

## **Appendix R**

### **Bureau of Land Management Master Leasing Plan Policy and Description of Leasing Analysis**



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## CHAPTER 1. – INTRODUCTION

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The Master Leasing Plan (MLP) policy was initiated in May 2010 through the Bureau of Land Management (BLM) Washington Office's Oil and Gas Leasing Reform Instruction Memorandum (IM) 2010-117 to provide for a proactive approach to planning for oil and gas development when changing circumstances, updated policies, and new information warrants taking a more focused look at resource management plan decisions pertaining to oil and gas leasing and post-leasing development of an area.

The BLM, with the U.S. Forest Service (USFS), has prepared a Proposed Land and Resource Management Plan (LRMP) and Final Environmental Impact Statement (FEIS) for the Tres Rios Field Office (TRFO), which includes oil and gas leasing analysis. The Draft LRMP and Environmental Impact Statement (EIS) were published in December 2007 with a 120-day comment period. Additionally a Supplement to the Draft EIS was published in August 2011 with a 90-day comment period. The Supplement was needed to disclose increased development projections associated with the potential for shale gas development that was identified by industry within the planning area. The Supplement also included a more detailed air quality model and analysis. During the comment period for the Supplement to the Draft EIS, the comments requested a MLP be considered for the Paradox Basin (which includes a large amount of National Forest System (NFS) lands and private minerals within the proposal).

As explained herein, although the LRMP area does not meet the criteria for preparation of an MLP, the BLM did consider the MLP guidance in finalizing the LRMP to ensure consistency with the MLP policy. The MLP policy does not apply to NFS lands; therefore, this appendix describes the applicable BLM-specific oil and gas analysis in the LRMP.

BLM IM WO-2010-117 lists criteria to be considered. Specifically, an MLP is required when all four of the following criteria are met:

- A substantial portion of the area to be analyzed in the MLP is not currently leased.
- There is a majority federal mineral interest.
- The oil and gas industry has expressed a specific interest in leasing, and there is a moderate or high potential for oil and gas confirmed by the discovery of oil and gas in the general area.
- Additional analysis or information is needed to address likely resource or cumulative impacts if oil and gas development were to occur where there are:
  - multiple-use or natural/cultural resource conflicts;
  - impacts on air quality;
  - impacts on the resources or values of any unit of the National Park System, national wildlife refuge, or USFS wilderness area, as determined after consultation or coordination with the National Park Service (NPS), the U.S. Fish and Wildlife Service, or the USFS; or
  - impacts on other specially designated areas.

The BLM also has the discretion to complete an MLP for areas that do not meet the MLP criteria. The MLP process entails analyzing likely development scenarios and varying levels of protective design features and mitigation measures in a defined area at a less site-specific level than a master development plan that has been fully defined by an operator.

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## CHAPTER 2. – BUREAU OF LAND MANAGEMENT OIL AND GAS ANALYSIS

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Chapter 3 of the FEIS documents the environmental analysis of five alternative scenarios for oil and gas leasing in the planning area. Resources that may be impacted by leasing and subsequent projected development of such leases include ecosystem components, such as soils, forested vegetation, and wildlife, as well as land uses and values such as domestic livestock grazing, timber, recreation, cultural/heritage resources, scenic byways, etc. The social and economic impacts of oil and gas development to surrounding communities and governments are also evaluated.

Approximately 79% of the Northern San Juan Basin (NSJB), is fully leased and developed. Within the NSJB, the remaining question is how to condition further development of existing leases as additional wells are proposed. Anticipated development could involve constructing additional wells on existing, expanded well pads. The analysis of NSJB development and the relation to the revised LRMP decisions is also analyzed.

Another area with low to moderate oil and gas potential is the San Juan Sag. The BLM projects that one to two exploratory wells would be requested annually over the life of the LRMP and that there would be minor interest in leasing in the San Juan Sag. Additionally, only about 14% of the mineral estate is federally owned.

The TRFO identified and analyzed Paradox Leasing Analysis Area (PLAA) because it contains the high and moderate potential areas, areas of known (i.e., producing) oil and gas development, areas where industry has expressed interest, and areas where oil and gas development potential exists. Within the PLAA there are multiple ownerships; however, only the BLM mineral estate acreage is included in this appendix and used to address the MLP four criteria and concerns raised in the external MLP. The analysis done in this document is based on BLM and split estate mineral acreage only and does not include USFS-administered lands. Any reference to “federal minerals” in this appendix will refer to BLM surface and private surface with federal minerals.

In November 2011, the Wilderness Society, the San Juan Citizens Alliance, and Rocky Mountain Wild requested that the BLM and USFS prepare a Paradox Basin MLP. The boundary and overall acreages of the externally proposed MLP area differ significantly from those in the PLAA. The difference in acreage is attributed to their proposal including private mineral estates and NFS lands.

## **2.1 Paradox Leasing Analysis Area**

### ***2.1.1 Criterion #1: A substantial portion of the area to be analyzed in the MLP is not currently leased.***

The BLM federal mineral estate (BLM surface and private surface with federal minerals) in the PLAA includes 618,061 acres. Of the BLM federal mineral estate, 48% is already leased and 53,933 acres (or 9%) would not be available for lease. Currently there are 317 active leases in the PLAA. Figure R.3 depicts the lands that are not available for lease (figures provided at end of Appendix R). The areas not available for lease include the wilderness study areas (WSAs) within the PLAA and portions of the Dolores River Canyon (specifically the wild segments of the Dolores River recommended for Wild and Scenic River status). Considering what is already leased and the acres that would not be available for lease, the remaining acres available for lease within the PLAA total 269,226 or 44%. Additionally, due to unfavorable geologic conditions, some of the remaining acreage would be not desirable for leasing.

Figure R.1, shows in general that the leased minerals of the Paradox Basin are generally contiguous. Those areas that remain unleased as of this analysis do occur within the high to moderate hydrocarbon potentials.

These 269,266 acres of unleased land are generally associated with: 1) deeply incised, extremely steep river canyon corridors where rugged topography inhibits industry access (the Dolores Canyon corridor in Dolores and San Miguel Counties and the Summit Canyon corridor in San Miguel County); 2) lands along the axis of northwest-southeast-trending synclines with poor hydrocarbon trap configuration (Dry Creek Basin and Disappointment Valley areas of San Miguel County); and, lastly, 3) areas between existing fields where previous leased acreage has expired due to unsuccessful wildcat drilling results (above Summit Canyon and in the Big Gypsum Valley areas of San Miguel County).

Therefore, the majority of the areas that are currently unleased have either been previously leased or do not contain geologic conditions conducive to oil and gas trapping and production.

It is important to note that the inclusion of currently leased lands, WSAs, similar landscapes, and areas stipulated as No Surface Occupancy (NSO), only 37% of the federal lands are available for leasing and not protected from surface occupancy.

Finally, of the 269,226 acres that would be made available for lease (and that are not currently leased), 47% of the area includes NSO stipulations to protect resources. An additional 43% have Controlled Surface Use (CSU) and Timing Limitations (TL) stipulations, with the remaining 11% having standard lease terms.

### **2.1.2 Criterion #2: There is a majority federal mineral interest.**

Using the information in Table R.1, approximately 48% of the PLAA land area is currently leased (294,902 acres). Lands encompassed by WSA and lands not available for leasing/withdrawn lands amount to approximately 9% of the area. Considering what is already leased and the acres that would not be available for lease, the remaining acres available for lease within the PLAA total approximately 44% of the area (269,226 acres). These acres are not in one large identifiable block but are dispersed throughout the area.

**Table R.1: Mineral Estate Ownership within the Paradox Leasing Analysis Area**

	Acres	Leased Acreage
BLM federal surface and mineral estate	433,866	192,291
Split estate (private or other surface owner with BLM mineral estate)	184,195	102,611
Total	618,061	294,902

### **2.1.3 Criterion #3: The oil and gas industry has expressed a specific interest in leasing, and there is a moderate or high potential for oil and gas confirmed by the discovery of oil and gas in the general area.**

The TRFO and southwest Colorado have been an area with oil and gas potential with a long history of development. Commercial production started as early as 1920. Data from the Colorado Oil and Gas Conservation Commission database show that 1,339 wells have been drilled in the planning area, which includes both BLM and NFS lands. Forty percent of these wells (533) were drilled after 1984. At the end of 2004, there were 502 producing wells, 339 (68%) of which were located in the Ignacio-Blanco coalbed methane (CBM) field of Archuleta and La Plata Counties. Of the remainder, 156 wells (31%) produced conventional oil and gas in Dolores, Montezuma, and San Miguel Counties.

Specifically, the PLAA within the TRFO is an area where oil and gas industry has expressed leasing and development interest. As discussed under Criterion #1, the area contains a significant amount of existing leases (317) and has had successful development over the past 90+ years. Additionally, the emergence of the Gothic Shale Gas Play (GSGP) within the PLAA (which was identified by industry in 2008 and necessitated the Supplement to the Draft EIS) is of interest to industry, especially given the advancement of horizontal drilling and hydraulic fracturing technology that has made development of shale gas possible and more economical. As disclosed in the reasonably foreseeable development projections of the FEIS, as many as 2,145 wells may be drilled in the planning area in the next 15 years. This includes BLM, NFS, state, and private lands. On the BLM and split estate lands alone, it is estimated that as many as 610 wells may be drilled. This includes both conventional and GSGP wells. These estimated numbers were generated from industry interviews, leasing trends, and current and projections of future hydrocarbon prices. It is expected that due to the remoteness of some potential locations, development activities would occur adjacent to existing infrastructure, which would assist in minimizing impacts.

Table R.2 provides the acres of hydrocarbon potential within the PLAA on BLM surface and private surface with federal minerals and Figure R.4 provides a visual depiction of the hydrocarbon potential.

**Table R.2: Hydrocarbon Occurrence Potential within the PLAA (acres)**

Mineral Estate Ownership	High Potential	Moderate Potential	Low Potential	No Potential
BLM (including split estate)	439,595	178,465	1917	0

As shown in Table R.2, the majority of the BLM mineral estate is within areas identified to have moderate or high potential. Including split estate acres, the BLM has 37% of the high and moderate potential lands

**2.1.4 Criterion #4: Additional analysis or information is needed to address likely resource or cumulative impacts if oil and gas development were to occur where there are multiple use or natural/cultural resource conflicts, impacts on air quality, impacts on the resources or values of any unit of the NPS, or impacts on other specially designated areas.**

In developing the LRMP for the TRFO, there were many public scoping meetings and two public comment periods (one for the Draft EIS and one for the Supplement to the Draft EIS), all of which identified resources of concern and important landscapes needing protection when allowing extractive resource use and management activities. The TRFO used these comments to develop plan direction for resource management and specifically for developing oil and gas leasing stipulations. In the external MLP submitted, concerns were specifically focused on the following TRFO resources: fish and wildlife, special status species, wilderness quality lands, recreation, Areas of Critical Environmental Concern (ACECs), and Colorado Natural Heritage Program potential conservation areas (PCAs). According to IM 2010-117, other important national and local resource issues that should be considered when developing an MLP include air quality; Special Recreation Management Areas; nearby state, tribal, or other federal agency lands; cultural resources; paleontological resources; visual resources; watershed conditions, including steep slopes and fragile soils; municipal watersheds; public health and safety; and the ability to achieve interim and final reclamation standards.

Of the 269,226 acres that would be made available for lease (and that are not currently leased), 47% of the area includes NSO stipulations to protect resources. An additional 43% have CSU and TL stipulations, with the remaining 11% having standard lease terms (see Table R.2). Figure R.2 illustrates the leasing stipulations within the PLAA. (Please note that there are overlapping stipulations within the PLAA and Figure R.2 illustrates only the most restrictive stipulation in a particular area. Please see Appendix H for maps that illustrate individual stipulations.)

**Table R.3: Acres of Stipulations on Lands Available for Lease in the Paradox Basin (BLM surface and private surface with federal minerals)**

Available and Stipulated Acres in the Paradox Basin	Acres	Percent
Acres available and not currently leased within the Paradox Basin	269,226	44%
Acres of NSO	125,876	47%
Acres of CSU and TL	114,777	43%
Standard lease terms	28,573	11%

The Proposed TRFO LRMP includes a suite of leasing stipulations to protect resources within the Paradox Basin and on all TRFO lands. Table R.5 summarizes the resources of concern and leasing stipulations proposed in the LRMP.

**Table R.5: Resources of Concern and Tres Rios Field Office Proposed Leasing Stipulations**

Resource	Stipulation
WSAs: Weber, Menefee, Dolores River Canyon, McKenna Peak	Not available for lease
Dolores River Canyon	NSO
Lands with wilderness characteristics: Snaggletooth, Coyote Wash	NSO

Resource	Stipulation
Occupied critical Gunnison sage-grouse habitat	NSO
Gunnison prairie dog - sensitive species	CSU
Raptors	NSO and TL
Big game and wide ranging animals	TL and CSU
Rare plants (threatened, endangered, and sensitive plants)	NSO
Rare plants (sensitive plants)	CSU
Rare plants (plants w/B1 and B2 rankings by Colorado Natural Heritage Program)	N/A
ACECs	NSO, CSU, and TL depending on resource
Mesa Verde Escarpment (i.e., area adjacent to a national park and protected for its cultural resources)	NSO
Visual resources	NSO
Water resources	NSO, CSU, and TL

The LRMP does include a variety of standards and guidelines to ensure diversity of plants, animals, fish, and overall management for sustainable ecosystems (see Section 2.1 of the LRMP for a full discussion of the ecosystem management strategy).

In addition to Table R.5, below is a summary of the protections that the LRMP and leasing stipulations proposes to protect the resources and areas of concern.

- The Dolores River Canyon has many unique and rare features, hence an NSO is proposed for the whole canyon, rim to rim, including some adjacent canyons and resources.
- Lands with wilderness characteristics are also proposed to be managed with an NSO stipulation.
- Occupied critical Gunnison sage-grouse habitat is proposed to be managed with an NSO stipulation. Additionally, there are stipulations to mitigate noise impacts, retain habitat, and to minimize impacts on currently unoccupied Gunnison sage-grouse habitat.
- Big game severe winter range, concentration areas, and production areas (seasons and locations critical to supporting life functions) have specific TL.
- Raptors: stipulations have been developed to protect nest sites, winter roost, and overall roost sites for various raptors.
- Rare plants: The TRFO has stipulations for threatened, endangered, and sensitive plants.
- ACECs: The TRFO has not applied a stipulation to ACECs, but rather is applying resource-specific stipulations to the resources of relevance and importance for each of the ACECs. For example, there is a CSU stipulation for gypsum soils (the habitat for the plant species that the ACEC is designated for), NSO and TL to protect raptor nests, CSU and NSO for sensitive, threatened, and endangered plants, etc.
- Mesa Verde Escarpment: The TRFO recognizes the quality of the mostly intact cultural resources at the base of Mesa Verde National Park and protects this area with an NSO stipulation.
- Visual resources: The foreground areas of areas classified to be managed for a Visual Resource Management (VRM) Class II are protected with an NSO stipulation. These are areas valued for their high scenic quality.
- Water resources: The proposed LRMP includes many water resource protection stipulations, including protections for rivers, reservoirs, lakes, perennial streams, riparian areas, fens, groundwater, and public water supplies.
- Air quality protections: The TRFO completed an air quality model for the LRMP and FEIS analysis, which included the projections for oil and gas development on the TRFO and development on adjacent lands and within the region. The model indicated that there could be potentially significant direct and indirect impacts to air quality (nitrogen and sulfur deposition, and visibility at a nearby Class I area), and potentially significant cumulative impacts to air quality (nitrogen dioxide, sulfur dioxide, visibility, and acid neutralizing capability at wilderness lakes). To mitigate these impacts, the LRMP proposes several management actions to reduce impacts on air quality, including the following requirements:

- Nitrogen oxide (NO<sub>x</sub>) limit of 2.0 grams per horsepower-hour or the minimum acceptable limit of regulatory agencies for new or replacement stationary engines less than 300 horsepower.
- NO<sub>x</sub> limit of 1.0 grams per horsepower-hour or the minimum acceptable limit of regulatory agencies for new or replacement stationary engines 300 horsepower or greater.
- Green completion technology for oil and natural gas well completions and for re-stimulation or re-fracture activities during workovers is required to prevent venting and most flaring of methane gas and other air pollutants into the atmosphere.
- For exploration, production, transport, and processing of oil and natural gas, storage vessels must not leak and tank thief hatches must be closed when not being serviced during liquid transport, repair, or measuring activities. Valves must be maintained in a leak-free condition (<10,000-part-per-million leakage). The venting of volatile organic compound (VOC) and hazardous air pollutant emissions would achieve at least 95 % emission reduction from uncontrolled emissions through the use of vapor recovery units, combustion, or other practices allowed by air quality regulatory agencies.
- Valves and pipes in liquid hydrocarbon service would periodically (at minimum on an annual basis) be inspected visually, audibly, or by other means for evidence of leaks. If leaks are detected, equipment must either be repaired or replaced as applicable.
- No-bleed, low-bleed, or air-driven pneumatic devices are required for all new and retrofitted oil and natural gas production sites to reduce methane emissions.
- All new separators and dehydrators used for natural gas production must use 95% control efficiency or better VOC emission control technology compared to uncontrolled emissions.
- At any one point in time, no more than four fluid minerals well pads and associated access roads would be constructed and drilled (or re-completed) concurrently in any given square mile.
- Construction activities that disturb a surface area greater than 1 acre and are of a duration greater than 5 days should use effective dust-suppression materials and techniques to prevent dust from visibly transporting from the area of disturbance
- VOCs, hazardous air pollutants, and greenhouse gases should not be vented from existing wells and should achieve at least 95 % emission reduction from uncontrolled emissions through capture and delivery to sales pipeline, vapor recovery units, combustion, or other practices allowed by air quality regulatory agencies.
- For new lease or new development areas, new mineral development facilities would be collocated and/or centralized.
- Optimization (use of fewer, larger, and more efficient engines with lower emission rates, rather than using many small engines with higher cumulative emissions, less efficiency, and higher cumulative horse power) should be required for fluid mineral development.
- Centralized and efficient liquid gathering systems should be used to carry condensate and produced water from wells to centralized gathering facilities to reduce mobile source emissions and other traffic impacts.
- Drill rig engines used for new or recompleted wells on the TRFO should meet the most current non-road diesel engine rules for Tier 2, Tier 4 transitional, or Tier 4 emission standards as these standards phase in over time.
- Recovered fluids should be disposed of properly.

The air quality impacts analysis did not model ozone at the agreement of stakeholders, but a management strategy for ozone analysis and monitoring was disclosed in the EIS and is summarized as follows:

- The BLM and USFS would monitor ozone downwind of the project at a site selected by the Colorado Department of Public Health and Environment, BLM, and USFS.
- The BLM and USFS would commit to long-term air quality monitoring (including ozone) at the Shamrock station.
- The BLM and USFS have authority and would apply resource-protective standards, guidelines, stipulations, and other mitigation measures on new leases. The agencies may also condition the approval of permits on existing leases if resource conditions warrant.

- Ozone modeling would be implemented when 210 wells have been permitted in the GSGP area or when project-level or field development National Environmental Policy Act (NEPA) analysis is conducted, whichever occurs first.

In addition to the resources of concern identified by the external MLP proposal, the TRFO has leasing stipulations for other wildlife, fish and bird species, steep slopes and sensitive soils, visual resources and recreation, and cultural and heritage resources. Appendix H provides a full description of the oil and gas leasing stipulations. All new leases would be subject to these leasing stipulations and the LRMP direction.

#### Water and Soil Related Stipulations and Lease Notices

- Municipal watersheds and public water supply (NSO and CSU)
- Major river corridors (NSO)
- Perennial streams, water bodies, riparian areas, and fens (NSO and CSU)
- Intermittent and ephemeral streams (NSO and CSU)
- Jurisdictional dams (NSO)
- Groundwater resources (CSU)
- Reservoirs and lakes (NSO)
- Lands with slopes greater than 35% (NSO)
- Lands with 25% to 35% slopes and lands with shale soils (CSU)
- Lands prone to mass movement (NSO)
- Lands with gypsum soils (CSU)
- Lands with biological soil crusts (CSU)

#### Vegetation and Plant Related Stipulations and Lease Notices

- Threatened or endangered plants (NSO)
- Colorado BLM State Director's sensitive plants (CSU)
- Old growth forests and woodlands (NSO)

#### Wildlife and Aquatic Related Stipulations and Lease Notices

- Mexican spotted owl (NSO)
- Lynx landscape linkage, denning and winter foraging habitat (CSU and TL)
- Southwestern willow flycatcher (NSO and TL)
- Gunnison sage-grouse occupied critical habitat (NSO, CSU, TL)
- Columbian sharp-tailed grouse (NSO, CSU and TL)
- Colorado River cutthroat trout (NSO)
- Greenback cutthroat trout (NSO)
- State wildlife areas (NSO)
- Eagles, all accipiters, falcons, buteos, and owls (NSO and TL)
- Big game parturition (TL)
- Big game severe winter range, winter concentration, and mule deer critical winter range and big game production areas (CSU and TL)
- Gunnison prairie dog (CSU)
- Bats (NSO)

#### Cultural Related Stipulations and Lease Notices

- Cultural resources (NSO)
- Horse Range Mesa paleontological site (NSO)

#### Recreation and Scenery Related Stipulations

- Developed administrative and recreation sites (NSO and CSU)
- Special Recreation Management Areas (CSU)
- National scenic byways; All American Roads and backcountry byways; designated scenic, recreation, and historic trails and recreation emphasis corridors (NSO)
- High scenic integrity objective and CRM Class II areas (NSO)

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