: consist of wellheads[1], separators[1], and temporary completion equipment (flowback units[1] and tanks)
- Frac pads: consist of sufficient space to temporarily hold equipment required to perform fracture stimulation[1] services
- Production pads: consist of any tankage required to hold produced water or condensate

Williams proposes to construct seven new well pads, all of which would also be on-site frac pads (**Table 3, Figure 1**). The working pad size includes the areas that would be used during construction, drilling, and completion activities. Efficiency rigs require a larger working pad size compared to conventional rigs to accommodate the equipment necessary to drill more wells in one location. The well pads at which only the exploration phase is proposed would be constructed to the size adequate to accommodate conventional rigs. The well pads at which both the exploration phase and development phase are proposed would ultimately be designed and built to a size that would accommodate efficiency drilling rigs, while keeping surface disturbance to a minimum at each well pad location. For the exploration phase at these well pads, the well pads may be built large enough to accommodate efficiency rigs, or the well pads may initially be built only to accommodate conventional rigs and then enlarged at a later date to prepare

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Table 4. Traffic Estimates for Exploration Phase Drilling and Well Completion for 19 Wells

Trip Type	Round-Trip Frequency
Drilling (1 conventional drilling rig, 8 well pads, 19 wells, 17 days per well, 323 days total)	
Drilling rig crews (1 rig, 2 crews/rig)	2/day
Conventional drilling rig move [a]	10/pad
Drill bit/tool delivery	1 biweekly
Mechanics/Welders	2/week
Supply delivery	4/week
Fresh water truck [b]	2/day
Fuel trucks	2/week
Wireline unit	2/well
Cement trucks and crew	4/well
Subtotal	**1,877 trips within 323-day period**
Completion (1 rig, 8 well pads, 19 wells, 4 days per well, 76 days total)	
Service rig (or coiled tubing unit or snubbing unit) [c]	4/well
Service rig crew	1/day
Wireline unit	6/well
Consultant	1/day
Frac/produced water trucks [d]	45/well
Pump trucks	6/well
Sand trucks	4/well
Equipment trucks (frac tanks)	32/pad
Equipment trucks (other equipment)	2/well
Testing and operations	8/well
Subtotal	**1,833 trips within 76-day period**
TOTAL	**3,710 trips**

[a] Four trucks and a crane would be required to move each rig to and from each well pad within the DMGAP. Unlike efficiency rigs, conventional rigs require some equipment to "skid" to the adjacent location on a pad. When drilling is complete on a pad, the rig would move to the next pad or outside the DMGAP.

[b] Williams contracts with trucking companies who have their own legal sources of water to provide fresh water for drilling purposes and dust control.

[c] During the completion process, any or all of these types of units may be used. The average use for all such units per well is noted.

[d] On average, a well will require 4,000 barrels of water for each fracture stimulation stage, and there may be as many as seven stages per well. This water is supplied by Williams' water recycling facilities located in the Grand Valley and Rulison Fields. The frac water is recycled and reused for subsequent wells. As much as 50 percent of the frac water is returned within 1 week; therefore, additional trucked water is needed to replenish. The number of water truck trips noted is an estimate for two wells on one pad with a 50 percent replenishment rate and subsequent trucking of water off the pad once the wells are fully completed.

[1] *Term is defined in the Glossary, Section 9.0.*

Table 5. Traffic Estimates for Development Phase Drilling and Well Completion for 63 Wells

Trip Type	Round-Trip Frequency
Drilling (1 efficiency drilling rig, 4 well pads, 63 wells, 12 days per well, 756 days total)	
Rig crews (1 rig, 2 crews/rig)	2/day
Efficiency drilling rig move [a]	16/pad
Drill bit/tool delivery	1/week
Mechanics	2/week
Supply delivery	4/week
Fresh water truck [b]	2/day
Fuel trucks	2/week
Wireline unit	2/well
Cement trucks and crew	4/well
Subtotal	**4,438 trips within 756-day period**
Completion on well pad site for well pads: PA 23-12 and PA 34-12 (1 rig, 2 well pads, 34 wells, 4 days per well, 136 days total)	
Service rig (or coiled tubing unit or snubbing unit) [c]	4/well
Service rig crew	1/day
Wireline unit	6/well
Consultant	1/day
Frac/produced water trucks [d]	45/well
Pump trucks	6/well
Sand trucks	4/well
Equipment trucks (frac tanks)	32/pad
Subtotal	**2,546 trips within 136-day period**
Completion on remote frac site[d] for well pads: W 34-2 and W 37-1 (2 pads, 29 wells, 4 days per well, 116 days total)	
Frac/produced water trucks [e]	• 45 to remote frac site/well • 0 to well pad
Pump trucks	• 6 to remote frac site/well • 0 to well pad
Sand trucks	• 4 to remote frac site/well • 0 to well pad
Equipment trucks (frac tanks)	• 32 to remote frac site/well • 0 to well pad
Testing and operations	• 0 to remote frac site • 2 to well pad/day
Subtotal	**2,987 trips within 116-day period**
TOTAL	**9,971 trips**

[a] Eight trucks and a crane would be required to move an efficiency rig to and from each well pad within the DMGAP area. Unlike conventional rigs, efficiency rigs do not require outside equipment to "skid" to the adjacent location on a pad. When drilling is complete on a pad, the rig would move to the next pad or outside the DMGAP area.

[b] Williams contracts with trucking companies who have their own legal sources of water to provide fresh water for drilling purposes and dust control.

[1] *Term is defined in the Glossary, Section 9.0.*

Table 5 Notes (Continued)

[c] During the completion process, any or all of these types of units may be used. The average use for all such units per well is noted.

[d] On average, a well will require 4,000 barrels of water for each fracture stimulation stage, and there may be as many as seven stages per well. This water is supplied by Williams' water recycling facilities located in the Grand Valley and Rulison Fields. The frac water is recycled and reused for subsequent wells. As much as 50 percent of the frac water is returned within 1 week; therefore, additional trucked water is needed to replenish. The number of water truck trips noted is an estimate for two wells on one pad with a 50 percent replenishment rate and subsequent trucking of water off the pad once the wells are fully completed.

[e] Assuming no water replenishment system in place.

the well pad for efficiency rig drilling. After completion operations, all of these pads would be reduced in size to a long-term footprint.

The proposed action also includes the use of three existing well pads (**Table 3, Figure 1**). Existing well pads W 37-1 and W 34-2 previously underwent exploration; therefore, only the development phase is proposed at these pads. These pads would be expanded to a working pad size that would accommodate an efficiency rig and after completion operations would be reduced in size to a long-term footprint that is equal to or less than the current pad size. These pads would be serviced by a remote frac site. The proposed activities at existing well pad Federal Rulison 14-95 are exploration via conventional drilling and on-site frac. This pad would be expanded to a working pad size that would accommodate a conventional drilling rig and after completion operations would be reduced to a long-term footprint that is equal to or less than the current pad size.

Additional proposed pads include one remote frac pad in the northern portion of Section 2 that would be used during the completion operations of the development phase and one centralized production facility in the northern portion of Section 12 that would be used for the life of the wells. Neither of these pads would be used as a drilling location (**Table 3, Figure 1**).

Each pad would be leveled using cut and fill construction techniques, where needed. The top 6 to 8 inches of soil (more if available) and associated vegetative material would be removed and stockpiled prior to constructing each pad. Stormwater controls would be installed on all pads, as needed.

For the exploration phase, one reserve pit[1] for drilling muds[1] would be used at each drilling location. The reserve pits would be designed and constructed according to BLM requirements. Williams uses water-based drilling muds that do not contain hazardous substances. Material safety data sheets[1] (MSDSs) would be available at each well pad location. The reserve pits would be open to allow for evaporation of pit fluids, as allowed under Federal and state regulations. Reserve pit fluids would be evaporated, removed, or solidified, and the pits would be closed as soon as practical but no longer than current regulations allow (typically within 1 year from the date drilling operations reached total depth).

A reserve pit is not required for efficiency rigs because they operate using a closed system. However, there is a need to dispose of drill cuttings[1]. Therefore, instead of a reserve pit, a cuttings trench[1] would be constructed. This trench is typically at the same location as the drilling rig and constructed large enough to handle all of the cuttings generated. All produced well

[1] *Term is defined in the Glossary, Section 9.0.*

cuttings would be disposed of in trenches specifically sized for their volume (approximately 385 cubic yards per well) with all stormwater controls specified by state and Federal regulations. In cases where the necessary volume is unavailable on site (i.e., due to unforeseen events such as bedrock that prohibits deep trenches), a backup site may be needed. This site would be constructed to meet all the applicable regulations.

With all pads combined, the proposed action would result in up to 11.0 acres of long-term (up to 35 years) disturbance from pads. With all pads combined, the proposed action would also result in up to 18.3 acres of short-term (1-2 years) disturbance from pads. Because the proposed action is phased development, for the DMGAP as a whole, pad construction and drilling would occur periodically throughout the 4-year drilling period. The timing of pad work would be dependent upon the drilling schedule (**Table 2**); pads would be constructed or expanded periodically as needed for drilling.

In addition to the pads discussed above, there are expected to be seven staging areas strategically placed throughout the DMGAP area to aid in construction of pipelines and associated facilities (**Table 3, Figure 1**). Local vegetation and soil characteristics at these locations would determine the activities required to clear the staging areas. In some cases vegetation and topsoil removal may be required. The disturbance (3.2 acres) would be short-term (less than 1 year) because each staging area would be reclaimed upon completion of the construction phase of the pipelines serviced by the staging area.

Williams would completely reclaim all disturbed areas that are not needed for production operations through the BLM's reclamation COA (Appendix to be completed with EA) and the interim and final reclamation procedures presented in Section 2.8 Best Management Practices, Design Features, and Mitigation Measures.

2.5 Drilling Operations

All wells would be directionally[1] drilled to locations within the Federal leases held by Williams (lease numbers COC 05173, COC 01524, COC 06934, and COC 06266B). **Figure 1** illustrates the boundaries of these leases.

Within this portion of the Piceance Basin, drilling wells from the surface to their total depth takes an average of 17 days using conventional rig technology and 12 days using efficiency rig technology.

Fresh water for use in drilling operations and dust control would be obtained from authorized sources, typically through contractors who have their own legal sources of water. Water would be trucked to the site. The actual volume of water used in drilling operations would depend on the depth of the well and any losses that might occur during drilling. Approximately 260 barrels of water (10,000 gallons) would be needed to drill each well, for a total of up to 820,000 gallons (2.52 acre-foot) of water for the proposed drilling operations. This estimate also includes any water that would be needed for dust control on access roads.

No oil or other oil-based drilling additives, chromium/metals-based mud, or saline mud would be used during drilling of the proposed wells. Only fresh water, biodegradable polymer soap,

[1] *Term is defined in the Glossary, Section 9.0.*

bentonite clay, and non-toxic additives would be used in the mud system. Any produced crude oil or condensate would be contained in on-site test tanks.

Depending on the location, each producing well would be drilled to an approximate depth of 7,000 feet to 10,000 feet (measured depth [MD]). Natural gas would be produced through perforations in the casing. The well control system would be designed to meet the conditions likely to be encountered in the hole and would conform to BLM requirements.

During the development phase, drill cuttings would be managed by burying them in the cuttings trench, as described above. Each well would generate approximately 385 cubic yards of cuttings. The cuttings are generally managed as they are generated so that once all the wells are drilled, all that remains is to cap the trench with native soils and recontour the area. If the size of the well pad is not sufficient to support a cuttings trench large enough to hold all of the cuttings, an off-site cuttings disposal site may be required.

2.6 Completion Operations

Completion operations are processes applied to the well bore after drilling has finished. These steps include running casing, perforating casing, and fracing, steps necessary to produce hydrocarbons from a well.

Fracture stimulation is a method for stimulating a rock formation next to a well bore to increase production of oil, gas, and other fluids from the rock formation. Fracture stimulation consists of pumping a water and proppant (sand) mixture at high rates and pressures into the rock intervals that contain natural gas. The water is produced back leaving the proppant behind to keep the small fracture open. A fracture stimulation stage[1] is the particular subsurface zone being fracture stimulated at any given time. Each proposed well would use approximately 170,000 gallons of water per fracture stimulation stage, and there would be five to seven fracture stimulation stages per well. The water used for completion operations would be recycled produced water from wells operated by Williams throughout the valley. It is not anticipated that other sources of water would be necessary.

2.6.1 Exploration Phase: Conventional Drilling

Fracture stimulation and other completion operations during the exploration phase would be conducted on-site at each well pad. The fracture stimulations are typically conducted without a service rig and consist of pump trucks, sand trucks, and frac tanks. Mobile wireline trucks would be used to set plugs between zones and to set plugs in the wellbore to isolate the stimulations. Once the wells have completed all of the fracture stimulations, a mobile service rig (or coiled tubing unit or a snubbing unit) would be used to drill out all the plugs, clean out the wellbore, and land the production tubing.

Completion operations are expected to average 20 to 25 days per well, which includes all of the time to fracture stimulate each zone, drill out the plugs, and install the production tubing. During this time, natural gas is expected to be sold instead of vented or flared, as it is anticipated that gas gathering lines would be in place prior to the completion. If not, the well may be shut in or the gas may be vented for up to 30 days or until the gas gathering line is in place, whichever is less.

[1] *Term is defined in the Glossary, Section 9.0.*

All water produced during this time would be recycled for use in subsequent fracture stimulations, and the condensate produced would be stored in tanks for sale.

2.6.2 Development Phase: Efficiency Drilling

Using SIMOPS, the time to complete a well drilled with an efficiency rig would be the same as with a conventional rig; however, drilling and completion operations would be done simultaneously. **Figure 2** illustrates the process of SIMOPS drilling, completion, and production. As drilling for one well completes, the drilling rig moves either laterally or down the cellar[1] to the next new well surface location. Once four drilled wells are exposed, completion procedures can begin on the exposed previously drilled well heads. Using SIMOPS, the completion operations do not need to wait until all wells have been drilled and the drilling rig moves off location.

Completion equipment would be located on the same pad as the drilling rig or at a centralized location, as noted in **Table 3**. Fracture stimulation during the development phase would be conducted at the well pad sites in Section 12 and at a proposed remote frac site for the well pads in Sections 1 and 2 (**Figure 1**).

Either temporary surface or buried pipelines would be used to transport completion fluids between the remote frac site and the well pad at which completion operations are being conducted.

Flowback fluids would be processed through Flowback Units[1] on the well pad to separate the sand from the gas and liquids and subsequently processed in a three-phased separator to separate the gas from the produced water and condensate. The gas would be metered and delivered to the gas gathering system. The water and condensate would be separated and sent to tanks. Produced water would be recycled for subsequent fracture stimulations or transported by truck or pipeline to approved collection facilities. Condensate would be tank gauged and sold via truck.

The location of the completion facilities would be finalized once the development phase is initiated, and the information would be provided in the PODs. Wherever feasible, completion operations would be conducted using existing disturbed areas. Pipelines would be located adjacent to existing access roads wherever practical. In the event that equipment or temporary surface lines would need to be located in previously undisturbed areas (as identified in the POD), Williams would consult with BLM to ensure all facilities are placed in locations that would not adversely affect resource concerns.

2.7 Well Production Facilities

Production facilities would be designed and installed to accomplish the following objectives:

1. Separate well stream fluids into manageable products (gas, condensate, and water) from each well individually.
2. Deliver each product to its ultimate destination. Natural gas would be delivered to the gas gathering system via pipeline. Condensate would be pipelined or trucked to a point at which it can be sold, and water would be transported via pipeline or truck to its next destination (either the Rulison Evaporation Facility or the site of future fracture stimulation staging areas).

[1] *Term is defined in the Glossary, Section 9.0.*

3. Accurately meter the volume of gas and condensate produced from each well/lease to assure mineral interest owners receive the correct value for these components. Each well can be controlled (choked) separately and production rates can be determined for each well every day. Natural gas would be metered prior to entering the gas gathering system. Condensate would be tank gauged or metered prior to sales.

To the extent feasible, Williams would consolidate the use of production facilities. The proposed system of gathering lines in the DMGAP is presented in **Figure 1** and **Table 3**, which consists of installation of new pipelines and upgrading of existing pipelines.

2.7.1 Exploration Phase: Conventional Drilling

During the exploration phase, the production equipment would be located on-site at each well pad and would consist of one separator per well, individual condensate tanks for each mineral interest, and two or more water tanks per pad (**Table 3**).

A gas gathering pipeline would be installed from each well pad site to transport gas to its final destination. The gas gathering pipelines would be constructed with steel pipe rated to handle the expected pressures and temperatures. This pipe would be buried where appropriate. Where possible, the gathering system would be located adjacent to access roads. Because the proposed action is phased development, for the DMGAP as a whole, installation of the gas gathering pipeline system would occur periodically throughout the 4-year period as pads are drilled and wells are brought on production.

During the exploration phase, installation of centralized production facilities is not anticipated; therefore pipelines to handle condensate and water are not expected to be in place initially.

Pipeline construction would occur within a 50-foot wide easement, which is the maximum anticipated surface disturbance from this activity. The proposed action includes approximately 22,800 feet of gas pipeline construction and upgrades, resulting in up to 26.2 acres of surface disturbance (**Table 3**). These impacts would be short-term, as pipeline corridors would be reclaimed to BLM specifications (Appendix to be completed with EA) as soon as practical after trenching and backfilling are complete (within 6 to 9 months). After construction, cut and fill slopes would be water-barred or regraded to conform to the surrounding topography and reclaimed to pre-disturbance appearance.

2.7.2 Development Phase: Efficiency Drilling

The equipment required for production during the development phase includes one separator per well (usually bundled into units that can handle four wells each), multiple water tanks, and individual condensate tanks for each mineral interest per well pad (**Table 3**). Prior to the drilling of wells by the efficiency rig, production facilities would be installed for all four of the wells planned for efficiency drilling. Installation of these facilities prior to the drilling of the wells is necessary in order to perform SIMOPS.

During the development phase, gas would be metered at each separator and delivered down steel gas pipelines, as described for the exploration phase.

[1] *Term is defined in the Glossary, Section 9.0.*

Once separated, the condensate would be trucked from an on-site condensate tank or conveyed down a dedicated condensate pipeline (installed in the same trench as the gas lines) to a central condensate tank facility, depending upon the location (as noted in **Table 3**). There would be a separate condensate pipeline for each mineral interest for royalty purposes. As the ownership of the condensate is the same for all of the wells sharing a condensate tank, individual production rates are not necessary for allocation of revenue; however, condensate production would be metered on each condensate convey line.

The produced water would be conveyed by a pipeline that terminates at a centralized collection facility (as noted in **Table 3**).

Condensate and water lines that are installed as part of this project would be collocated with the gas gathering system; therefore, these pipelines would not contribute to the total acres of surface disturbance. By transporting the condensate and water down pipelines to central locations, trucking to recover fluids (condensate and water) is substantially reduced.

No new compressor stations[1] are anticipated within the DMGAP.

2.8 Production Operations and Maintenance

Williams would operate all wells, pipelines, and ancillary production facilities in a safe manner, as set forth by standard industry operating guidelines and procedures. Routine maintenance of producing wells would be necessary to maximize performance and to recover all of the economic reserves possible. Critical data for each well would be accessible via telemetry with the host computer system in Williams' Parachute, Colorado office. Using this system, daily travel to each location is not necessary, as the parameters can be viewed and controlled remotely. Each well location would be visited several times per week to ensure that operations are proceeding in an efficient and safe manner. The visits would include checking separators, meters, valves, fittings, and on-site storage of produced water and condensates. The on-site equipment also would be routinely maintained, as necessary. Additionally, all roads and well locations would be regularly inspected and maintained to minimize erosion and assure safe operating conditions.

The exploration phase of the proposed action would be used to assess the productivity of the downhole resources accessed by each well pad and to select well pads for further development. Four well pads (PA 23-12, PA 34-12, W 37-1, and W 34-2) are proposed for both exploration and potential full development under this proposed action (**Table 2**). Six well pads (PA 34-12, Federal Rulison 14-95, SP 32-14, SP 44-13, SP 43-14, and SP 23-13) are proposed for solely the exploration phase under this proposed action (**Table 2**). Wells may be plugged and abandoned and well pads reclaimed if the wells are dry or non-producing. Other well pads may be selected for further development, which would be analyzed in a subsequent NEPA analysis.

2.9 Best Management Practices, Design Features, and Mitigation Measures

This section presents BMPs, design features, and mitigation measures that would be incorporated during implementation of the proposed action to minimize impacts to environmental or natural resources. Measures to be incorporated are also presented in the Master APD (Williams 2006).

[1] *Term is defined in the Glossary, Section 9.0.*

2.9.1 General

- Williams would implement BMPs consistent with its environmental programs and in accordance with recommended state and Federal guidance and regulations. Wherever feasible, existing disturbed areas would be used to the maximum extent practical.
- Any spills or releases of regulated wastes or materials would be investigated, responded to, and remediated in accordance with BLM, Colorado Oil and Gas Conservation Commission (COGCC), and Colorado Department of Health and Environment (CDPHE) regulations and guidance.

2.9.2 Construction

- Well pad locations, access roads, and ancillary facilities would be located, constructed, and maintained to avoid or minimize disturbance to natural and cultural resources, including perennial and intermittent streams, wetlands, and wildlife.
- All well pads, access roads, and ancillary facilities would be located in such a manner as to avoid or minimize wildlife habitat fragmentation.
- New roads would be constructed and existing roads maintained in accordance with the minimum standards for a BLM Resource Road, as outlined in BLM Manual 9113, and construction details outlined in the COAs.
- For all construction activities, stormwater controls would be placed to control erosion and sediment and materials runoff, in accordance with BLM requirements and state (CDPHE) stormwater regulations, permits, and plans.
- All construction activities that may affect "waters of the United States" as defined by Federal regulation would be evaluated to determine applicability of the U.S. Army Corps of Engineers (USACE) 404 permitting process, including Nationwide Permits.
- Water free of unacceptable contaminants, substances, or materials would be used for dust abatement, where deemed necessary. This water would be obtained from authorized sources, typically through contractors who have their own legal source of water.
- Signs would be posted as required by BLM to control traffic hazards and speed.

2.9.3 Drilling and Completion Operations

- All materials used for drilling and completion operations would be managed to avoid or minimize the potential for an-offsite release. This may include berms, tarps, diversion ditches, and other acceptable methods. During the time that reserve pits are open, the pits would be closed off from wildlife and livestock by two strands of barbed wire above a woven wire fence.
- Water-based drilling muds would be used during the drilling process. MSDS sheets would be maintained on-site for both drilling and completion materials.
- All non-hazardous waste materials would be disposed of as required by state and county regulations.
- Closed loop drilling mud systems would be used with efficiency rigs. If reserve pits are used to contain fluids, they would be evaluated under Williams' Migratory Bird

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Management Plan to determine the need for netting or other exclusionary methods to protect wildlife.

- Completion fluids would be recycled as much as possible on the same location as the frac pumps to minimize trucking.

2.9.4 Production Equipment and Pipelines

- Pipelines would be routed to avoid wetlands, wildlife, or other sensitive areas to the greatest extent practical. Topsoil and overburden material would be stockpiled and segregated.
- To minimize surface disturbance, wheel trenchers (ditchers) or ditch witches would be used where possible to construct pipeline trenches. Track hoes or other equipment would be used where topographic or other factors require their use.
- If trenches greater than 0.25 mile in length are open for the installation of pipelines, Williams would consult with BLM to determine the need for plugs and access bridges to allow livestock and wildlife to cross the trench.
- Generally, pipelines would be reclaimed within 6 to 9 months with BLM prescribed seed mixes on Federal lands, and landowner prescribed seed mixes on private lands.

2.9.5 Production Operations and Maintenance

- Production equipment would be equipped with solar panel-powered remote communications to monitor gas, water, and condensate levels so as to minimize traffic to and from well pads. Wherever possible equipment would be clustered in a single location.
- Following development of all wells within a prescribed area, gates and fences would be installed to allow for only required traffic to maintain production equipment and allow a workover rig every few years as dictated by maintenance needs. Public access would not be allowed.
- All tanks would be managed in accordance with Federal Spill Prevention Countermeasures and Controls (SPCC) and BLM regulations, including Onshore Order No. 7, as applicable.

2.9.6 Interim Reclamation

After completion activities, Williams would reclaim all disturbed areas not needed for production. The areas that would undergo interim reclamation are presented in **Table 3** as short-term surface disturbance.

- Within 1 year of well completion, Williams would stabilize the disturbed area by recontouring, mulching, providing run-off and erosion control, seeding with BLM-prescribed native seed mixes (or sterile non-native grasses for seeding of topsoil piles), and conducting weed control, as necessary.

[1] *Term is defined in the Glossary, Section 9.0.*

2.9.7 Abandonment

Upon abandonment, each borehole would be plugged and abandoned and the associated surface equipment would be removed. Subsurface pipelines would be purged and plugged at specific intervals. A Sundry Notice would be submitted by the operator to the BLM that describes the engineering, technical, or environmental aspects of final plugging and abandonment. This notice would describe final reclamation procedures and any mitigation measures associated with the final reclamation performed by the operator. The BLM and 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.

2.9.8 Final Reclamation

All surface disturbances would be reclaimed in accordance with the GSEO reclamation policies, including the COAs in (Appendix to be completed with EA) and the Noxious and Invasive Weed Management Plan for Oil and Gas Operators (USDI 2007). Reclamation would include the following objectives:

- Recontour all disturbances to approximately the topography that existed prior to construction, and re-spread topsoil.
- Restore primary productivity of each site and establish diverse native vegetation that provides for natural plant and community succession.
- Establish native vegetation that is a vigorous and self-sustaining stand of desirable native plant species resistant to the invasion of noxious or undesirable species.
- Noxious weeds and other undesirable plant species inadvertently introduced due to soil disturbance during construction activities would be monitored and treated over the life of the project by methods approved by the Authorized Officer. Any herbicides needed for the control of noxious weeds and other undesirable species would be identified in a Pesticide Use Permit (PUP). The PUP would be placed on record with the BLM.
- In the long-term, reclaimed landscapes should have characteristics that approximate the original visual qualities and plant species composition of the surrounding area.

2.9.9 Big Game Habitat Enhancements

Within the DMGAP project area, openings/meadows within pinyon-juniper woodlands provide critical foraging habitat for deer and elk during winter. These openings, which are often dominated by decadent sagebrush, are slowly being replaced by young juniper. As the landscape loses this patchwork quality, the healthy balance (i.e., forage to cover) of habitat types is lost, and the overall value of the area to wildlife is diminished.

Williams, in conjunction with BLM and the Colorado Division of Wildlife (CDOW), proposes to contribute to the improvement of the habitat through the implementation of an enhancement plan aimed at restoring a multi-age sagebrush community and increasing the diversity and abundance of native grasses and forbs in the DMGAP area. Williams proposes to accomplish this by:

- Promoting regrowth of sagebrush within identified openings in pinyon-juniper woodlands present on the lower slopes of the DMGAP project area. This objective would be achieved by removing in-growth of young juniper and mowing unproductive decadent growth of sagebrush. Where practical, broadcast seeding of native grass species within

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these treated areas would be used to inhibit growth of cheat grass and allow reestablishment of native species.

- Where dense stands of gambel oak and other species of the mountain shrub community are encountered, mowing and/or hydro-axing of old-growth would be utilized to encourage regrowth of understory species and provide enhanced access for big game.

Nine irregularly shaped areas, totaling approximately 108 acres, are proposed for treatment (**Figure 3**). In areas degraded by encroaching pinyon-juniper, removal of trees would approach 100 percent and approximately 20-25 percent of decadent sagebrush would be mowed. In areas dominated by decadent sagebrush, approximately 40-60 percent would be mowed. Approximately 25-50 percent of oak brush would be mowed in treatment areas where dense stands of this vegetation type prevent the growth of herbaceous species. In some cases, large patches of existing vegetation would be left for cover.

Treatments would emphasize the creation of diverse edge patterns along the perimeter of each treatment area to create mosaic patterns. Borders of treatment areas would be irregular, with edges that "feather" from treated to untreated areas. Project timing would consider precipitation, temperature, land use including natural gas development, as well as seasonal impacts to wildlife that use the project area.

If needed, the treatment areas would be seeded to further promote the establishment of native species. Seed mixtures would include a mix of native species occurring on the site, whenever possible. Non-native species would not be used except where no appropriate native plants are available. If non-native species are used, they would be non-competitive and non-invasive.

In addition to the habitat treatments, Williams proposes to limit activity associated with the developmental aspects of the proposed action by:

- Reducing human disturbance in important habitat areas during critical times of the year by installing gates and closing roads,
- Using telemetry to collect well production data, and
- Accessing well site locations during the times of the day when wildlife is not likely to be present in the area.

The proposed habitat improvements would be carried out over multiple years as pad development occurs. This approach would allow monitoring and, if needed, adjustments necessary to achieve desired outcomes. Initial improvements would occur during the late summer and fall of 2007. Reductions in access would occur as practicable and other limitations on activity in the area would be implemented as standard operating procedures.

3.0 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 all of the APDs associated with the proposed action. All of the proposed well pads require Federal approval prior to implementation because all are located on Federal surface. For the purpose of the following comparative analysis, under the no action alternative the DMGAP would undergo

[1] *Term is defined in the Glossary, Section 9.0.*

none of the development as described for the proposed action, including activities associated with pads, roads, pipelines, and staging areas. However, additional natural gas development could occur on private lands within the DMGAP area under APDs approved by COGCC, and other forms of surface disturbance could occur within the DMGAP area.

4.0 ALTERNATIVES CONSIDERED DURING THE DEVELOPMENT OF THE DMGAP

An alternative to the proposed action is considered reasonable if it is feasible and would achieve the purpose and need. This section describes the alternatives that were considered but eliminated from the DMGAP. Section 4.1 presents modifications that were made to the proposed project components as a result of consultation with resource specialists. Evaluation during the planning process determined that the components initially proposed did not sufficiently address the relevant resource issues. Similarly, Section 4.2 presents alternative access routes that were evaluated as part of the planning process but were not included in the plan because they did not meet the objectives of the proposed action. Alternative 4 was selected as the preferred access route alternative, and is included as part of the proposed action. The alternative presented in Section 4.3 was not included because it is not considered to be a practical option.

4.1 Project Component Modifications

The proposed locations of the various project components, including pads, roads, and pipelines, reflect the results of field visits conducted by BLM, Williams, and subcontractors to assess proposed well pad layout, proposed access routes and pipelines, erosion control, and reclamation[1] potential. The primary purpose of the field visits was to assess potential resource impacts associated with the implementation of the proposed action, and revisions to the design of the proposed facilities were made to minimize potential impacts. This section presents a summary of the modifications made to the proposed action based on BLM comments. In addition, specific locations for some of these components may also be updated in required PODs and as stipulated in the APD.

Notable modifications include the following:

- Pads, roads, and pipelines were relocated away from known cultural sites given buffers provided by BLM.
- Pads, roads, and pipelines were relocated away from known raptor nests.
- Two pad sites were moved to reduce visual impacts.
- Roads were rerouted to avoid and reduce visual impacts.
- Roads were rerouted to minimize impacts to riparian areas and minimize the associated impacts on big game.
- Pipelines were collocated and aligned with roads wherever possible to minimize surface disturbance.
- One pad was moved to avoid steep slope and erosion concerns.
- Wells were consolidated to eliminate one drilling pad.
- A consolidated tank battery was placed on private land to avoid Federal land.

[1] *Term is defined in the Glossary, Section 9.0.*

4.2 Access Road Alternatives

Several alternative access routes were evaluated to meet the objectives of the proposed action. Access roads within the DMGAP area were selected based upon the following criteria:

- Use existing disturbance, if possible.
- Meet maximum grade limit of 10 to 12 percent.
- Accommodate pipelines and pipeline routes so as to deliver completion fluids and produced fluids to centralized locations as much as practical.
- Avoid areas of concern (cultural or paleontological sites, threatened and endangered species, BLM sensitive species, wildlife impacts, visual resources).
- If unable to avoid areas of concern, select the route that can be best mitigated to minimize the impact.
- All minerals in the DMGAP area are owned by the BLM; therefore, the disturbance should remain on BLM surface, where practical, to avoid economically adverse costs from private parties with no share of the mineral interest.

Four alternative access routes were evaluated to meet the objectives of the proposed action and the criteria described above:

Alternative 1: Use existing road from CR 302 to BLM tower.

This road has a grade of 12 to 22 percent, which is too steep. In order to develop an access route from this direction, the road would have to be lengthened significantly to get to an acceptable 10 percent grade. This eliminates the opportunity to use the existing disturbance in this area.

Alternative 2: Develop new road from Section 11 into Section 14 utilizing existing disturbance in Section 11.

This route would require at least three switchbacks from SW Section 11 to reach a point from which to access the proposed pad sites in Section 14 and 13 and maintain a maximum grade of 10 to 12 percent. There are three primary concerns with this route: 1) the surface in Section 11 is privately owned, and the minerals in Section 13 and 14 are owned by the BLM; 2) the mineral leases in Section 11 are pooled but not operated by Williams, and therefore Williams has little to no bargaining position to negotiate the construction of a road; and 3) these switchbacks could pose a visual concern.

Alternatives 3a, 3b, and 3c: Develop new road from CR 302 in SE Section 15 or NW Section 23 to a point from which to access the proposed pad sites in Sections 13 and 14.

Several routes were explored to develop a viable access road from the south and still meet the objectives. Only one of these alternatives met the maximum grade objective; however, operational concerns arose. The proposed development calls for centralizing production facilities in the northern half of Section 12 because this is near existing infrastructure (gas gathering system, water management system, and access roads). Developing the access road to the well sites located in Sections 13 and 14 from the south would then require additional infrastructure to be built near CR 302 where none exists now. This would lead to greater impacts than if the access road were developed from the north.

[1] *Term is defined in the Glossary, Section 9.0.*

Alternative 4: Develop new road linking the proposed development and existing infrastructure in Section 12 into Section 13 or 14.

A route was identified that: 1) best met the criteria for maximum grade; 2) accommodated pipelines and other infrastructure; 3) avoided known cultural and paleontological sites; and 4) avoided threatened or endangered species.

Of these alternatives, Alternative 4 was selected to be incorporated into the proposed action because it best met the criteria presented above.

4.3 Development via Conventional Drilling

An alternative to the proposed action could include conducting all well development via conventional drilling instead of using efficiency drilling. This alternative is not considered to be a practical option. Using conventional drilling technology, up to eight wells can be drilled at a single well pad, whereas, using efficiency drilling technology, up to 22 wells can be drilled at a single well pad. Development is proposed in Sections 1, 2, and 12 using four well pads. To fully implement the proposed development with the use of solely conventional rig technology, at least three more well pads would be required and possibly more depending upon topography, access, and other on-site conditions. In addition to the long-term disturbance that would result from these additional pads, this alternative would also require more road construction and pipeline construction.

SUMMARY OF LEASE AND GRANT STIPULATIONS

The Federal leases within the DMGAP area were all issued prior to any NEPA regulations and stipulations. Their effective lease dates are as follows: COC 01524 - May 1951, COC 06934 - February 1955, COC 05173 - January 1953, and COC 06266 - January 1955. Although no special stipulations or notices are included on the leases, any protective measures deemed appropriate by the BLM could be applied to developments on these leases through the application of Conditions of Approval (COAs) on individual APDs.

5.0 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 (RMP; USDI 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 (SEIS; USDI 1999b).

Decision Number/Page: Record of Decision, Glenwood Springs Resource Management Plan Amendment, November 1991, page 3; Record of Decision, Glenwood Springs Resource Management Plan Amendment, March 1999, page 15 (USDI 1999a).

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

[1] *Term is defined in the Glossary, Section 9.0.*

"In areas being actively developed, the operator must submit a Geographic Area Proposal (GAP) that describes a minimum of 2 to 3 years activity for operator controlled leases within a reasonable geographic area" (USDI 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.

6.0 REFERENCES

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7.0 GLOSSARY

Application for a Permit to Drill (APD): An application document submitted to the Bureau of Land Management (BLM) for each well or well cluster.

Best Management Practice (BMP): A standard practice in developing leases that is a measure or procedure to avoid or mitigate anticipated impacts to resources or other land uses.

Cellar: A pit in the ground to provide additional height between the rig floor and the well head to accommodate the installation of blowout preventers and other equipment necessary for safe drilling operations.

Centralized production/collection facility: A facility to which produced water and condensate are conveyed via pipeline and collected.

Completion (operations): Processes applied to the well bore after drilling has finished. These steps include running casing, perforating casing, and fracing, steps necessary to produce hydrocarbons from a well.

Compressor station: Facility that moves natural gas through transmission lines or into storage by creating pressure differentials.

[1] *Term is defined in the Glossary, Section 9.0.*

Condensate: Liquid hydrocarbons separated from gas production.

Condition of Approval (COA): Site-specific COAs may be attached to APDs (see above) at the time of actual lease development. As appropriate, the BLM will add COAs to mitigate environmental consequences of the proposed action or to ensure compliance with applicable rules, regulations, and BMPs (see above).

Conventional (drilling, rig): A traditional drilling rig designed to drill one to eight wells per well pad. These rigs are generally easier/quicker to transport between drilling sites but have a larger footprint than efficiency rigs.

Cuttings trench: A location used to dispose of drill cuttings.

Development (well): Well drilled after exploration wells have been completed and produced. Well drilled to a known producing formation in a previously discovered field.

Directional (drilling): A method of drilling by which the well bore is steered to a location away from the surface location. This allows multiple wells to be drilled from one well pad.

Downhole: Refers to equipment or operations that take place down inside a borehole.

Drill cuttings: Rock fragments produced by drilling.

Drilling (operations): Drilling is the process of penetrating rock formations with a drill bit from the surface to a target formation below the surface.

Efficiency (drilling, rig): A drilling rig specifically designed to drill multiple wells (up to 22) and allows for Simultaneous Operations (see below). The time to drill and complete wells with efficiency rigs is greatly reduced from using conventional rigs.

Environmental Assessment (EA): A NEPA (see below) document prepared to determine if a proposed action or alternative will significantly affect the quality of the human environment. If the impacts are determined to be insignificant, a Finding of No Significant Impact (FONSI) is prepared and is made a part of the decision. If the impacts are determined to be significant, an environmental impact statement (EIS) must be prepared.

Environmental Impact Statement (EIS): A NEPA (see below) document prepared when the impacts of a proposed action will significantly affect the quality of the human environment.

Exploratory/exploration (well): An well drilled for the purpose of securing geological or geophysical information to be used in the exploration or development of oil, gas, geothermal, or other mineral resources.

Flowback Unit: A series of pressure vessels designed to separate solids (sand) and liquids (water and condensate) from the gas stream during the well completion process. This allows for the sale of gas during this period instead of venting it to the atmosphere.

Frac Pad: A surface location with sufficient space to temporarily hold equipment required to perform fracture stimulation services.

Fracture Stimulation: A method for stimulating a rock formation next to a well bore to increase production of oil, gas, and other fluids from the rock formation.

Fracture Stimulation Stage: The particular subsurface zone being fracture stimulated at any given time.

Gathering (line, system): Pipeline that transports oil or gas from a central point of production to a transmission line or mainline.

[1] *Term is defined in the Glossary, Section 9.0.*

Material safety data sheet (MSDS): A compilation of information required under the OSHA Communication Standard disclosing the identity of hazardous chemicals, health and physical hazards, exposure limits, and precautions.

Mud: Drilling fluid used to lubricate the drill string, line, walls of the well, flush cutting to the surface, and create enough weight to prevent blowouts.

National Environmental Policy Act (NEPA): NEPA assures that the BLM (and other federal agencies) will consider the impact of an action on the human environment before decisions are made and the action is taken. It requires that NEPA documents concentrate on issues that are significant to the action in question. The NEPA process is intended to help public officials make better decisions based on an understanding of environmental consequences, and take actions that protect, restore, and enhance the human environment. When an activity or action is proposed on BLM-administered public lands in Colorado, BLM conducts an interdisciplinary review of the environmental effects of the proposal so that the relevant environmental information is available to citizens and public officials.

Plan of Development (POD): A document providing detailed information for construction, drilling, and well field operations. Submitted to BLM with the APD.

Production (operations): Production is the process of bringing produced fluids/gases up the well bore for transportation via pipelines to central collection facilities.

Production Pad: A surface location which consists of sufficient tankage to manage water and condensate production.

Reclamation: The process of restoring a disturbed area to a more natural state.

Remote frac: A situation in which completion equipment and operations are located off-site from the drilling operations.

Reserve pit: Pit used to collect spent drilling fluids, cuttings, and wash water during drilling operations.

Resource Management Plan (RMP): A BLM planning document that presents systematic guidelines for making resource management decisions for a resource area. An RMP is based on an analysis of an area's resources, their existing management, and their capability for alternative uses. An RMP is issue-oriented and developed by an interdisciplinary team with public participation.

Separator (separation unit): Equipment that separates well stream fluids into manageable products (gas, condensate, and water).

Simultaneous Operations (SIMOPS): The process of performing several different tasks on multiple wells from one pad at the same time. For example, efficiency rigs are designed for SIMOPS where the rig can be drilling a well while other wells are undergoing completion operations, and other wells are actually producing – all from one pad at the same time.

Staging area: A location set up in the project area where resources can be placed to aid in construction of pipelines and facilities.

Well: A bored, drilled, or driven shaft, or a dug hole below the earth's surface whose purpose is to reach underground water or hydrocarbon (oil or gas) supplies, or to store or bury fluids below ground.

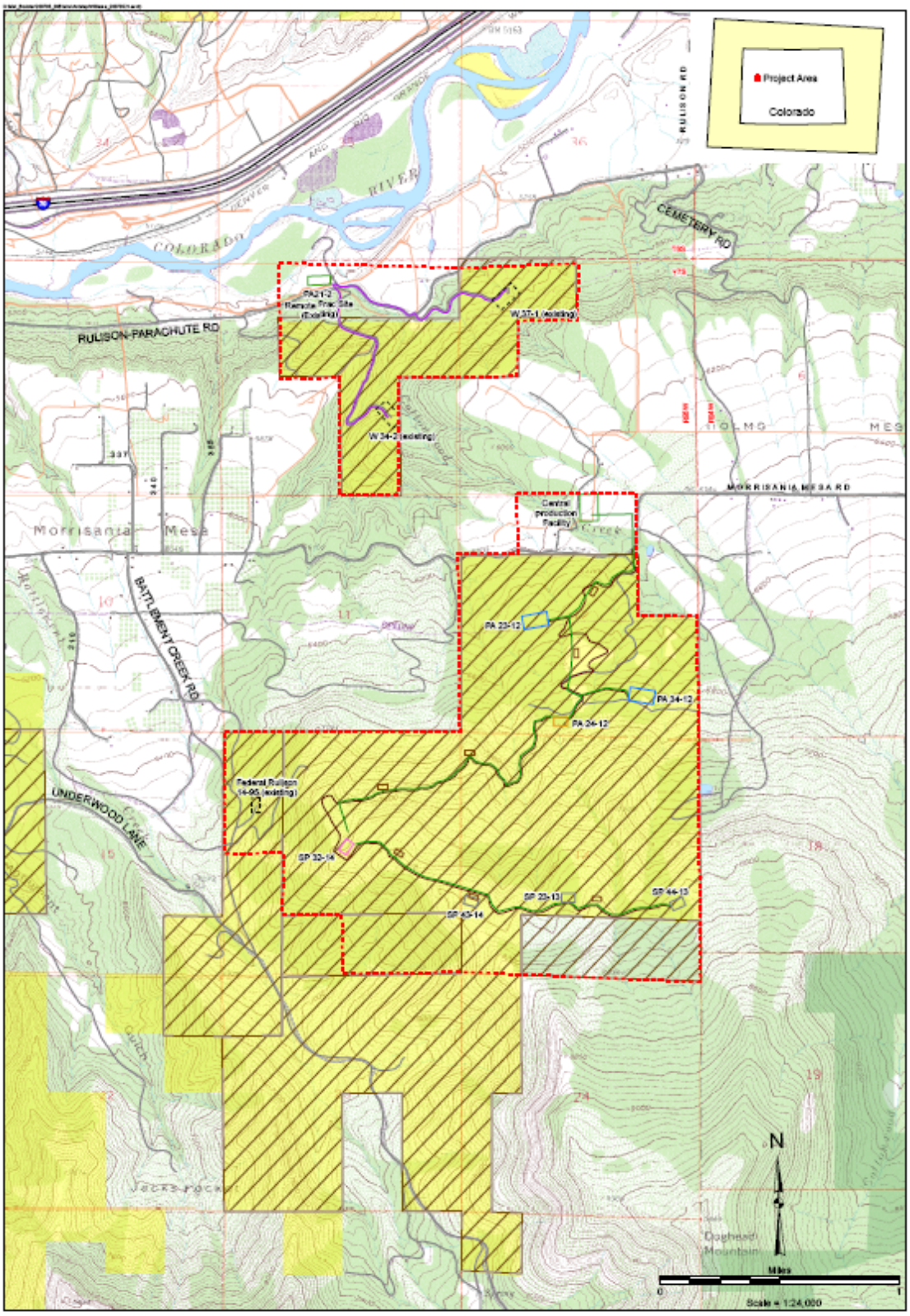
Wellhead: The wellhead consists of the pieces of equipment mounted at the opening of the well to regulate and monitor the extraction of hydrocarbons from the underground formation.

[1] *Term is defined in the Glossary, Section 9.0.*

Well Pad: A surface location from which wells are drilled, which consists of wellheads and separators.

[1] *Term is defined in the Glossary, Section 9.0.*

FIGURES



June 2007

Highways
Other Road
County Roads
Pipeline

Proposed/Existing Pad
Existing Pad
2007
2008
2009
2010

Offsite Facility
Proposed Staging Area (Pipeline Construction)
Proposed Frac Line
Proposed Pipeline
Proposed Road

Federal Mineral Lease
DMGAP
Surface Ownership
BLM
USFS

FIGURE 1
DOGHEAD MOUNTAIN GAP
EA PROPOSED ACTION
WILLIAMS PRODUCTION

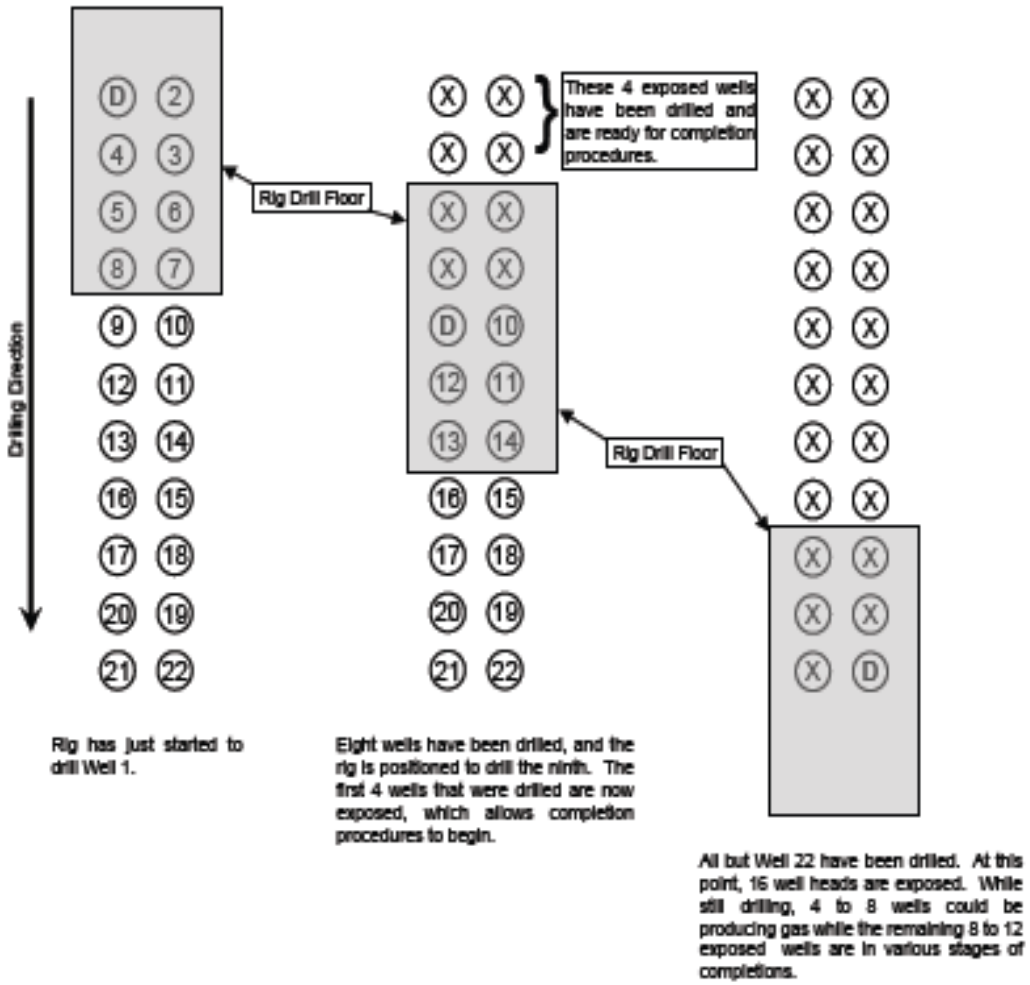


Figure 2 - SIMOPS Drilling, Completing, and Producing Williams Production – Parachute, CO.

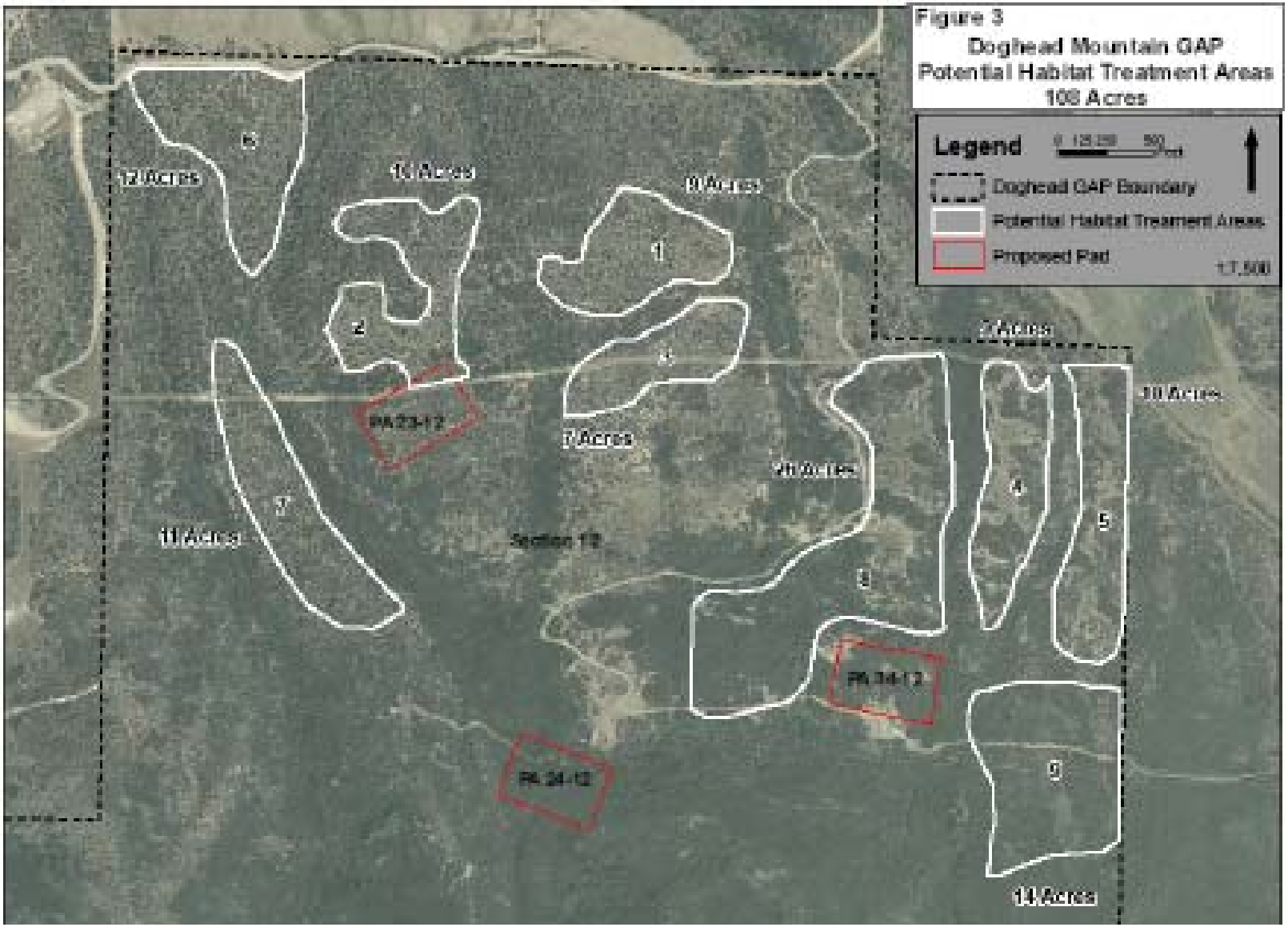


Figure 3
Doghead Mountain GAP
Potential Habitat Treatment Areas
100 Acres
Legend
Doghead GAP Boundary
Potential Habitat Treatment Areas
Proposed Pad
1:7,500
12 Acres
10 Acres
9 Acres
7 Acres
10 Acres
11 Acres
14 Acres
Section 19