

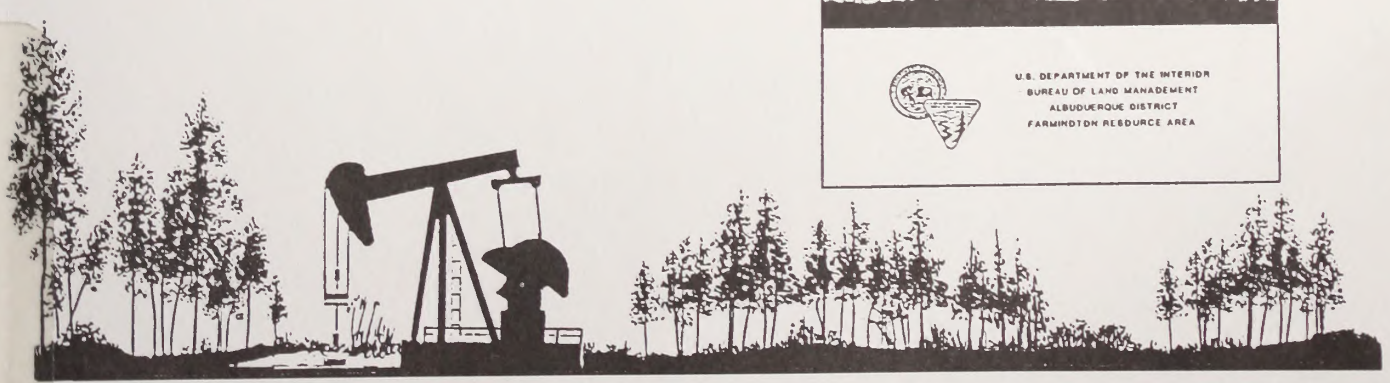
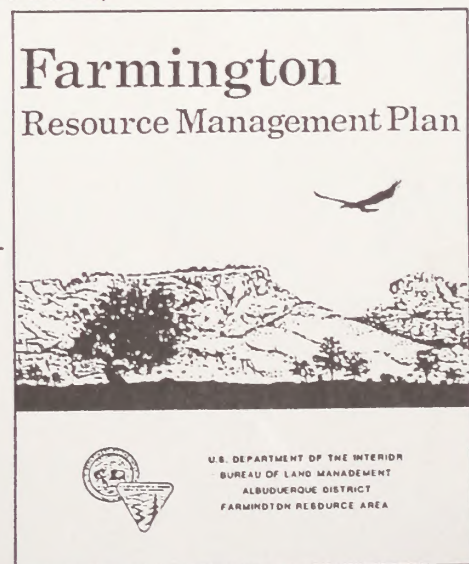
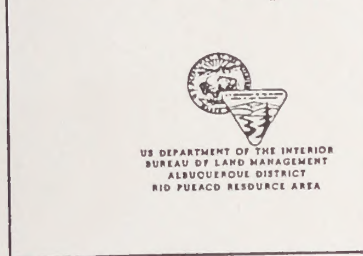


United States Department of the Interior
Bureau of Land Management
Albuquerque District Office
Albuquerque, New Mexico

December 1991



Albuquerque District Proposed Resource Management Plan Amendment/ Final Environmental Impact Statement OIL & GAS LEASING AND DEVELOPMENT



The Bureau of Land Management...
is responsible for the balanced management of the public lands and resources and their various values so that they are considered in a combination that will best serve the needs of the American people. Management is based upon the principles of multiple use and sustained yield, a combination of uses that takes into account the long-term needs of future generations for renewable and non-renewable resources. These resources include recreation, range, timber, minerals, watershed, fish and wildlife, wilderness, and natural, scenic, scientific, and cultural values.

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**Albuquerque District Proposed Resource
Management Plan Amendment and
Final Environmental Impact Statement
OIL AND GAS LEASING AND DEVELOPMENT**

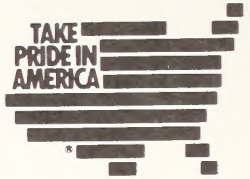
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United States Department of the Interior



BUREAU OF LAND MANAGEMENT
ALBUQUERQUE DISTRICT OFFICE
435 MONTANO N.E.
ALBUQUERQUE, NEW MEXICO 87107

Dear Reader:

Enclosed for your review is the Proposed Albuquerque District Resource Management Plan Amendment (RMPA)/Environmental Impact Statement (EIS) for Oil and Gas Leasing and Development. This document describes and analyzes the impacts of three alternatives for the leasing and development of federal oil and gas within the Albuquerque District in the State of New Mexico. This document is a full final RMPA/EIS, therefore, all alternatives from the draft are included. This document contains the Proposed Plan which is a modified version of the Preferred Alternative published in the Draft RMPA/EIS in June 1991.

This plan is subject to protest using the procedures stated in 43 CFR, Part 1610.5-2. The 30-day protest period begins when the EPA Notice of availability is published in the Federal Register. Protests should be mailed to: Director, Bureau of Land Management, 1849 C Street NW, Washington, DC 20240.

At the end of the thirty-day protest period, the Proposed Plan, excluding any portions under protest, will become final. Approval will be withheld on any portion of the plan under protest until final action has been completed on such protest. Upon completion of this RMPA/EIS the Approved Plan and Record of Decision will be published. Individuals not wishing to protest the plan, but wanting to comment may send comments to the BLM, Albuquerque District Office, 435 Montano NE, Albuquerque, New Mexico 87107. All comments will be considered in preparation of the Record of Decision.

The Proposed RMPA/EIS was prepared using the comments received through the public review process on the Draft RMPA/EIS. The draft is reprinted in whole in this document with substantive changes printed in bold italicized letters. The comments on the draft and responses to those comments are printed in this document.

Sincerely,

Robert T. Dale
District Manager

Enclosure

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SUMMARY

The Albuquerque District Oil and Gas *Proposed* Resource Management Plan (RMP) Amendment and Environmental Impact Statement (EIS) identifies and analyzes the future options for managing the federal mineral estate situated within and administered by the Bureau of Land Management (BLM) Albuquerque District through the Farmington, Rio Puerco, and Taos Resource Areas.

The Proposed RMP Amendment and EIS *has been* prepared using the BLM planning regulations issued under the authority of the Federal Land Policy and Management Act of 1976 and the National Environmental Policy Act of 1969. When completed, the *Proposed* RMP Amendment/EIS will provide a comprehensive framework for managing the federal oil and gas resources within the district over the next 20 years.

The contents of this *Proposed* RMP Amendment/EIS primarily focus on resolving the following issues related to oil and gas leasing and development in the district. The resolution of these issues can only be achieved within the context of proper land use planning.

1. Determine if additional federal mineral estate should be considered for oil and gas leasing.
2. Based on reasonable foreseeable development (RFD) scenarios, determine the effects of developing oil and gas leases in designated Special Management Areas (SMAs) and other areas of concern.
3. Determine the impact of management constraints (lease stipulations, conditions of approval, and no leasing) on oil and gas development.
4. Identify the cumulative impacts of oil and gas development.

The issues and planning criteria are discussed in Chapter 1. The aspects of current management are covered in the Continuing Management Guidance Section of Chapter 2. Continuing Management Guidance is based primarily on laws, regulations, manuals, and existing land use plans.

Three RMP Amendment/EIS alternatives have been developed to describe the different management options available to the BLM for administering federal oil and gas in the district. These alternatives were developed to respond to the issues mentioned above. Each alternative presents a different level of *leasing and* application of oil and gas management constraints. Together with the Continuing Management Guidance, each of the alternatives forms a separate land-use plan.

The three alternatives developed for the Albuquerque District RMP Amendment/EIS are summarized below and are further described in Chapter 2. The impacts anticipated from these alternatives are described in Chapter 4, and a comparative summary of impacts is included in Tables S-1 through S-4.

Alternative A: Current Management (No Action)

Under this alternative, existing policy and decisions established in each RMP for resource programs would remain in effect. Management of oil and gas resources would continue as specified in the existing RMPs. Development of existing leases would continue in accordance with terms and conditions of the lease. New leases would continue to be issued under this alternative in accordance with the decisions in the existing RMPs. The BLM would continue to implement Section 6 of lease form 3100-11 to require lessees to conduct operations in a manner that would minimize adverse impacts to resources, land uses, and users.

Alternative B: Production

The primary focus of this alternative is on the leasing and development of oil and gas resources in the resource areas. Except for areas closed to leasing (nondiscretionarily) by legislation, oil and gas resources would be leased and/or developed under the BLM's standard lease terms and conditions. Stipulations would not be attached to future leases.

Under this alternative, existing policy and decisions that exclude leasing and/or impose constraints on developing leases in SMAs would be rescinded, and would be replaced with those allowing leasing and development under standard terms and conditions. Management of other public lands and resources would continue according to the policy and decisions established in previous planning documents.

Alternative C: *Proposed* Alternative

The primary emphasis of this alternative is on the protection and preservation of cultural, visual, recreation, wildlife, and paleontological resource values, particularly in SMAs. Under this alternative, existing policy and decisions for some SMAs would be changed. Management constraints would be placed on a number of SMAs, and some areas now discretionarily closed to leasing would be opened with management constraints. Stipulations would be attached to new leases issued in SMAs.

Development of existing leases would continue according to the terms of the lease. The BLM would continue to implement Section 6 of lease form 3100-11 to require lessees to conduct operations in a manner that would minimize adverse impacts to resources, land uses, and users. Management of other public lands and resources would continue according to the policy and decisions established in previous planning documents.

**TABLE S-1. ALBUQUERQUE DISTRICT
SUMMARY IMPACT TABLE^{1/}**

District Resources	No Action Alternative	Production Alternative	<i>Proposed</i> Alternative
Oil and Gas ^{2/} , ^{3/}	Wells developed - 4,604 Oil produced (bbl) - 1,485,000 Gas produced (Mcf) - 102,489,000 Royalties generated - \$23,630,000 Local government revenues, jobs & personal income - slight increase Surface acres disturbed - 29,968 ^{4/}	Wells developed - 4,812 Oil produced (bbl) - 1,533,800 Gas produced (Mcf) - 107,300,000 Royalties generated - \$24,713,000 Same as No Action Surface acres disturbed - 31,308	Wells developed - 4,542 Oil produced (bbl) - 1,443,000 Gas produced (Mcf) - 94,614,000 Royalties generated - \$23,263,000 Same as No Action Surface acres disturbed - 29,578
Visual Resources	VRM Class I management objectives - not met on 7,072 acres VRM Class II management objectives - not met on 17,432 acres	VRM Class I management objectives - not met on 13,230 acres VRM Class II management objectives - not met on 20,421 acres ^{5/}	VRM Class I management objectives - not met on 7,072 acres VRM Class II management objectives - not met on 17,432 acres
Recreation	Amount of acreage for undeveloped types of recreation reduced Impacts may occur to undeveloped camp-sites	Same as No Action Same as No Action	Same as No Action Same as No Action
Wilderness Study Areas	Acres closed to leasing & development for protection of wilderness values - 151,790 Areas leased before FLPMA can be developed only in manner to protect wilderness values; development considered on case-by-case basis If released by Congress from wilderness study, WSA would be open to leasing and development	Same as No Action Same as No Action Same as No Action	Same as No Action Same as No Action Same as No Action

TABLE S-1. (concluded)

District Resources	No Action Alternative	Production Alternative	Proposed Alternative
Wildlife	Critical big game winter range disturbed Habitat loss may result in reduction of game numbers: Deer loss - 297 Elk loss - 195 Antelope loss - 59	Critical big game winter range disturbed Habitat loss may result in reduction of game numbers: Deer loss - 308 Elk loss - 202 Antelope loss - 61	Critical big game winter range disturbed Habitat loss may result in reduction of game numbers: Deer loss - 293 Elk loss - 193 Antelope loss - 59
Soils and Hydrology	<i>Wells drilled (4,604) would disturb 29,968 acres with estimated potential sediment yield of 0.5 to 0.85 acft/yr and 23 to 39 tons of additional salt.</i>	<i>Wells drilled (4,812) would disturb 31,308 acres with estimated potential sediment yield of 0.54 to 0.9 acft/yr and 25 to 41 tons of additional salt.</i>	<i>Wells drilled (4,542) would disturb 29,578 acres with estimated potential sediment yield of 0.5 to 0.8 acft/yr and 23 to 37 tons of additional salt.</i>
Cultural Resources	Positive impacts include site identification, avoidance, or recovery Negative impacts include site damage from development, vandalism to known locations & improved access.	Same as No Action Same as No Action	Same as No Action Same as No Action
Paleontology	Continuation of current management practices would avoid significant impacts to these resources	Same as No Action	Same as No Action
Forestry	Removal of: Timber-3,880 Mbf Fuelwood-255,550 cords Stumpage Value-3,235,000	Removal of: Timber-4,050 Mbf Fuelwood-267,045 Stumpage Value-3,379,900	Removal of: Timber-3,830 Mbf Fuelwood-252,165 Stumpage Value-3,192,600

Notes: ^{1/}Unless stated otherwise, figures given are for the 20-year life of this Plan Amendment.
^{2/}The production estimates are based on reasonably foreseeable development well projections and are in addition to current production from existing wells.
^{3/}Acres open and closed to leasing and development are shown in Tables 2-3 and 2-4 in Chapter 2.
^{4/}The extent of vegetative reclamation is discussed on page 1-13, "Vegetation and Non-Sensitive Habitat."
^{5/}If Ah-shi-sic-pah WSA is not designated as wilderness, VRM Class II management objectives would not be met on an additional 6,563 acres.

**TABLE S-2. FARMINGTON RESOURCE AREA
SUMMARY IMPACT TABLE^{1/}**

Area Resources	No Action Alternative	Production Alternative	Proposed Alternative
Oil and Gas ^{2/}	Wells developed - 4,527 Oil produced (bbl) - 1,477,000 Gas produced (Mcf) 95,433,000 Royalties generated - \$23,511,000 Local government revenues, jobs & personal income - maintained at current levels Surface acres disturbed - 28,520	Wells developed - 4,733 Oil produced (bbl) 1,526,000 Gas produced (Mcf) 100,004,000 Royalties generated - \$24,590,000 Same as No Action Surface acres disturbed - 29,818	Wells developed - 4,465 Oil produced (bbl) 1,428,000 Gas produced (Mcf) 94,290,000 Royalties generated - \$23,160,000 Same as No Action Surface acres disturbed - 28,130
Visual Resources	VRM Class I management objectives - not met on 7,072 acres VRM Class II management objectives - not met on 17,386 acres	VRM Class I management objectives - not met on 12,518 acres VRM Class II management objectives - not met on 31,884 acres ^{3/}	VRM Class I management objectives - not met on 10,758 acres VRM Class II management objectives - not met on 20,437 acres
Recreation	Amount of acreage for undeveloped types of recreation reduced Impacts may occur to undeveloped campsites	Same as No Action Same as No Action	Same as No Action Same as No Action
Wilderness Study Areas	Acres closed to leasing & development for protection of wilderness values - 6,563 Areas leased before FLPMA can be developed only in manner to protect wilderness values; development considered on a case-by-case basis If released by Congress, from wilderness study, WSAs may be open to leasing and development	Same as No Action Same as No Action Same as No Action	Same as No Action Same as No Action Same as No Action

TABLE S-2. (concluded)

Area Resources	No Action Alternative	Production Alternative	<i>Proposed</i> Alternative
Wildlife	Critical big game winter range disturbed Habitat loss may result in reduction of game numbers: Deer loss - 286 Elk loss - 119 Antelope loss - 12	Critical big game winter range disturbed Habitat loss may result in reduction of game numbers: Deer loss - 298 Elk loss - 124 Antelope loss - 12	Critical big game winter range disturbed Habitat loss may result in reduction of game numbers: Deer loss - 282 Elk loss - 118 Antelope loss - 12
Soils and Hydrology	<i>Wells drilled (4,527) would disturb 28,520 acres with estimated potential sediment yield of 0.5 to 0.8 acft/yr with 23 to 36 tons of additional salt.</i>	<i>Wells drilled (4,733) would disturb 29,818 acres with estimated potential sediment yield of 0.48 to 0.8 acft/yr with 22 to 36 tons of additional salt.</i>	<i>Wells drilled (4,465) would disturb 28,130 acres with estimated potential sediment yield of 0.5 to 0.8 acft/yr with 22 to 36 tons of additional salt.</i>
Cultural Resources	Same as No Action Alternative for Albuquerque District	Same as No Action Alternative for Albuquerque District	Same as No Action Alternative for Albuquerque District
Paleontology	Same as No Action Alternative for Albuquerque District	Same as No Action Alternative for Albuquerque District	Same as No Action Alternative for Albuquerque District
Forestry	Removal of: Timber-3,690 Mbf Fuelwood-247,180 cords Stumpage Value-3,118,100	Removal of: Timber-3,860 Fuelwood-258,400 Stumpage Value-3,260,000	Removal of: Timber-3,644 Fuelwood-243,800 Stumpage Value-3,075,700

Notes: ^{1/}Unless stated otherwise, figures given are for the 20-year life of this Plan Amendment.

^{2/}The production estimates are based on reasonably foreseeable development well projections and are in addition to current production from existing wells.

^{3/}If Ah-shi-sic-pah WSA is not designated as wilderness, VRM Class II management objectives would not be met on an additional 6,563 acres.

**TABLE S-3. RIO PUERCO RESOURCE AREA
SUMMARY IMPACT TABLE^{1/}**

Area Resources	No Action Alternative	Production Alternative	<i>Proposed</i> Alternative
Oil and Gas ^{2/}	Wells developed - 47 Oil produced (bbl) - 7,660 Gas produced (Mcf) 162,400 Royalties generated - \$51,300 Local government revenues, jobs & personal income - maintained at current levels Surface acres disturbed - 620	Wells developed - 48 Oil produced (bbl) 7,850 Gas produced (Mcf) 169,500 Royalties generated - \$52,800 Same as No Action Surface acres disturbed - 634	Wells developed - 47 Oil produced (bbl) 7,660 Gas produced (Mcf) 162,400 Royalties generated - \$51,300 Same as No Action Surface acres disturbed - 620
Visual Resources	VRM Class I and II management objectives - met on all assigned acreage	Same as No Action	VRM Class I management objectives - same as No Action VRM Class II management objectives - not met on 13,530 acres
Recreation	Amount of acreage for undeveloped types of recreation would be reduced Impacts may occur to undeveloped campsites	Same as No Action Same as No Action	Same as No Action Same as No Action
Wilderness Study Areas	Acres closed to leasing & development for protection of wilderness values - 112,227 Areas leased before FLPMA can be developed only in manner to protect wilderness values; development considered on a case-by-case basis If released by Congress from wilderness study, WSAs may be open to leasing and development	Same as No Action Same as No Action Same as No Action	Same as No Action Same as No Action Same as No Action

TABLE S-3. (concluded)

Area Resources	No Action Alternative	Production Alternative	<i>Proposed</i> Alternative
Wildlife	Critical big game winter range disturbed Habitat loss may result in reduction of game numbers: Deer loss - 4 Elk loss - 5 Antelope loss - 0	Same as No Action Habitat loss may result in reduction of game numbers: Deer loss - 4 Elk loss - 5 Antelope loss - 0	Same as No Action Habitat loss may result in reduction of game numbers: Deer loss - 4 Elk loss - 5 Antelope loss - 0
Soils and Hydrology	<i>Wells drilled (47) would disturb 620 acres with estimated potential sediment yield of 0.009 to 0.015 acft/yr with < 1 ton/yr of additional salt.</i>	<i>Wells drilled (48) would disturb 634 acres with estimated potential sediment yield of 0.02 to 0.03 acft/yr with 0.9 to 1.6 tons of additional salt.</i>	<i>Wells drilled (47) would disturb 620 acres with estimated potential sediment yield of 0.01 to 0.015 acft/yr with 0.4 to 0.7 tons of additional salt.</i>
Cultural Resources	Same as No Action Alternative for Albuquerque District	Same as No Action Alternative for Albuquerque District	Same as No Action Alternative for Albuquerque District
Paleontology	Same as No Action Alternative for Albuquerque District	Same as No Action Alternative for Albuquerque District	Same as No Action Alternative for Albuquerque District
Forestry	Removal of: Timber-81 Mbf Fuelwood-3,580 cords Stumpage Value-50,000	Removal of: Timber-81 Mbf Fuelwood-3,666 acres Stumpage Value-50,800	Removal of: Timber-81 Mbf Fuelwood-3,580 acres Stumpage Value-50,000

Note: ^{1/}Unless stated otherwise, figures given are for the 20-year life of this Plan Amendment.

^{2/}The production estimates are based on reasonably foreseeable development well projections and are in addition to current production from existing wells.

**TABLE S-4. TAOS RESOURCE AREA
SUMMARY IMPACT TABLE^{1/}**

Area Resources	No Action Alternative	Production Alternative	<i>Proposed</i> Alternative
Oil and Gas ^{2/}	Wells developed - 30 Oil produced (bbl) - 0 Gas produced (Mcf) 6,894,00 Royalties generated - \$68,200 Local government revenues, jobs & personal income - maintained at current levels Surface acres disturbed - 828	Wells developed - 31 Oil produced (bbl) - 0 Gas produced (Mcf) 7,126,000 Royalties generated - \$70,600 Same as No Action Surface acres disturbed - 856	Wells developed - 30 Oil produced (bbl) - 7,660 Gas produced (Mcf) 162,000 Royalties generated - \$51,300 Same as No Action Surface acres disturbed - 828
Visual Resources	VRM Class I and II management objectives - met on all assigned acres	Same as No Action	Same as No Action
Recreation	Amount of areas for undeveloped types of recreation reduced Impacts may occur to some undeveloped campsites	Same as No Action Same as No Action	Same as No Action Same as No Action
Wilderness Study Areas	Acres closed to leasing & development for protection of wilderness values - 33,000 Areas leased before FLPMA can be developed only in manner to protect wilderness values; development considered on a ease-by-ease basis If released by Congress from wilderness study, WSAs may be open to leasing and development	Same as No Action Same as No Action	Same as No Action Same as No Action

TABLE S-4. (concluded)

Area Resources	No Action Alternative	Production Alternative	Proposed Alternative
Wildlife	Critical big game winter range disturbed Habitat loss may result in a reduction of game numbers: Deer loss - 7 Elk loss - 71 Antelope loss - 47	Same as No Action Habitat loss may result in a reduction of game numbers: Deer loss - 7 Elk loss - 73 Antelope loss - 40	Same as No Action Habitat loss may result in a reduction of game numbers: Deer loss - 7 Elk loss - 71 Antelope loss - 47
Soils and Hydrology	<i>Wells drilled (30) would disturb 828 acres with estimated potential sediment yield of 0.02 acft/yr or less with < 1 ton of additional salt.</i>	<i>Wells drilled (31) would disturb 856 acres with estimated potential sediment yield of 0.3 to 0.04 acft/yr with 1.2 to 2.0 tons of additional salt.</i>	<i>Wells Drilled (30) would disturb 828 acres with estimated potential sediment yield of 0.01 to 0.02 acft/yr with 0.7 to 1.1 tons of additional salt.</i>
Cultural Resources	Same as No Action Alternative for Albuquerque District	Same as No Action Alternative for Albuquerque District	Same as No Action Alternative for Albuquerque District
Paleontology	Same as No Action Alternative for Albuquerque District	Same as No Action Alternative for Albuquerque District	Same as No Action Alternative for Albuquerque District
Forestry	Removal of: Timber-109 Mbf Fuelwood-4,780 acres Stumpage Value-66,900	Removal of: Timber-112 Mbf Fuelwood-4,940 acres Stumpage Value-69,000	Removal of: Timber-109 Mbf Fuelwood-4,782 acres Stumpage Value-66,900

Note: ^{1/}Unless stated otherwise, figures given are for the 20-year life of this Plan Amendment.

^{2/}The production estimates are based on reasonably foreseeable development well projections and are in addition to current production from existing wells.

Introduction

Chapter 1



CHAPTER 1

INTRODUCTION

PURPOSE AND NEED

This document is the Bureau of Land Management's (BLM's) Districtwide Resource Management Plan (RMP) Amendment and Environmental Impact Statement (EIS) for the Albuquerque District. The document updates management constraints on and analyzes the environmental impacts of oil and gas leasing and development. It amends the previous RMPs prepared for the Farmington, Rio Puerco, and Taos Resource Areas. The previous RMPs identify the management policy, direction, and decisions for administering resource programs based on the issues of concern identified by the BLM (with public and other agency input) at the time the RMPs were prepared.

The primary purpose of the RMP Amendment is to "...establish the fluid minerals [oil and gas] determinations [areas closed to leasing and areas open to leasing with and without constraints] that...are required (for the entire oil and gas mineral estate) in every resource management plan (RMP) prepared by the BLM (BLM Handbook H-1624-1 I-A.)." The amendment is needed to comply with the requirement for identifying, where needed, "...fluid mineral determinations...in every RMP regardless of whether or not fluid minerals is associated with a planning issue or management concern (H-1624-1 II.C.)." Preparation of this document is guided by BLM planning regulations issued under the authority of the Federal Land Policy and Management Act of 1976 and by BLM Handbook H-1624-1 (Planning for Fluid Mineral Resources).

The current management constraints or restrictions to oil and gas leasing and development in Special Management Areas (SMAs) are updated and modified (if necessary) in this document. Additionally, areas are identified where (1) stipulations may be applied to new oil and gas leases, or (2) conditions of approval (COAs)

may be attached to applications for permits to drill (APDs) on existing leases.

The primary purpose of the EIS is to "...analyze and document the direct, indirect, and cumulative impacts of...reasonably foreseeable future actions resulting from Federally authorized fluid minerals activities. By law, these impacts must be analyzed before the agency makes an irreversible commitment. In the fluid minerals program, this commitment occurs at the point of lease issuance. Therefore, the EIS prepared with the RMP is intended to satisfy NEPA requirements for issuing fluid mineral leases (BLM Handbook H-1624-1 B.-2.)."



LOCATION AND SIZE

The Albuquerque District encompasses approximately the north half of New Mexico and includes all of the following counties: Bernalillo, Cibola, Colfax, Harding, Los Alamos, McKinley, Mora, Rio Arriba, Sandoval, San Juan, San Miguel, Santa Fe, Taos, Tarrant, Union, Valencia (refer to Map 1). The population of the district is centered around Farmington, Aztec, Bloomfield, and Shiprock in the northwest; Gallup and Grants in the west; Albuquerque in the south; and Santa Fe, Española, and Taos in the northeast. The total area administered by the BLM Albuquerque District is **3,046,000** surface acres and **5,607,500** acres of oil and gas mineral (subsurface) estate.

SCOPE OF THE DOCUMENT

CONCERNS ANALYZED

Development of the BLM's land use plans (Resource Management Plans or RMPs) is generally based on the concerns expressed by other government agencies, the public, industry, special interest groups, and private organizations. Except for *closing some areas to leasing* and placing constraints on oil and gas leasing and development in SMAs, previous RMPs did not consider the management and impacts of oil and gas leasing and development because the concern was not identified at the time the RMPs were developed. Oil and gas leasing and development is the only concern addressed in this RMP amendment.

MANAGEMENT CONSTRAINTS ON OIL AND GAS LEASING AND DEVELOPMENT

During the leasing and development of federal oil and gas, management constraints or restrictions can be applied to protect other resources such as wilderness or wildlife habitat. These constraints are designed to ensure that the impacts of oil and gas development on these and other resources are avoided or reduced. Constraints can be applied at various times during the leasing and development process, and become more site-specific and detailed as the process continues.

An area of federal oil and gas can be classified as open or closed to leasing. Open areas can be leased and developed under standard lease terms and conditions, or constraints can be applied in the form of lease stipulations before the lease is put out for bid. When an operator is seeking to drill a well at a specific location on a lease, constraints can be applied in the form of Conditions of Approval (COAs) to the Application for a Permit to Drill (APD).

Three leasing determinations are to be made in this RMP Amendment/EIS:

1. Open to Leasing with Standard Lease Terms and Conditions (STCs);

2. Open to Leasing and Development with Stipulations. Lease stipulations include the following:

- a. Timing Limitation (Seasonal),
- b. Controlled Surface Use, or
- c. No Surface Occupancy;

3. Closed to Leasing and Development, either:

- a. Discretionarily, or
- b. Nondiscretionarily.

This document also identifies Conditions of Approval (COAs) applied at the development (APD) stage (Appendix B-3).

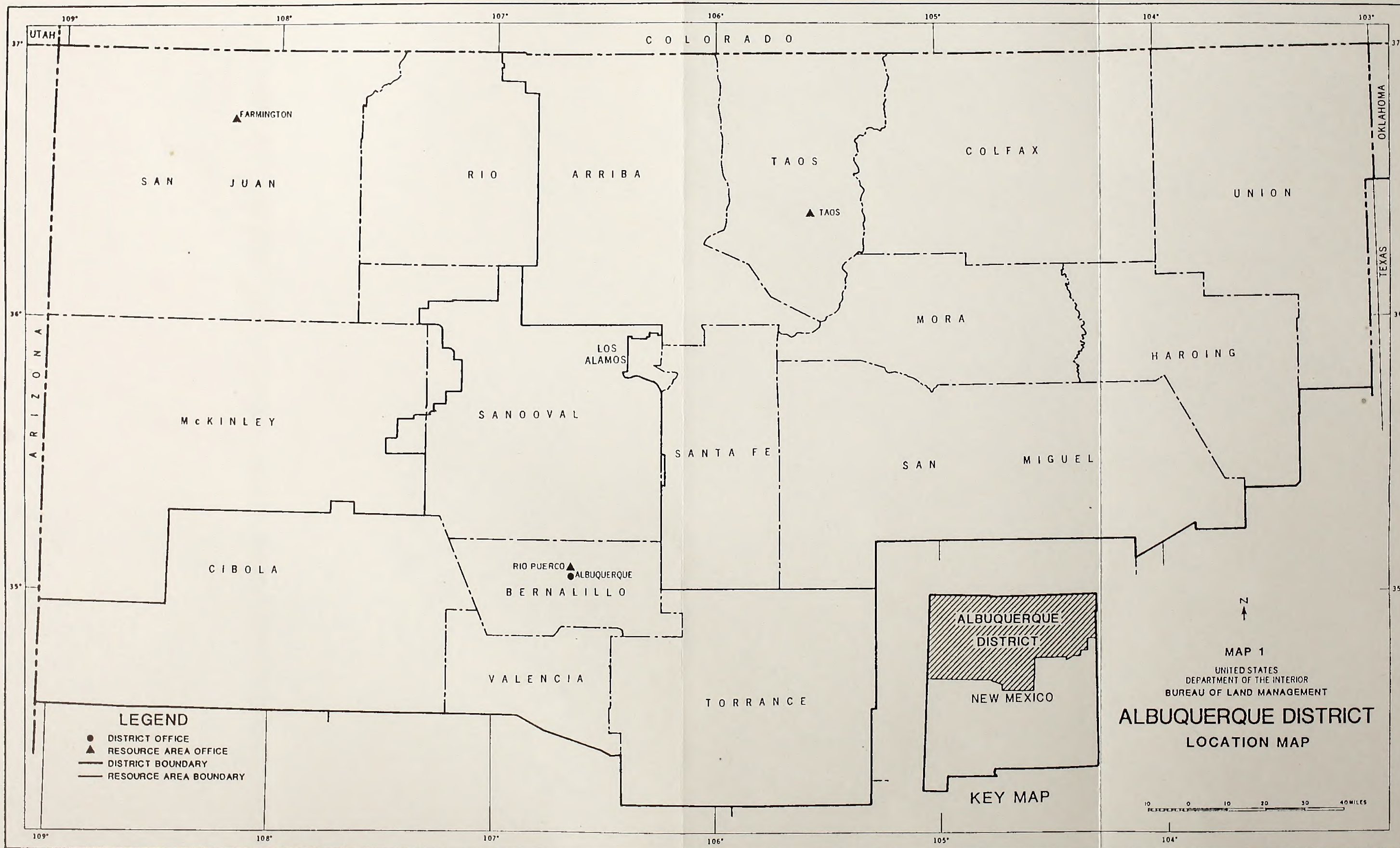
The management constraints that forbid surface occupancy and close certain areas to leasing (discretionarily) prohibit development in the areas where they are applied. Although the management constraints that specify timing (seasonal) closures and controlled surface use would affect development, lease holders would still be able to develop their leases.

OIL AND GAS RESOURCES CLOSED TO LEASING (NONDISCRETIONARILY)

The 1920 Mineral Leasing Act, as amended, authorizes the Secretary of the Interior to lease federal oil and gas resources on all public domain and acquired lands. Federal minerals excluded from such leasing by legislation or secretarial policy include those underlying units of the National Park System; National Wildlife Refuges; Indian reservations; incorporated cities, towns, and villages; and lands recommended for wilderness designation, wilderness study, or already within the National Wilderness Preservation System.

OTHER SURFACE MANAGING AGENCIES

This document addresses the impacts of federal oil and gas leasing and development regardless of the surface ownership, except for federal oil and gas underlying lands administered by the





U.S. Department of Agriculture, Forest Service (USFS). Land use planning for oil and gas resources under lands administered by the USFS is addressed in USFS Land and Resource Management Plans. As a cooperating agency on USFS plans, the BLM generally provides information about current oil and gas leasing and development, oil and gas occurrence potential, and reasonably foreseeable development (RFD) projections to the USFS.

When federal oil and gas are leased and developed on lands administered by other agencies, (e.g., the Forest Service, Corps of Engineers and Bureau of Reclamation), the BLM contacts the agency for consent to lease, specific surface protection lease stipulations, and mitigation requirements for field operations.

More restrictive stipulations can be added by the BLM. These stipulations apply to specific developmental and operational aspects of lease development that are not normally considered by other surface managing agencies.

INDIAN TRUST RESPONSIBILITY

Oil and gas leases for Indian mineral estate are issued by the U.S. Department of the Interior, Bureau of Indian Affairs (BIA). Occasionally, individual tribes or allottees enter into joint ventures or other non-lease agreements with private parties to develop Indian oil and gas resources. The BLM provides leasing advice and recommendations to the BIA, tribe, or allottee(s). The decision to lease or enter into a joint venture or agreement to develop Indian oil and gas is solely that of the BIA, the tribe, or the individual allottee.

The BLM approves oil and gas operations (APDs) and enforces regulations on Indian oil and gas leases under 43 CFR 3160 with the concurrence of the BIA, various tribes, and individual Indian allottees. Under the Indian Self-Determination Act, tribes may regulate oil and gas operations independently of other entities.

The BLM issues oil and gas leases where federal minerals underlie Indian-owned surface. The Indian surface owner (BIA, tribe, or allottee) is contacted for concurrence and to identify specific surface protection stipulations, if any, before the lease is issued.

SPLIT ESTATE (PRIVATE SURFACE/ FEDERAL MINERALS)

Management constraints prescribed for federal oil and gas leasing and development on split estate apply only to mineral development activities permitted by the BLM. On such mineral development, the BLM provides surface and subsurface constraints that ensure the environment is protected. These constraints do not restrict the activities of private landowners.

HISTORY AND BACKGROUND

FARMINGTON RESOURCE AREA

Commercial natural gas production began in the San Juan Basin in 1921, although extensive development of the oil and gas resources in the Farmington Resource Area (FRA) did not occur until the 1950s. Oil and gas leases cover much of the resource area. Of the 2,260,100 acres of federal oil and gas, **1,991,370** acres have been leased (refer to Table 1-1 and Figure 1-1). Of the total acres leased, 1,071,000 acres are held by production. Oil and gas production occurs from 160 oil fields and 114 gas fields.

A lease is held by production and does not expire if at least one producing well exists on it. A lease without production expires at the end of its initial term and becomes available for re-leasing. Once a well produces, the life of the lease is dependent on the well continuing to produce in paying quantities. If the well ceases production before the end of the initial lease term, the life of the lease ends with the initial term. Once production ceases and/or the initial terms ends, the lease expires and is made available for re-leasing.

Problems can occur in managing oil and gas and other resource values because most of the leases in the FRA were issued before passage of the

TABLE 1-1. ALBUQUERQUE DISTRICT FEDERAL OIL AND GAS ACREAGE

District/ Resource Area	Total	Leased	Unleased	Held by Production
ALBUQUERQUE DISTRICT TOTALS	5,607,500	2,849,065	2,758,435	1,129,803 ^U
FARMINGTON				
McKinley	512,600	295,187	217,413	16,425
Rio Arriba	510,700	510,700	-----	301,975
Sandoval	148,800	148,800	-----	88,708
San Juan	1,088,000	1,036,683	51,317	663,895
Subtotal	<u>2,260,100</u>	<u>1,991,370</u>	<u>268,730</u>	<u>1,071,003^U</u>
RIO PUERCO				
Bernalillo	74,600	5,273	69,327	----
Cibola	772,900	17,877	755,023	----
McKinley	18,900	-----	18,900	----
Sandoval	493,800	274,486	219,314	57,800
Torrance	449,300	32,151	417,149	----
Valencia	64,300	4,048	60,252	----
Subtotal	<u>1,873,800</u>	<u>333,835</u>	<u>1,539,965</u>	<u>57,800</u>
TAOS				
Colfax	40,300	10,201	30,099	----
Harding	208,600	94,031	114,569	1,000
Los Alamos	30,000	-----	30,000	----
Mora	39,700	27,174	12,526	----
Rio Arriba	239,400	236,930	2,470	----
San Miguel	225,600	15,708	209,892	----
Santa Fe	178,600	32,674	145,926	----
Taos	327,700	39,887	287,813	----
Union	183,700	67,255	116,445	----
Subtotal	<u>1,473,600</u>	<u>523,860</u>	<u>949,740</u>	<u>1,000</u>

Source: BLM Automated Lands and Minerals Records System (as of October, 1990).

Notes: ^UAn additional 170,000 acres is held by production under unitization and communitization agreements (Federal Report, December, 1990). This acreage is not included in the total.

Minerals Qua

FIGURE 1-1

FEDERAL OIL AND GAS ACRES BY LEASING STATUS AND RESOURCE AREA

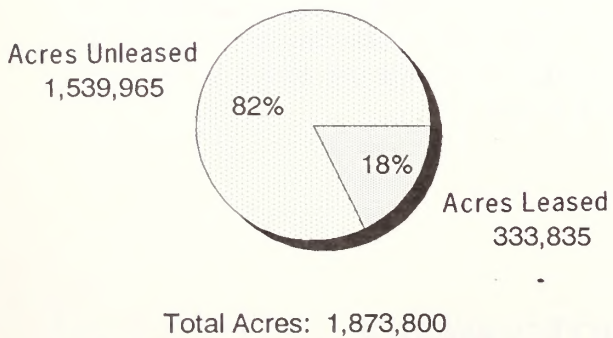
District Summary



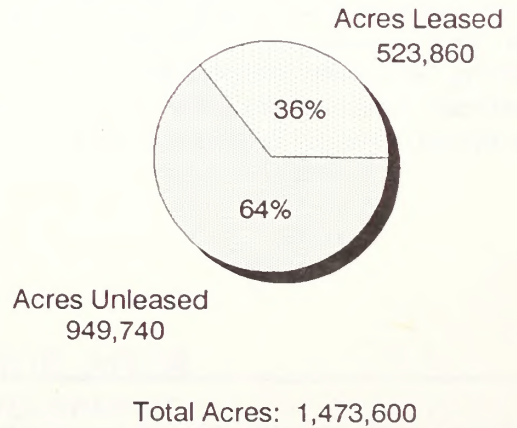
Farmington Resource Area



Rio Puerco Resource Area



Taos Resource Area



National Environmental Policy Act (NEPA) in 1969 and the Federal Land Policy and Management Act (FLPMA) in 1976. Most pre-NEPA leases do not contain the stipulations that are needed to adequately protect non-oil-and-gas resources from environmental impacts.

The various economic factors influencing oil and gas markets have resulted in alternating cycles of rapid and slow (boom and bust) development of these resources. Most recently, companies have begun efforts to extract coal gas from the Fruitland Formation. It is estimated that nearly 50 trillion cubic feet of gas are contained in the Fruitland Formation (Kelso and Wicks, 1988), in contrast to an estimated 14 trillion cubic feet for conventional wells in sandstone formations (Kemp and Petersen, 1988).

Technical problems associated with extracting coal gas have, until lately, made this gas uneconomical to produce. A federal tax incentive contained in Section 29 of the Internal Revenue Code has made drilling and production of non-conventional fuel sources such as coal gas more attractive.

Approximately 22,000 wells (producing or temporarily abandoned) exist in the FRA (based on information contained in the Petroleum Institute Newsletter and lease development files). Approximately 96 percent of the oil and gas development has occurred in 26 percent of the resource area (refer to Map 2). About 14,000 wells have been drilled on 1,349,000 acres in the northeast corner of San Juan County, with about 7,100 wells on 936,000 acres in the west half of Rio Arriba County. The remaining 4 percent of drilling (900 wells) has occurred primarily in the northeast corner of McKinley County and the northwest corner of Sandoval County.

To date, the amount of surface disturbance caused by oil and gas development is estimated to be 15,400 acres for well pads^{1/}, with an estimated 35,990 acres^{2/} of surface disturbance associated with roads. Figures for the road network are *included in the 37,990 acres*. The construction of new pipeline systems (gathering and transportation) for coal gas has resulted in new surface disturbances of 6,394 acres^{3/}, and surface impacts associated with salt water disposal wells are estimated to occur on 7,850 acres.

The total existing surface disturbance is estimated to be **65,629** acres. An estimated **60,383** acres of surface disturbance occurs within San Juan and Rio Arriba Counties, with another **5,251** acres occurring primarily in McKinley and Sandoval Counties.

RIO PUERCO RESOURCE AREA

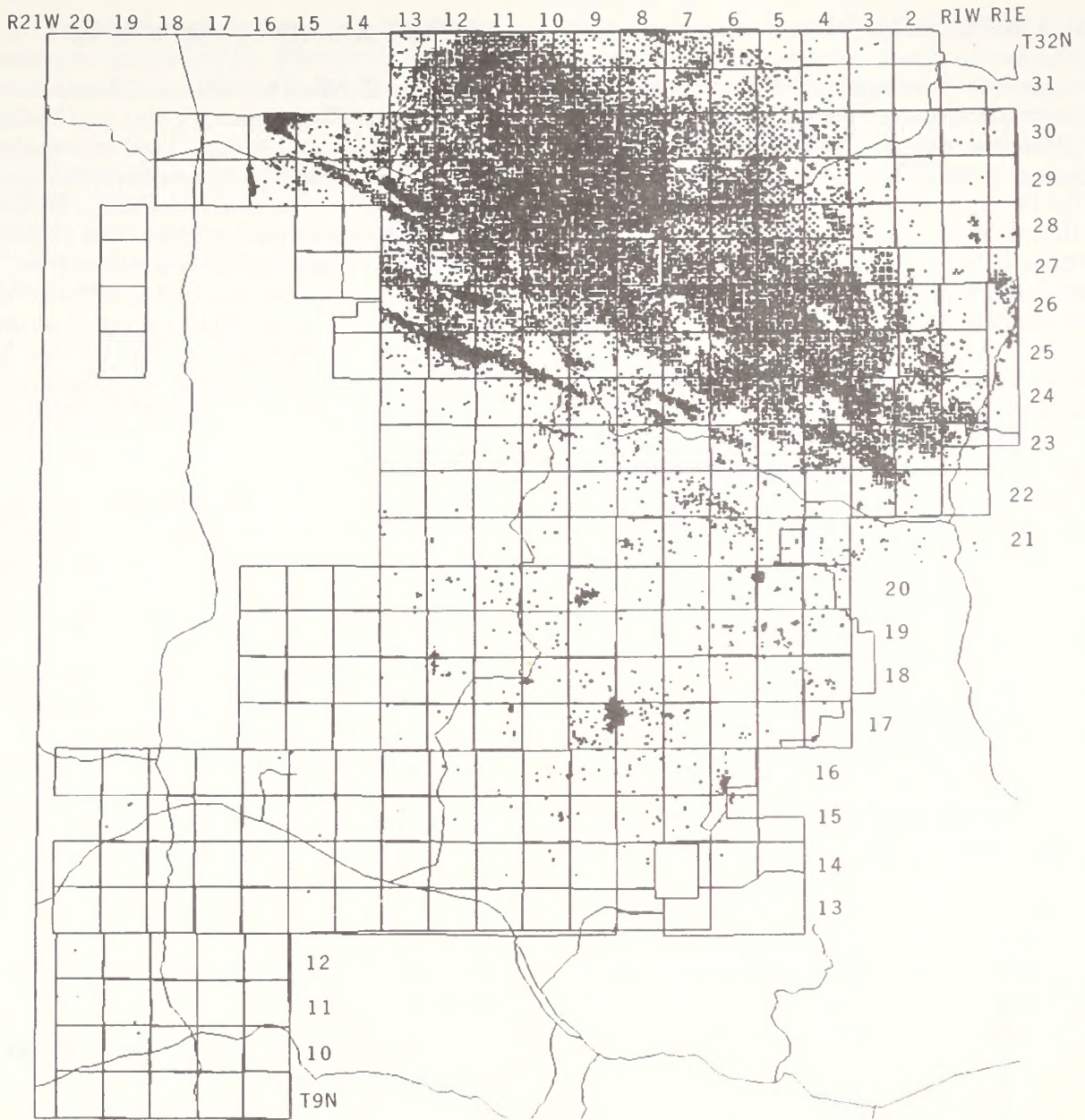
Because little development has occurred in this resource area, most of the oil and gas estate is available for leasing. Development in the Rio Puerco Resource Area (RPRA) is located in a concentrated area along the southern margin of the San Juan Basin in McKinley and Sandoval counties. Of the 1,873,800 oil and gas acres in the RPRA, 333,835 acres have been leased (refer to Table 1-1 and Figure 1-1). Approximately 17 percent (57,800 acres) of the leased area is held by production.

The number of wells in this resource area (producing and temporarily abandoned) is estimated to be 80. Approximately 80 acres remain in use for well pads. An estimated 383 acres of surface disturbance are associated with roads. Total surface disturbance related to oil and gas development in the RPRA is estimated to be **463** acres.

^{1/}Assumes 1 acre per well, with a 30-percent reduction in the 22,000 producing wells for twinned well locations.

^{2/}Assumes 2.4 acres per well for **14,750** conventional gas wells, and .9 acres per well for 650 coal gas wells.

^{3/}Assumes .7 acre per well for 650 coal gas wells, and 980 miles of pipeline with a 50-foot width (1 mile multiplied by 6.06 acres).

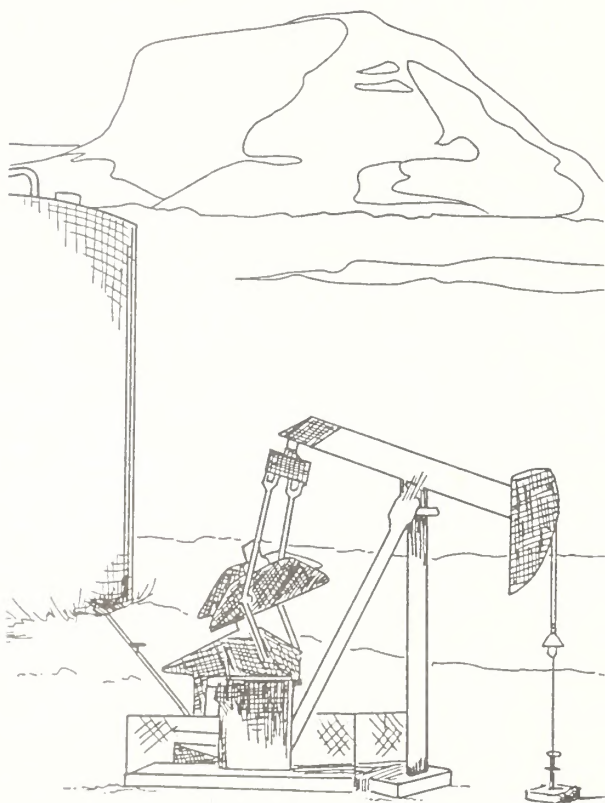


MAP 2
FARMINGTON RESOURCE AREA
EXISTING OIL AND GAS DEVELOPMENT
 (Wells represented by dots - darker areas
 indicate concentration of wells)

TAOS RESOURCE AREA

Because little development has occurred in this resource area, most of the oil and gas estate is available for leasing. Development in the Taos Resource Area (TRA) is located in the vicinity of the Bravo Dome, in Harding, Union, and Colfax counties. Of the 1,473,600 oil and gas acres in the TRA, 523,860 acres have been leased. Of this amount, 1,000 acres are held by production (refer to Table 1-1 and Figure 1-1).

Based on available data, 6 wells (5 producing and 1 shut-in) exist in the TRA. Approximately 6 acres remain in use for well pads, and about 44 acres of surface disturbance are associated with roads. Total oil-and-gas-related surface disturbance in the TRA is estimated to be **50** acres.



THE PLANNING PROCESS

Under the BLM's 1617 Manual (Resource Management Plan Approval, Use, and Modification), "A plan amendment is used to consider a proposal or action that...warrants further consideration before the plan is revised....There are three categories of plan amendments. These categories provide appropriate variation in procedures for use in considering different kinds of proposals. The variations are based on the significance of environmental impacts and the role of resource management decisions in a program activity decision sequence" (Manual 1617, Section .42).

This amendment is being prepared according to the procedures provided for a Category 3 amendment. Under this category, "The proposal considered through the amendment, if implemented, would have significant environmental impact."

Normally plan implementation does not occur "...until after a subsequent decision making process which involves EIS preparation" (Manual 1617, Section .42C.). However, the BLM has continued to issue oil and gas leases while this document has been prepared. New leases have been issued under existing RMP management policy, guidance, and decisions for each resource area.

The procedures for preparing a Category 3 amendment are:

1. Public and interagency coordination notices are published.
2. The planning issue(s) specific to the amendment proposal is (are) identified.
3. Planning criteria are developed, also specific to the amendment proposal.
4. A notice of the availability of the proposed planning criteria is published. The proposed planning criteria may be drafted and included in the public notice (1 above) if issues are well known.
5. Necessary data are collected.

6. Analysis of the management situation necessary to understand the relevant data and to support subsequent planning actions is completed.

7. Formulation of alternatives is completed, including a description of the proposed change in the plan and alternatives to be analyzed in detail (including no action) in terms relatable to the existing plan.

8. The beneficial and adverse consequences of the change and alternatives are analyzed using BLM planning and environmental analysis procedures necessary to fully understand the consequences of the proposed alternatives. This analysis includes examining the impact of the proposal and alternatives to the existing plan.

9. A *proposed* alternative is selected.

10. The Area Manager completes the preparation of the draft amendment and the District Manager recommends the amendment to the State Director. The State Director reviews the amendment and makes a proposed decision. The Draft Amendment/EIS is then prepared and distributed for public review. (Note: The BLM is at this step in the planning process. Alternative C has been selected by the District Manager as the *Proposed* Alternative.)

11. A consistency review is completed, including the Governor's review and modification of the *Proposed* Alternative, if necessary.

12. The State Director makes a decision and publishes a notice of the amendment decision. This notice clearly explains how the existing plan is being changed.

13. Protests are received for 30 days following the notice and resolved as appropriate.

14. A record of decision is prepared and implementation begins.

PLANNING ISSUES AND CRITERIA

The issues addressed in this amendment were identified by an interdisciplinary team of resource specialists with interagency consultation;

state government input; review by BLM managers; and extensive discussions and public meetings with individuals, industry representatives, and special interest groups. An issue is an opportunity, conflict, or problem regarding the use or management of public lands and resources.

Planning criteria are the standards, rules, and measures used in collecting data and formulating plan alternatives; they guide final plan selection. Planning criteria are taken from appropriate laws and regulations, guidance found in BLM manuals and directives, and concerns expressed in meetings and consultations, both with the public and other agencies.

The BLM planning regulations at 43 CFR 1600 equate land use planning with problem solving and issue resolution. Not all problems can be resolved through land use planning. Some may require changes in policy, budget, or law.

The following issues and their associated planning criteria have been identified for resolution in this amendment.

Issue 1. Determine if there is additional federal mineral estate that should be considered for oil and gas leasing.

Issue 2. Based on reasonable foreseeable development (RFD) scenarios, determine the effect of developing oil and gas leases in designated special management areas and other areas of concern.

Issue 3. Determine the impact of management constraints (lease stipulations and conditions of approval) on oil and gas development.

Issue 4. Identify the cumulative impacts of oil and gas development.

The planning criteria for Issues 1 through 3 are concerned with identifying (1) oil and gas resource occurrence potential, (2) the amount of leased acreage, producing and non-producing, (3) areas where development is occurring or is projected to occur, and (4) areas where leasing and/or development is occurring or could occur with management constraints.

Criteria for Issue 4 are based on identifying (1) the area where existing (and new) leases are issued under STCs, (2) the amount of oil and gas acreage that would not be available for future leasing and development, and (3) the least restrictive management constraints on new lease development that would protect resource values and uses. The effects of future development of existing and new leases have been considered during impact identification and analyses for this Plan Amendment/EIS.

The criteria used to determine the impacts on oil and gas resources are similar to those developed for determining the amount of oil and gas acreage available for leasing and development. These criteria are based primarily on identifying (1) the amount of oil and gas acreage that would not be available for leasing and development, (2) whether the type and extent of management constraints would protect resource values and uses, and (3) the effects of management constraints on future oil and gas development and production.

Issue 5. Determine if existing management constraints on oil and gas leasing and development are proper and sufficient to protect other resource values.

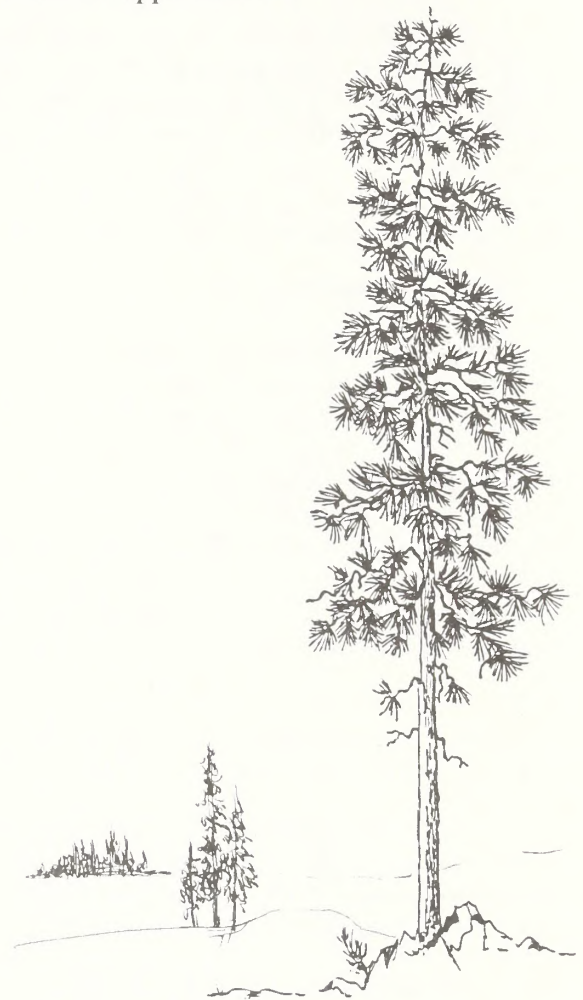
Issue 6. Identify management constraints necessary to address American Indian concerns and to protect wildlife, fragile soils, water resources, and other resource values.

The primary criteria for Issues 5 and 6 are based on determining (1) if continued management will adequately protect and preserve SMAs and other resource values, and (2) the implementability of management prescriptions and objectives in areas with current and future lease development. An additional criterion to consider is the necessity of applying stipulations to new leases in areas where existing leases may expire or terminate, particularly in SMAs with critical resource values.

Issue 7. Clarify the stipulations applied at the lease issuance stage and conditions of approval (COAs) applied before development activities begin.

BLM resource specialists have identified specific lease stipulations, COAs, and the area(s)

where they are required for future leasing and development. Because stipulations are applied at the leasing stage, they are general and apply to the entire lease. COAs, which are applied at the APD stage of lease development, apply to a particular well location. The COAs attached to each APD permit will be determined primarily by the proposed location of each well. The COAs usually considered and attached to APDs are listed in Appendix B-3.



ENVIRONMENTAL CONCERNS

The use of public land resources often impacts the human environment. The environmental concerns usually considered in RMPs and EISs are listed below. The first ten have been considered and evaluated. The evaluations have indicated that further analysis in this amendment is not warranted. Environmental concerns addressed in this document are discussed in the second listing of resource components.

Environmental Concerns Evaluated Not Warranting Further Analysis

1. Wild Horses and Burros

A single, small herd of wild horses and burros inhabits the Farmington Resource Area and moves between public and forest lands. Forage available to these animals is adequate. Because of the size of the herd, the size of the area used by the herd, and the resources available on both public and forest land, future oil and gas leasing and development will not affect the resources required to maintain this herd.

2. Air Quality

Future oil and gas leasing and development, together with the dust resulting from natural processes, may result in legal emission standards being exceeded in localized areas for short periods of time. Natural processes and the implementation of standard mitigation measures will result in fairly rapid dispersion of hydrocarbons, carbon dioxide, hydrogen sulfide, and natural emissions. As a result, future oil and gas leasing and development will not measurably affect air quality.

3. Vegetation and Non-Sensitive Habitat

During the life of this plan, it is estimated that 30,000 acres will be disturbed (.5 percent of the district-wide oil and gas acres). Of this total, approximately 14,000 acres will be affected by long-term disturbance for well pads and roads. The balance of the acreage will be rehabilitated in the short term. Well pads and roads will be abandoned and rehabilitated during the 20-year life of this plan amendment, so no net loss of vegetation is anticipated. Implementation of required management constraints will, in most instances, restore disturbed areas to near-predevelopment conditions over the long term and may result in increased forage production for wildlife and livestock use when compared to undisturbed areas. Because only a small part of the total acreage will be disturbed and the ongoing process of vegetative replacement will occur during development and abandonment, vegetative loss is only discussed as it relates to sensitive wildlife habitat and woodlands. Other vegetative uses will not be measureably affected

by oil and gas development and are not analyzed further in this document.

4. Grazing Management

Future lease development could result in the short-term, temporary loss of forage for livestock use. However, based on the limited, temporary amounts of forage taken out of production, the number of animals permitted to use forage on public lands will not change. New development that could affect range projects or facilities will be avoided as much as possible. In those instances when avoidance is not possible, management constraints will require companies to repair or replace these facilities. Therefore, future oil and gas development will not measurably affect grazing management.

5. Designated Wilderness Areas

Wilderness areas are withdrawn from oil and gas leasing upon congressional designation. Development of existing leases within wilderness areas is considered on a case-by-case basis. Any approved development must meet the non-impairment criteria of the Wilderness Act of 1964. Because such development must not impair wilderness values, oil and gas development impacts to designated wilderness will not be allowed. Therefore, impacts to wilderness values in designated wilderness are not addressed in this document.

6. Disposal of Produced Water

Concerns exist about the impacts that might occur from the disposal of produced water, especially that from Fruitland Formation (coal gas) wells. Development of coal gas wells generally includes withdrawal of appreciable amounts of water from sub-surface coal seams (beds). If shallow aquifers above are in communication with the coal beds, some depletion of those overlying aquifers may occur.

In the San Juan Basin, thick shales that are generally impermeable lie between the coals and the shallow aquifers. The presence of these shales, combined with the depth differential between the coals and the overlying useable aquifers, likely precludes the loss of shallow groundwater. In addition, evidence [such as

differences in pressure, water types, and water quality between the coal beds and adjacent (overlying and underlying) formations] indicates that the coals are a closed geologic system and most likely are not in communication with aquifers. If communication were to exist, this could be detected by analysis of produced water, which would change in quality and type to more closely resemble the shallow water composition.

The adequacy of current produced water disposal methods has been considered and a review of current information has been conducted during the preparation of this document. After review of state and federal regulatory requirements and the disposal procedures required of operators, produced water disposal operations are not expected to result in the contamination of aquifers. The information considered and determinations made on the adequacy of existing programs and permitting procedures are presented in Appendix B.

Impacts caused by produced water associated with older (conventional) wells or facilities are not analyzed in this document. Studies by the BLM and other agencies are ongoing or are proposed in areas of concern.

7. Methane (Coal Gas) Migration

Methane gas from the Fruitland (coal) Formation has been identified in private water wells and wells with cathodic protection in the Cedar Hill area of the Farmington Resource Area. This problem, identified in the last 5 years, is thought to occur as the result of methane gas migrating into aquifers along fractured rocks or in open areas (annular voids) around well casings of older (conventional) wells. A gas migration theory has been formulated by the New Mexico Oil Conservation Division (NMOCD) and BLM personnel (refer to Appendix E).

In November 1989, NMOCD issued an order requiring operators to perform remedial cementing to surround the well casing of older Fruitland Formation wells with cement. In February 1990, the BLM issued a notice to lessees to fully cement Fruitland well casings. It is felt that these measures, and current state and federal regulatory requirements and procedures required of and instituted by industry on newly drilled

wells, will preclude the problems of methane migration into aquifers. Because methane migration is a problem associated with old wells, and state-of-the-art drilling methods will prevent methane migration, this subject is not addressed further in this document.

8. Geothermal Resources

No geothermal leases exist on BLM-administered land in the Albuquerque District. Although authorized under separate statute and implemented by different regulations (43 CFR 3209), geothermal leasing and development procedures are virtually identical to those for oil and gas leasing and development. The same sequence of leasing actions and development activities, including the application of management constraints, is followed for both resources.

Geothermal resources are dropped from further consideration based on the low probability of their development occurring in the Albuquerque District during the 20-year life of this plan amendment.

9. Social and Economic Concerns

The development projected for the Rio Puerco and Taos Resource Areas under all alternatives during the next 20 years is 48 and 31 wells, respectively. Based on these numbers and the rate of development (5 percent per year), development of existing and new oil and gas leases will not create noticeable impacts on employment, income, or government revenues in these two resource areas.

The projected level of federal oil and gas development under all alternatives in the Farmington Resource Area should help to maintain the current levels of employment, personal income, and government revenues. San Juan County has a sufficiently large number of oil-and-gas-related jobs to be reported in the "mining sector" portion of the state's Covered Employment and Wages report for 1989. The figures show that oil and gas accounts for approximately 8 percent of the jobs and 12 percent of the income for non-agricultural wage and salary jobs. The counties receive taxes on oil and gas production and the sale of oil and gas equipment. In 1989, \$68.6 million in oil and gas

royalties were paid to the U.S. government, of which 50 percent was returned to the State of New Mexico.

Any change in revenues resulting from oil and gas leasing and development under all alternatives is expected to be less than 2 percent per year, which would result in no noticeable change in the social infrastructure and economy in San Juan County. Based on these figures, it is expected that this level of development would maintain the current level of oil and gas exploration, development, and production. For this reason, social and economic impacts are not addressed further in this document.

10. Hazardous Materials

The sites shown in Table 1-2 have been identified to contain hazardous substances and are in various stages of investigation. Until these sites have a recommended response action declared by the appropriate regulatory agency, all surface and subsurface authorizations will be suspended. Because these areas are small, and surface and subsurface authorizations will be suspended, this concern is dropped from further analysis in this document.

It is recognized that oil and gas development activities do generate wastes which are regulated pursuant to the Resource Conservation and Recovery Act (RCRA). Proper disposal of oil and gas generated waste material is regulated by the following State and Federal statutes:

New Mexico Solid Waste Act of 1990

New Mexico Hazardous Waste Act, as amended 1989

Resource Conservation and Recovery Act of 1976, Subtitle C and Subtitle D.

Oil Pollution Act of 1990 (Public Law 101-380, August 18, 1990) Title 1, Section 1006 (Natural Resources)

Environmental Concerns Addressed in This Document

1. Oil and Gas

A limited amount of oil and gas resources will be removed from or remain unavailable for future leasing and/or development in the Albuquerque District. Consideration of this oil

TABLE 1-2. HAZARDOUS MATERIAL SITES IN THE ALBUQUERQUE DISTRICT^{1/}

Site Name	ID Number	Location
Lee Acres Landfill	NMD980750020 ^{2/}	T 29 N, R 12 W, Section 23, NMPM San Juan County, NM
Kirtland Landfill	NMD980506059 ^{2/}	T 30 N, R 14 W, Section 31, NMPM San Juan County, NM
Flora Vista Landfill	NMD981599038 ^{2/}	T 30 N, R 12 W, Section 3, NMPM San Juan County, NM
Farmington South Landfill	NMD980864243 ^{2/}	T 29 N, R 13 W, Section 20, NMPM San Juan County, NM
Bloomfield Landfill	NM01411A0008 ^{3/}	T 29 N, R 11 W, Section 34, NMPM San Juan County, NM

Notes: ^{1/}All sites have been closed.

^{2/}Site identified by a number assigned by the Environmental Protection Agency (EPA).

^{3/}Site identified by a federal facility number assigned by the BLM; no EPA number has been assigned.

and gas acreage and the impacts to oil and gas production under all alternatives are included in this document.

2. Visual Resources

The development associated with leases results in the impairment to and/or loss of visual resource values, i.e., topography, line, color, form, and naturalness. Protection of these values in association with oil and gas leasing and development is required by federal laws and BLM policy. Non-impairment or minimal impairment of visual resources is limited primarily to areas placed in two visual resource management categories, Class I and Class II. Based on the need to manage for visual values and the potential impacts to both the visual and the oil and gas resources in the district, impacts to visual resources are considered in this document.

3. Recreation

Limited oil and gas development has occurred in the Rio Puerco and Taos Resource Areas. Additionally, management constraints on oil and gas leasing and development in many SMAs in resource areas are expected to preclude adverse impacts to recreation uses and activities.

However, extensive oil and gas activities have occurred and are projected to continue throughout much of the Farmington Resource Area. Exploration, development, and production activities could continue to result in the loss of areas available primarily for recreational use because leases exist in these areas. Analysis of the impacts on recreational use focuses on the type and amount of oil and gas facilities projected to occur as the result of future leasing and/or development in recreation management areas.

4. Wilderness Study Areas

Legislation prohibits the issuance of oil and gas leases in areas designated as wilderness study areas (WSAs). This prohibition remains in effect until each area is designated as wilderness or dropped from study. The final determination on and possible designation of new wilderness areas is scheduled to be completed by Congress in 1994.

Areas designated as wilderness are not available for leasing. The no-leasing policy may or may not remain in effect for areas that are not designated as wilderness. The leasing decisions and constraints implemented for other overlapping special area designations within a WSA [SMAs, ACECs, Cultural Resource Management Areas (CRMAs)] apply to portions of most WSAs.

Under existing RMPs, oil and gas leasing is excluded from many of the special areas. Those WSAs or portions of WSAs in which no overlapping special areas occur would be *moved from a closed to leasing (discretionarily) category to leasing with STCs category*. To determine how wilderness values would be affected if WSAs were leased with STCs, impact analysis is included in this document.

5. Wildlife

Limited oil and gas development under management constraints in the Rio Puerco and Taos Resource Areas is not expected to result in adverse impacts to wildlife. However, continued oil and gas development in the Farmington Resource Area will *continue to affect* wildlife habitat. Depending on the time of year, the type of activities, and the amount of development, wildlife may avoid areas of development. The analysis focuses primarily on the impacts anticipated to occur in SMAs and in habitat types critical to wildlife.

6. Threatened & Endangered Species

There are 27,611 acres within the Albuquerque District that have been identified as SMAs and ACECs for the protection of species that are proposed for listing, officially listed (T&E), or candidates for listing.

The BLM policy is to ensure the implementation of the Endangered Species Act of 1973 (16 U.S.C. 1531 et.seq.) as amended. Because the BLM is committed to complying with the ESA, other applicable laws, regulations, policies, and manual requirements, the development of oil and gas under any alternative will not be allowed to occur where such development would affect T&E or other Special Status Species or their habitats. The analysis focuses on the policies of the BLM, which in compliance with the ESA,

will not allow impacts on T&E and other Special Status Species.

7 and 8. Soils and Hydrology

An extensive road and pipeline network to support oil and gas development has been established in the Farmington Resource Area since the 1950s. An estimated **65,630** acres are *dedicated to* long-term use for well pads, production facilities, roads, and pipelines. *Approximately 45 to 50% of the area disturbed during installation of roads, pipelines and well pads is not needed during the production phase and is revegetated. Analysis of impacts to the soil and water resources is primarily concerned with estimating future sediment yields from new oil and gas development.*

9 and 10. Cultural Resources and Paleontology

The protection and preservation of cultural and paleontological resources is required under existing laws and regulations. Impact analysis is concerned with identifying and analyzing the potential effects of oil and gas development on

these resources. Impact analysis focuses on how well these resources can be managed in areas of high oil and gas development, particularly under the mandate of protecting and preserving artifacts, fossils, and the information potential of a cultural or paleontological site.

11. Forestry

U.S. Forest Service inventory of the Albuquerque District shows a rather extensive vegetative climax forest type known as woodland (731,000 acres). Forest acres (28,000) within the district are limited to isolated tracts scattered over the higher elevations and mesas.

The BLM's policy for managing these resources is directed at preserving and improving the remaining forested areas in the district. The type and extent of impacts caused by oil and gas development projected to occur in or adjacent to forested areas is analyzed. The impact analysis focuses on the type and amount of development that would result in reduced amounts of forest and woodland habitats.



Plan Alternatives and Management Constraints

Chapter 2



CHAPTER 2

PLAN ALTERNATIVES AND CONTINUING MANAGEMENT GUIDANCE

INTRODUCTION

This chapter contains two sections, the first of which discusses plan alternatives and the second, continuing management guidance. The first section outlines three proposed plan alternatives that represent different levels of future oil and gas leasing and development. The alternatives are based on the range of actions usually considered in land use planning, i.e., resource protection through full production. Each alternative presents a different blend of resource allocations and emphases.

The second section of the chapter summarizes continuing management guidance. It contains the basic policy applicable to the various resource management programs for which the Bureau of Land Management (BLM) is responsible, regardless of which alternative is selected.

Multiple land use decisions have been made for each of the resource areas of the Albuquerque District in existing Resource Management Plans (RMPs). This RMP Amendment constitutes planning for oil and gas mineral resources. The amendment establishes the management constraints needed for future oil and gas leasing and development. This amendment updates existing management decisions that pertain to the oil and gas resource in the previous RMPs. Those public land resources and programs not addressed in this document will continue to be managed under the existing RMPs and as outlined in this chapter in the section on continuing management guidance.

PLAN ALTERNATIVES

INTRODUCTION

The National Environmental Policy Act, the BLM's land use planning regulations (43 CFR 1600), and BLM Handbook 1624-H require the agency to "rigorously explore and objectively evaluate all reasonable alternatives." Three alternatives have been developed to address the issue of federal oil and gas leasing and development in the Albuquerque District. They are the Current Management (No Action), Production, and *Proposed* Alternatives. These alternatives were developed to analyze two actions: (1) different levels of oil and gas leasing and development, and (2) varying degrees of protection and preservation for resource values and uses, particularly in Special Management Areas (SMAs).

The No Action Alternative (Alternative A) evaluates the continued implementation of existing land use plans (Resource Management Plans or RMPs), policies, and decisions, while the other two alternatives evaluate changes to existing RMPs. The Production Alternative (Alternative B) gives oil and gas leasing and development priority over other resource values and uses. The *Proposed* Alternative (Alternative C) focuses on (1) protecting and preserving the resource values in SMAs, and (2) implementing the least restrictive constraints that will provide adequate resource protection while allowing oil and gas leasing and development to occur. These alternatives provide a reasonable range of options to guide oil and gas leasing and development in the Albuquerque District.

Forecasts for reasonably foreseeable development (RFD) of oil and gas resources (under existing management, the *Proposed* and Production Alternatives) have been made for the district (refer to Appendix B-4). The RFDs apply to federal leasing and development, and predicts the number of wells, the extent of roads and pipelines, and ancillary facilities to be developed during the next 20 years.

Based on the amount of oil and gas acreage and the number of wells projected to be drilled, an average number of acres per well has been developed by county (refer to Table 2-1). These figures represent the projected well density or frequency by county, and have been used primarily to estimate the number of wells that could be drilled in SMAs. The acreage that could be disturbed in an SMA has been calculated by multiplying the number of wells projected to be drilled in the SMA by the acreage required to drill and develop each well.



In addition to the average acres per well (density) for impact analyses, areas of high and low levels of existing development have been identified. The area with the highest concentration of wells in the Albuquerque District occurs in the Farmington Resource Area; it has been identified as a "high-intensity development region." The high-intensity development regions for the Rio Puerco and Taos Resource Areas are smaller areas in which development has occurred or is occurring. The balance of each resource area has been identified as a low-intensity development region.

Based on the extent of previous development in the high-intensity development regions, it is assumed that 90 percent of future well development will occur in these same areas. The remaining 10 percent will be distributed throughout the low-intensity development region of each resource area.

BLM policy for federal well spacing is to accept the well spacing units established by the New Mexico Oil Conservation Division (NMOCD). Well spacing for lease development is expected to continue at levels currently set by the NMOCD. Well spacing for conventional oil wells is 40 acres; gas wells are limited to a placement of one well within 160 acres. This standard applies to most geological formations in which oil and gas drilling could occur. Based on the current standards, a well could be drilled to every producing formation in a 160-acre area. In this instance, and depending on the number of producing formations, four to five wells could be drilled in a 160-acre area.

Well spacing for gas wells in the Fruitland Formation, a coal-bearing layer present in the San Juan Basin of the Farmington Resource Area, is one well per 320 acres.

The amount of acreage (and wells) projected to be developed under the Production Alternative is based on the total numbers developed for the RFD (refer to Table 2-2). The amount of acreage (and wells) projected to be developed under the No Action and *Proposed* Action Alternatives is based on the acres that remain available for development after areas are closed to leasing or management constraints are applied.

Stipulations are attached to new leases and modify rights *that would normally be* granted under standard terms and conditions (STCs). Conditions of Approval (COAs) are attached to Applications for a Permit to Drill (APDs). Until existing unstipulated leases expire or terminate and are re-leased with stipulations, the BLM will apply the management constraints presented in this document to those leases.

Federal oil and gas leasing and development occurs on lands where the surface is managed by federal, state, or Indian agencies, or by private individuals. The BLM's management constraints apply only where the BLM manages the surface. Constraints are applied to oil and gas development in consultation with the surface manager or owner.

**TABLE 2-1. ALBUQUERQUE DISTRICT - WELL DENSITY PROJECTIONS
FOR AREAS OF HIGH- AND LOW-INTENSITY DEVELOPMENT
(acres per well)**

District/ Resource Area	Total Development			High-Intensity Development Region			Low-Intensity Development Region		
	Fed'l. O&G Acres	Proj. Fed'l. Wells ^{1/}	Acres per Well ^{2/}	Fed'l. O&G Acres	Proj. Fed'l. Wells ^{1/}	Acres per Well ^{2/}	Fed'l. O&G Acres	Proj. Fed'l. Wells ^{1/}	Acres per Well ^{2/}
	ALBUQUERQUE DISTRICT								
TOTAL	5,607,500	4,812	1,165	1,425,200	4,228	337	4,182,300	584	7,161
Farmington									
Sandoval	148,800	15	9,920				148,800	15	9,920
McKinley	512,600	63	8,137				512,600	63	8,137
San Juan	1,088,000	3,500	311	732,480	3,150	233	355,520	350	1,016
Rio Arriba	<u>510,700</u>	<u>1,155</u>	442	<u>273,600</u>	<u>1,040</u>	263	<u>237,100</u>	<u>115</u>	2,062
Subtotal/Avg.	2,260,100	4,733	478	1,006,080	4,190	240	1,254,020	543	2,309
Rio Puercio									
Bernalillo	74,600	1	74,600				74,600	1	74,600
Cibola	772,900	6	128,817				772,900	6	128,817
Torrance	449,300	9	49,922				449,300	9	49,922
Valencia	64,300	1	64,300				64,300	1	64,300
Sandoval	493,800	31	15,929	323,520	28	11,554	170,280	3	56,760
McKinley	<u>18,900</u>	<u>0</u>	0	<u> </u>	<u>—</u>		<u>18,900</u>	<u>0</u>	0
Subtotal/Avg.	1,873,800	48	39,038	323,520	28	11,554	1,550,280	20	77,514
Taos									
Colfax	40,300	15	2,687				40,300	15	2,687
Harding	208,600	7	29,800	68,480	6	11,413	140,120	1	140,120
Mora	39,700	0	0				39,700	0	0
Rio Arriba	239,400	1	239,400				239,400	1	239,400
San Miguel	225,600	1	225,600				225,600	1	225,600
Santa Fe	178,600	2	89,300				178,600	2	89,300
Taos	327,700	1	327,700				327,700	1	327,700
Union	183,700	4	45,925	27,120	4	6,780	156,580	0	0
Los Alamos	<u>30,000</u>	<u>0</u>	0	<u> </u>	<u>—</u>		<u>30,000</u>	<u>0</u>	0
Subtotal/Avg.	1,473,600	31	47,535	95,600	10	9,560	1,378,000	21	65,619

Notes: ^{1/}Figures based on RFD well projections.
^{2/}Oil and gas acreage divided by the projected number of wells.

**TABLE 2-2. REASONABLY FORESEEABLE DEVELOPMENT
FEDERAL OIL AND GAS ACREAGE**

District/Resource Area/Item	No Action Alternative	Production Alternative	Proposed Alternative
Albuquerque District			
Acres available for development ^{1/}	5,089,500	5,194,600	5,081,500
Wells drilled/20 years	4,604	4,812	4,542
Acres disturbed/20 years	29,698	31,308	29,578
Wells drilled/year	230	241	227
Acres disturbed/year	1,498	1,566	1,478
Acres unavailable for development ^{2/}	105,500	0	138,700
Wells lost/20 years	208	0	270
Wells lost/year	10	0	14
Farmington Resource Area			
Acres available for development ^{1/}	2,139,000	2,205,700	2,163,900
Wells drilled/20 years	4,527	4,733	4,465
Acres disturbed/20 years	28,520	29,818	28,130
Wells drilled/year	226	237	223
Acres disturbed/year	1,426	1,491	1,406
Acres unavailable for development ^{2/}	66,700	0	98,400
Wells lost/20 years	206	0	268
Wells lost/year	10	0	13
Rio Puerco Resource Area			
Acres available for development ^{1/}	1,557,000	1,566,300	1,524,600
Wells drilled/20 years	47	48	47
Acres disturbed/20 years	620	634	620
Wells drilled/year	2.3	2.4	2.3
Acres disturbed/year	31	32	31
Acres unavailable for development ^{2/}	9,700	0	9,700
Wells lost/20 years	1	0	1
Wells lost/year	<1	0	<1
Taos Resource Area			
Acres available for development ^{1/}	1,393,500	1,422,600	1,393,000
Wells drilled/20 years	30	31	30
Acres disturbed/20 years	828	856	828
Wells drilled/year	1.5	1.5	1.5
Acres disturbed/year	41	43	41
Acres unavailable for development ^{2/}	28,100	0	30,600
Wells lost/20 years	1	0	1
Wells lost/year	<1	0	<1

Notes: ^{1/} Does not include Closed to Leasing and No Surface Occupancy acreage.

^{2/} Acreage from the Closed to Leasing (Discretionarily) and No Surface Occupancy categories (refer to Table 2-3)

ALTERNATIVE A: CURRENT MANAGEMENT (NO ACTION)

Under this alternative, existing policy and decisions established in each RMP for resource programs would remain in effect. Management of oil and gas resources would continue as specified in the existing RMPs. Development of existing leases would continue in accordance with the terms and conditions of the lease.

New leases would continue to be issued under this alternative in accordance with the decisions in the existing RMPs. The BLM would continue to implement Section 6 of lease form 3100-11 to require lessees to conduct operations in a manner that would minimize adverse impacts to resources, land uses, and users.

Under this alternative, SMAs designated as Wilderness Study Areas (WSAs) would be closed nondiscretionarily. If these WSAs were dropped by Congress from wilderness consideration and were not assigned other special status designations in *the previous RMPs*, they would be open to leasing and development under STCs.

ALBUQUERQUE DISTRICT

A total of 5,607,500 oil and gas acres exist in the district. Under this alternative, management policy and decisions would affect leasing and/or development on approximately 485,500 acres, which would be closed to leasing (discretionarily and nondiscretionarily; refer to Tables 2-3, 2-4, Appendix A and Figure 2-1). Development of existing leases in these areas would continue to be considered on a case-by-case basis.

Under this alternative, 4,307,800 acres would be available for leasing and development with the BLM's standard lease terms and conditions (STCs; refer to Appendix B). On the remaining 814,200 acres, management constraints would be attached to new leases as lease stipulations. The constraints would be attached as COAs for APDs approved on existing leases after *consultation* with the lessee(s).

The RFD projects the development of 4,604 wells over the 20-year life of this plan amendment, primarily on existing federal oil and gas leases (refer to Table 2-2). Surface disturbance associated with developing these wells would occur on 29,968 acres for well pads, road ties, pipeline ties, miscellaneous disturbance, and produced water disposal wells. It is expected that this disturbance would occur at the rate of 5 percent (1,498 acres) per year. Successful rehabilitation of well pads and pipeline rights-of-way would reduce the amount of long-term surface disturbance.

FARMINGTON RESOURCE AREA

A total of 2,260,100 oil and gas acres exist in this resource area. Approximately 118,100 acres would be closed to leasing (discretionarily and nondiscretionarily; refer to Appendix A, Tables 2-3, 2-4, and Figure 2-2). Development of existing leases in these areas would continue to be considered on a case-by-case basis.

Under this alternative, 1,555,000 acres would be available for leasing and development with the BLM's STCs (refer to Appendix B). On the remaining 587,000 acres, management constraints would be attached to new leases as lease stipulations. The constraints would be attached as COAs for APDs approved on existing leases after *consultation* with the lessee(s).

The RFD projects the development of 4,527 wells over the 20-year life of this plan amendment, primarily on existing federal oil and gas leases (refer to Table 2-2). Surface disturbance associated with developing these wells would occur on 28,520 acres for well pads, road ties, pipeline ties, miscellaneous disturbance, and produced water disposal wells. It is expected that this disturbance would occur at the rate of 5 percent (1,426 acres) per year. Successful rehabilitation of well pads and pipeline rights-of-way would reduce the amount of long-term surface disturbance.

**TABLE 2-3. FEDERAL OIL AND GAS ACREAGE
AVAILABLE FOR LEASING AND/OR DEVELOPMENT
BY MANAGEMENT CATEGORY AND AREA
(acres rounded to nearest hundred)**

Alternative/ Management Category	Albuquerque District	Farmington Resource Area	Rio Puerco Resource Area	Taos Resource Area
<u>No Action Alternative</u>				
CLOSED				
Discretionarily ^{1/ 2/}	72,600	63,700	2,900	6,000
Nondiscretionarily ^{3/ 4/}	412,900	54,400	307,500	51,000
CLOSED TOTAL	485,500	118,100	310,400	57,000
OPEN				
With standard terms/ conditions	4,307,800	1,555,000	1,512,300	1,240,500
With constraints				
Timing limitation ^{5/}	605,700	584,000	14,700	7,000
Controlled surface use ^{6/}	176,000	0	30,000	146,000
No surface occupancy ^{4/}	32,800	3,000	6,400	23,100
CONSTRAINTS TOTAL	814,500	587,000	51,100	176,100
OPEN TOTAL	5,089,100	2,142,000	1,563,400	1,416,600
GRAND TOTAL	5,607,500	2,260,100	1,873,800	1,473,600
<u>Production Alternative</u>				
CLOSED				
Discretionarily ^{1/}	0	0	0	0
Nondiscretionarily ^{3/4/ 7/}	412,900	54,400	307,500	51,000
CLOSED TOTAL	412,900	54,400	307,500	51,000
OPEN				
With standard terms/ conditions	5,194,600	2,205,700	1,566,300	1,422,600
With constraints				
Timing limitation ^{5/}	0	0	0	0
Controlled surface use ^{6/}	0	0	0	0
No surface occupancy ^{4/}	0	0	0	0
CONSTRAINTS TOTAL	0	0	0	0
OPEN TOTAL	5,194,600	2,205,700	1,566,300	1,422,600
GRAND TOTAL	5,607,500	2,260,100	1,873,800	1,473,600

TABLE 2-3 (concluded)

Alternative/ Management Category	Albuquerque District	Farmington Resource Area	Rio Puerco Resource Area	Taos Resource Area
<i>Proposed Alternative</i>				
CLOSED				
Discretionarily ^{1/2/}	36,300	21,100	3,000	12,200
Nondiscretionarily ^{3/4/}	412,900	54,400	307,500	51,000
CLOSED TOTAL	449,200	75,500	310,500	63,200
OPEN				
With standard terms/conditions	4,589,800	1,848,700	1,501,300	1,240,500
With constraints				
Timing limitation ^{5/}	133,500	126,500	0	7,000
Controlled surface use ^{6/}	358,200	189,400	23,300	145,500
No surface occupancy ^{4/}	44,800	20,700	6,700	17,400
Timing and controlled use	32,000	0	32,000	0
CONSTRAINTS TOTAL	568,500	336,600	62,000	169,900
OPEN TOTAL	5,158,300	2,184,600	1,563,300	1,410,400
GRAND TOTAL	5,607,500	2,260,100	1,873,800	1,473,600

- Notes:
- ^{1/} Closed to leasing based on management constraints for SMAs/ACECs.
 - ^{2/} If WSAs (currently under a nondiscretionary closure) are not designated wilderness, they would be discretionarily closed to leasing.
 - ^{3/} Closed to new leasing (nondiscretionarily) by a congressional designation or mineral withdrawals.
 - ^{4/} This oil and gas acreage is considered unavailable for development for purposes of impact analysis.
 - ^{5/} Timing limitations required to protect deer and elk winter range.
 - ^{6/} Controlled surface use to protect resource values and uses in SMAs and ACECs.
 - ^{7/} If WSAs were not designated, they would be open to leasing under standard terms and conditions.

**TABLE 2-4. FEDERAL OIL AND GAS ACREAGE
AVAILABLE FOR LEASING AND/OR DEVELOPMENT
BY MANAGEMENT CATEGORY AND ALTERNATIVE
(acres rounded to nearest hundred)**

District/Resource Area Management Category	No Action Alternative	Production Alternative	Proposed Alternative
Albuquerque District			
CLOSED			
Discretionarily ^{1/2/}	72,600	0	36,300
Nondiscretionarily ^{3/}	412,900 ^{2/4/}	412,900 ^{5/}	412,900 ^{2/4/}
CLOSED TOTAL	485,500	412,900	449,200
OPEN			
With standard terms/conditions	4,307,800	5,194,600	4,589,800
With constraints			
Timing limitation ^{6/}	605,700	0	133,500
Controlled surface use ^{7/}	176,000	0	358,200
No surface occupancy	32,500 ^{4/}	0	44,800 ^{4/}
CONSTRAINTS TOTAL	814,200	0	568,500
OPEN TOTAL	5,122,000	5,194,600	5,158,300
GRAND TOTAL	5,607,500	5,607,500	5,607,500
Farmington Resource Area			
CLOSED			
Discretionarily ^{1/2/}	63,700	0	21,100
Nondiscretionarily ^{3/}	54,400 ^{2/4/}	54,400 ^{5/}	54,400 ^{2/4/}
CLOSED TOTAL	118,100	54,400	75,500
OPEN			
With standard terms/conditions	1,555,000	2,205,700	1,848,000
With constraints			
Timing limitation ^{6/}	584,000	0	126,500
Controlled surface use ^{7/}	0	0	189,400
No surface occupancy	3,000 ^{4/}	0	20,000 ^{4/}
CONSTRAINTS TOTAL	587,000	0	336,600
OPEN TOTAL	2,142,000	2,205,700	2,184,600
GRAND TOTAL	2,260,100	2,260,100	2,260,100

TABLE 2-4. (concluded)

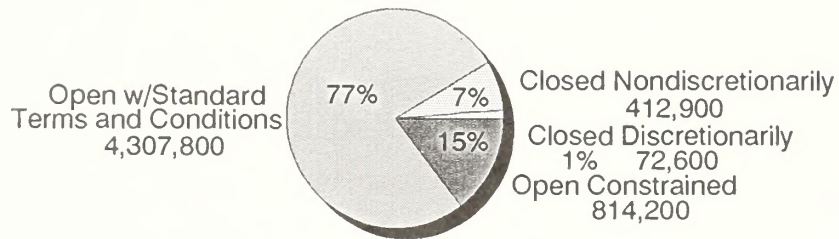
District/Resource Area/ Management Category	No Action Alternative	Production Alternative	Proposed Alternative
Rio Puerco Resource Area			
CLOSED			
Discretionarily ^{1/2/}	2,900	0	3,000
Nondiscretionarily ^{3/}	307,500 ^{2/4/}	307,500 ^{5/}	307,500 ^{2/4/}
CLOSED TOTAL	310,400	307,500	310,500
OPEN			
With standard terms/conditions	1,512,300	1,566,300	1,501,300
With constraints			
Timing limitation ^{6/}	14,700	0	0
Controlled surface use ^{7/}	30,000	0	23,300
No surface occupancy	6,400 ^{4/}	0	6,700 ^{4/}
Timing and controlled use	0	0	32,000
CONSTRAINTS TOTAL	51,100	0	62,000
OPEN TOTAL	1,563,400	1,566,300	1,563,300
GRAND TOTAL	1,873,800	1,873,800	1,873,800
Taos Resource Area			
CLOSED			
Discretionarily ^{1/2/}	6,000	0	12,200
Nondiscretionarily ^{3/}	51,000 ^{2/4/}	51,000 ^{5/}	51,000 ^{2/4/}
CLOSED TOTAL	57,000	51,000	63,200
OPEN			
With standard terms/conditions	1,240,500	1,422,600	1,240,500
With constraints			
Timing limitation ^{6/}	7,000	0	7,000
Controlled surface use ^{7/}	146,000	0	145,500
No surface occupancy	23,100 ^{4/}	0	17,400 ^{4/}
CONSTRAINTS TOTAL	176,100	0	169,900
OPEN TOTAL	1,416,600	1,422,600	1,410,400
GRAND TOTAL	1,473,600	1,473,600	1,473,600

- Notes: ^{1/} Closed to leasing based on management constraints for SMAs/ACECs.
^{2/} If WSAs (currently under a nondiscretionary closure) *are* designated wilderness, they would be discretionarily closed to leasing.
^{3/} Closed to new leasing (nondiscretionarily) by a congressional designation and by mineral withdrawals.
^{4/} This oil and gas acreage is considered unavailable for development for purposes of impact analysis.
^{5/} If WSAs were not designated wilderness, WSA acres would be open to leasing.
^{6/} Timing limitations required to protect deer and elk winter range.
^{7/} Controlled surface use required to protect resource values and uses in SMAs and ACECs.

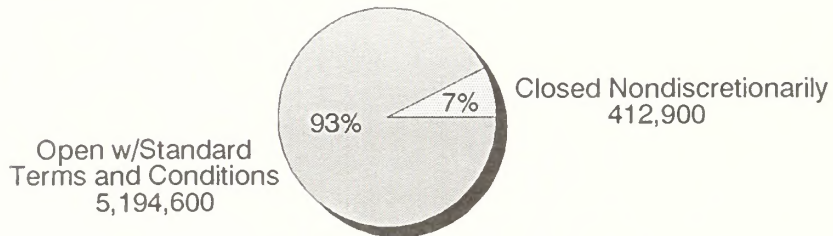
FIGURE 2-1 MANAGEMENT CATEGORIES BY ALTERNATIVE

District Summary

No Action Alternative (acres)



Production Alternative (acres)



Proposed Alternative (acres)

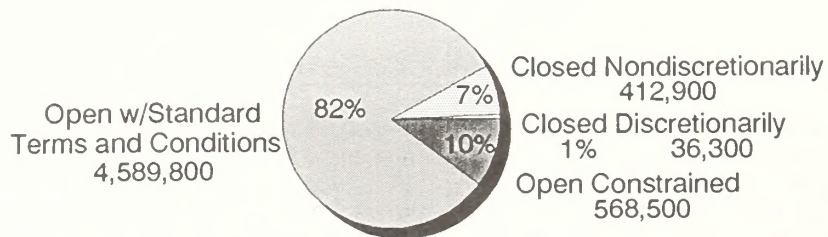
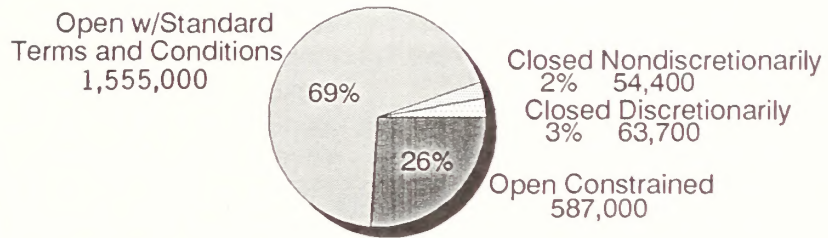


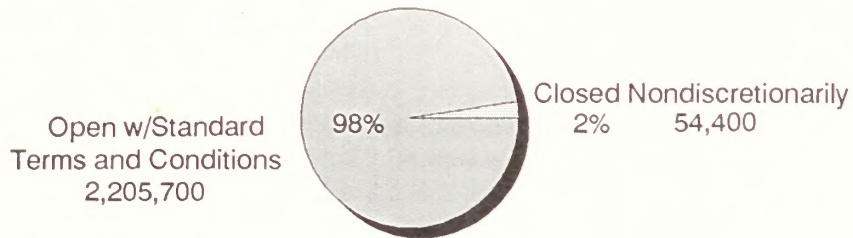
FIGURE 2-2 MANAGEMENT CATEGORIES BY ALTERNATIVE

Farmington Resource Area

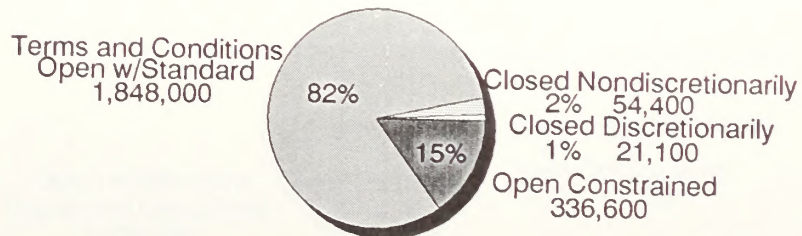
No Action Alternative (acres)



Production Alternative (acres)



Proposed Alternative (acres)



RIO PUERCO RESOURCE AREA

A total of 1,873,800 oil and gas acres exist in this resource area. Approximately 310,400 acres would be closed to leasing (discretionarily and nondiscretionarily; refer to Appendix A, Tables 2-3, 2-4, and Figure 2-3). Development of existing leases in these areas would continue to be considered on a case-by-case basis.

Under this alternative, 1,512,300 acres would be available for leasing and development with the BLM's STCs (refer to Appendix B). On the remaining 51,100 acres, management constraints would be attached to new leases as lease stipulations. The constraints would be attached as COAs for APDs approved on existing leases after consultation with the lessee(s).

The RFD projects the development of 47 wells over the 20-year life of this plan amendment, primarily on existing federal oil and gas leases (refer to Table 2-2). Surface disturbance associated with developing these wells would occur on 620 acres for well pads, road ties, and pipeline ties. It is expected that this disturbance would occur at the rate of 5 percent (31 acres) per year. Successful rehabilitation of well pads and pipeline rights-of-way would reduce the amount of long-term surface disturbance.

TAOS RESOURCE AREA

A total of 1,473,600 oil and gas acres exist in this resource area. Management policy and decisions would affect leasing and/or development on approximately 57,000 acres, which would be closed to leasing (discretionarily and nondiscretionarily; refer to Appendix A, Tables 2-3, 2-4, and Figure 2-4). Development of existing leases in these areas would continue to be considered on a case-by-case basis.

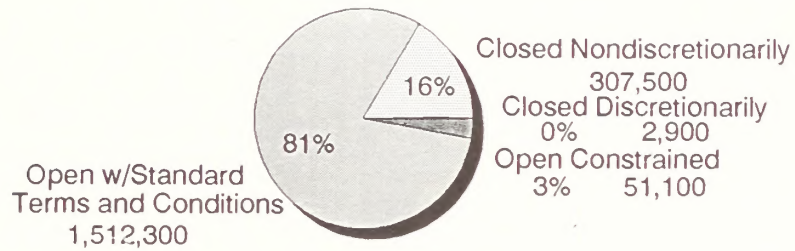
Under this alternative, 1,240,500 acres would be available for leasing and development with the BLM's STCs (refer to Appendix B). On the remaining 176,100 acres, management constraints would be attached to new leases as lease stipulations. The constraints would be attached as COAs for APDs approved on existing leases after consultation with the lessee(s).

The RFD projects the development of 30 wells over the 20-year life of this plan amendment, primarily on existing federal oil and gas leases (refer to Table 2-2). Surface disturbance associated with developing these wells would occur on 828 acres for well pads, road ties, and pipeline ties. It is expected that this disturbance would occur at the rate of 5 percent (41 acres) per year. Successful rehabilitation of well pads and pipeline rights-of-way would reduce the amount of long-term surface disturbance.

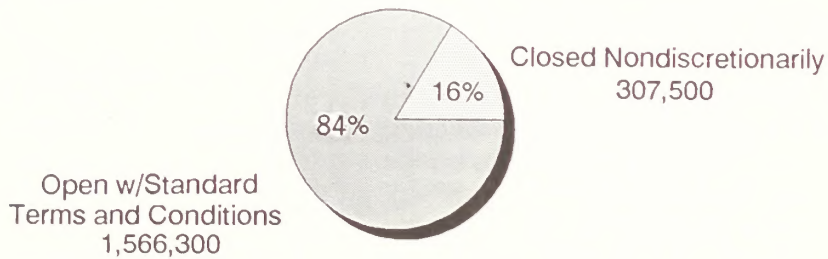
FIGURE 2-3 MANAGEMENT CATEGORIES BY ALTERNATIVE

Rio Puerco Resource Area

No Action Alternative (acres)



Production Alternative (acres)



Proposed Alternative (acres)

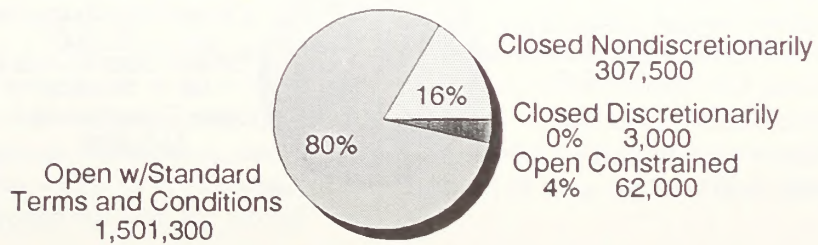
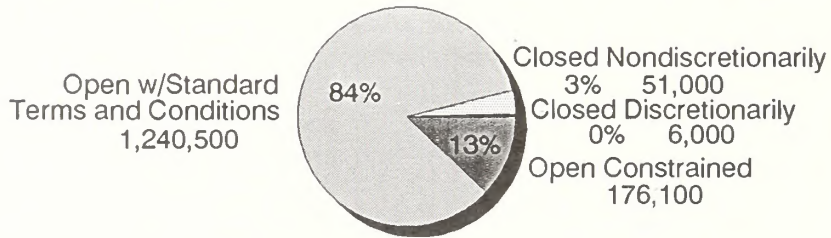


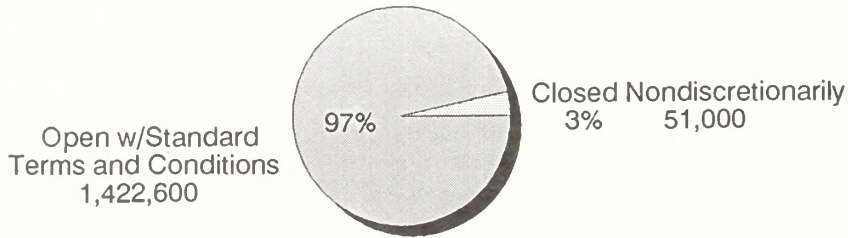
FIGURE 2-4 MANAGEMENT CATEGORIES BY ALTERNATIVE

Taos Resource Area

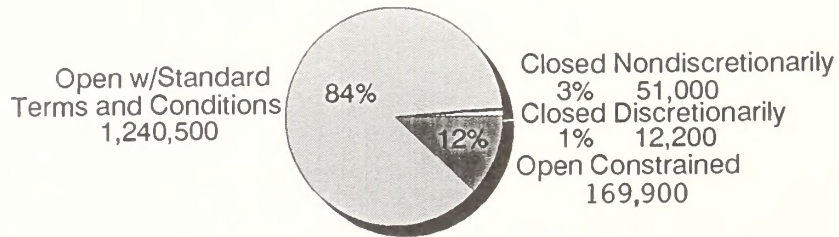
No Action Alternative (acres)



Production Alternative (acres)



Proposed Alternative (acres)



ALTERNATIVE B: PRODUCTION

The primary emphasis of this alternative is to focus on the leasing and development of oil and gas resources in the resource areas. Except for areas closed to leasing (nondiscretionarily) by legislation, oil and gas resources would be leased and/or developed under the BLM's STCs. Lease stipulations would not be attached to future leases.

Under this alternative, existing policy and decisions that exclude leasing and/or impose constraints on developing leases in SMAs would be replaced with those allowing leasing and development under standard terms and conditions. Management of other public lands and resources would continue according to the policy and decisions established in previous planning documents.

Under this alternative, SMAs designated as Wilderness Study Areas (WSAs) would be closed nondiscretionarily. If these WSAs *are* dropped by Congress from wilderness consideration, they would be open to leasing and development under STCs.

ALBUQUERQUE DISTRICT

A total of 5,607,500 oil and gas acres exist in the district. Management policy and decisions would affect leasing and/or development on approximately 412,900 acres, which would be closed to leasing (nondiscretionarily; refer to Tables 2-3, 2-4, Appendix A, and Figure 2-1). Development of existing leases in these areas would continue to be considered on a case-by-case basis. Under this alternative, 5,194,600 acres would be available for leasing and development with the BLM's STCs.

The RFD projects the development of 4,812 wells over the 20-year life of this plan amendment, primarily on existing federal oil and gas leases (refer to Table 2-2). Surface disturbance associated with developing these wells would occur on 31,308 acres for well pads, road ties, pipeline ties, miscellaneous disturbance, and produced water disposal wells. It is expected that this disturbance would occur at the rate of

5 percent (1,566 acres) per year. Successful rehabilitation of well pads and pipeline rights-of-way would reduce the amount of long-term surface disturbance.

FARMINGTON RESOURCE AREA

A total of 2,260,100 oil and gas acres exist in this resource area. Legislative designations and mineral withdrawals exclude leasing on 54,400 acres in wilderness areas, cities, and towns. Approximately 2,205,700 acres would be available for leasing and development under the BLM's STCs (refer to Appendix A, Tables 2-3 and 2-4, and Figure 2-2).

The RFD projects the development of 4,733 wells over the 20-year life of this plan amendment, primarily on existing federal oil and gas leases (refer to Table 2-2). Surface disturbance associated with developing these wells would occur on 29,818 acres for well pads, road ties, pipeline ties, and produced water disposal wells. It is expected that this disturbance would occur at the rate of 5 percent (1,491 acres) per year. Successful rehabilitation of well pads and pipeline rights-of-way would reduce the amount of long-term surface disturbance.

RIO PUERCO RESOURCE AREA

A total of 1,873,800 oil and gas acres exist in this resource area. Legislative designations exclude leasing on 307,500 acres. Approximately 1,566,300 acres would be available for leasing and development under the BLM's STCs (refer to Appendix A, Tables 2-3 and 2-4, and Figure 2-3).

The RFD projects the development of 48 wells over the 20-year life of this plan amendment, primarily on existing federal oil and gas leases (refer to Table 2-2). Surface disturbance associated with developing these wells would occur on 634 acres for well pads, road ties, and pipeline ties. It is expected that this disturbance would occur at the rate of 5 percent (32 acres) per year. Successful rehabilitation of well pads and pipeline rights-of-way would reduce the amount of long-term surface disturbance.

TAOS RESOURCE AREA

A total of 1,473,600 oil and gas acres exist in this resource area. Legislative designations exclude new leasing in the Rio Grande Wild and Scenic area on 51,000 acres. Approximately 1,422,600 acres would be available for leasing and development under the BLM's STCs (refer to Appendix A, Tables 2-3, 2-4, and Figure 2-4).

The RFD projects the development of 31 wells over the 20-year life of this plan amendment, primarily on existing federal oil and gas leases (refer to Table 2-2). Surface disturbance associated with developing these wells would occur on 856 acres for well pads, road ties, and pipeline ties. It is expected that this disturbance would occur at the rate of 5 percent (43 acres) per year. Successful rehabilitation of well pads and pipeline rights-of-way would reduce the amount of long-term surface disturbance.



ALTERNATIVE C: *PROPOSED* ALTERNATIVE

The primary emphasis of this alternative is to focus on the protection and preservation of cultural, visual, recreation, wildlife, and paleontological resource values, particularly in SMAs. Under this alternative, some existing lease stipulations for SMAs would be modified. Management constraints would be placed on a number of SMAs, and some areas now discretionarily closed to leasing would be opened with management constraints. Stipulations would be attached to new leases issued in SMAs.

Development of existing leases would continue according to the terms of the lease. The BLM would consult with lessees to implement management constraints on existing leases. Management of other public lands and resources would continue according to the policy and decisions established in previous planning documents.

Under this alternative, SMAs designated as Wilderness Study Areas (WSAs) would be closed nondiscretionarily. If these WSAs *are* dropped by Congress from wilderness consideration and were not assigned other special status designations *in the previous RMPs*, they would be open to leasing and development under STCs.

ALBUQUERQUE DISTRICT

A total of 5,607,500 oil and gas acres exist in the district. Management policy and decisions would affect leasing and/or development on approximately 449,200 acres, which would be closed to leasing (discretionarily and nondiscretionarily; refer to Tables 2-3, 2-4, Appendix A, and Figure 2-1). Development of existing leases in these areas would continue to be considered on a case-by-case basis. Under this alternative, 4,589,800 acres would be available for leasing and development under the BLM's STCs (refer to Appendix B). On the remaining **568,500** acres, management constraints would be attached to new leases as lease stipulations. Upon consultation with the lessee, COAs would also be attached to APDs approved on existing leases.

The RFD projects the development of 4,542 wells over the 20-year life of this plan, primarily on existing federal oil and gas leases (refer to Table 2-2). Surface disturbance associated with developing these wells would occur on 29,578 acres for well pads, road ties, pipeline ties, miscellaneous disturbance, and produced water disposal wells. It is expected that this disturbance would occur at the rate of 5 percent (1,478 acres) per year. Successful rehabilitation of well pads and pipeline rights-of-way would reduce the amount of long-term surface disturbance.

FARMINGTON RESOURCE AREA

A total of 2,260,100 oil and gas acres exist in this resource area. Management policy and decisions would affect leasing and/or development on approximately 75,500 acres, which would be closed to leasing (discretionarily and nondiscretionarily; refer to Appendix A, Tables 2-3, 2-4, and Figure 2-2). Development of existing leases in these areas would continue to be considered on a case-by-case basis.

Under this alternative, 1,848,000 acres would be available for leasing and development under the BLM's STCs (refer to Appendix B). On the remaining 336,600 acres, management constraints would be attached to new leases as lease stipulations. Upon consultation with the lessee, COAs would also be attached to APDs approved on existing leases.

The RFD projects the development of 4,465 wells over the 20-year life of this plan amendment, primarily on existing federal oil and gas leases (refer to Table 2-2). Surface disturbance associated with developing these wells would occur on 28,130 acres for well pads, road ties, pipeline ties, and produced water disposal wells. It is expected that this disturbance would occur at the rate of 5 percent (1,406 acres) per year. Successful rehabilitation of well pads and pipeline rights-of-way would reduce the amount of long-term surface disturbance.

RIO PUERCO RESOURCE AREA

A total of 1,873,800 oil and gas acres exist in this resource area. Management policy and decisions would affect leasing and/or development on approximately 310,500 acres, which would be closed to leasing (discretionarily and nondiscretionarily; refer to Appendix A, Tables 2-3, 2-4, and Figure 2-3). Development of existing leases in these areas would continue to be considered on a case-by-case basis.

Under this alternative, **1,501,300** acres would be available for leasing and development under the BLM's STCs (refer to Appendix B). On the remaining 62,000 acres, management constraints

would be attached to new leases as lease stipulations. Upon consultation with the lessee, COAs would also be attached to APDs issued on existing leases.

The RFD projects the development of 47 wells over the 20-year life of this plan amendment, primarily on existing federal oil and gas leases (refer to Table 2-2). Surface disturbance associated with developing these wells would occur on 620 acres for well pads, road ties, and pipeline ties. It is expected that this disturbance would occur at the rate of 5 percent (31 acres) per year. Successful rehabilitation of well pads and pipeline rights-of-way would reduce the amount of long-term surface disturbance.

TAOS RESOURCE AREA

A total of 1,473,600 oil and gas acres exist in this resource area. Management policy and decisions would affect leasing and/or development on approximately 63,200 acres, which would be closed to leasing (discretionarily and nondiscretionarily; refer to Appendix A, Tables 2-3, 2-4, and Figure 2-4). Development of existing leases in these areas would continue to be considered on a case-by-case basis.

Under this alternative, 1,240,500 acres would be available for leasing and development under the BLM's STCs (refer to Appendix B). On the remaining 169,900 acres, management constraints would be attached to new leases as lease stipulations. Upon consultation with the lessee, COAs would also be attached to APDs issued on existing leases.

The RFD projects the development of 30 wells over the 20-year life of this plan amendment, primarily on existing federal oil and gas leases (refer to Table 2-2). Surface disturbance associated with developing these wells would occur on 828 acres for well pads, road ties, and pipeline ties. It is expected that this disturbance would occur at the rate of 5 percent (41 acres) per year. Successful rehabilitation of well pads and pipeline rights-of-way would reduce the amount of long-term surface disturbance.

ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

In developing alternatives, some proposals were considered initially but dropped before detailed analysis. These proposals include the following:

1. No oil and gas leasing and development is not a reasonable option because federal law allows and departmental policy encourages leasing and development of federal oil and gas resources. Also, leases exist with provision for development on over 50 percent of the federal oil and gas acres in the Albuquerque District.

To consider "no leasing" on acres where oil and gas development has little or no impact on other resource values or on acres where other resource values would not benefit positively from withholding oil and gas development is not reasonable nor does it meet the Bureau's multiple use objective.

2. A Resource Conservation Alternative would have given primary emphasis to the protection of non-oil-and-gas resources, especially those in areas selected for special management (e.g., SMAs, WSAs). In the Farmington Resource Area, where most of the oil and gas leasing and development will take place during the life of this plan, approximately 11,000 acres in SMAs could be managed differently under the Conservation Alternative than under the *Proposed* Alternative. This figure represents less than .5 percent of the federal oil and gas acres, so it is unlikely that the impacts would be distinguishable between these two alternatives. Additionally, nearly 8,800 of the 11,000 acres are already leased and have 116 wells. This would tend to further reduce the difference in impacts between the Conservation and *Proposed* Alternatives. In the Rio Puerco and Taos Resource Areas,

the small amount of projected development would not be measurable between alternatives. Therefore, the Conservation Alternative has not been carried forward in this document.

3. A No Surface Occupancy Constraint was considered for the 61,087 acres within SMAs discretionarily closed to leasing under the *Proposed* Alternative. In the Farmington Resource Area, where most of the oil and gas leasing and development will take place, substantial acreage within these SMAs is currently leased and held by production. A NSO Constraint attached to the acreage available for leasing within these SMAs would result in additional wells and associated development on adjacent leased acreage within the SMAs. This development would approach the amount analyzed in the Production Alternative. The No Leasing Constraint is the only practical option that provides a level of protection consistent with the management prescriptions for these SMAs.

The application of an NSO Constraint on the SMAs discretionarily closed to leasing in the Rio Puerco and Taos Resource Areas would result in impacts similar to those analyzed in the other alternatives. The relatively low potential for hydrocarbon occurrence and future oil and gas development in these areas results in insignificant cumulative impact differences, regardless of the constraint applied. The No Leasing Constraint for these areas provides the most consistency with existing management prescriptions.

Application of the NSO Constraint to the SMAs that are discretionarily closed to leasing in the Albuquerque District would imply levels of protection and development that are unrealistic under the circumstances described above. Because the cumulative impacts of applying the NSO Constraint to the discretionarily closed to leasing SMAs would not be significantly different from the alternatives analyzed, the NSO Constraint on selected areas was dropped from further consideration.

CONTINUING MANAGEMENT GUIDANCE

INTRODUCTION

This section describes the resource management direction that will continue to guide multiple use decisions in the BLM Albuquerque District, regardless of which RMP Amendment alternative is selected. This direction is fundamental; its associated guidance is based on laws, regulations, manuals, policy, executive orders, memoranda, and applicable planning documents. The Farmington (USDI, BLM 1988a), Rio Puerco (USDI, BLM 1986), and Taos (USDI, BLM 1988b) RMPs provide specific guidance on multiple land use planning for each resource area.

OIL AND GAS

Mineral resources are managed in accordance with the objectives of the Mining and Minerals Policy Act of 1970 and the National Materials and Minerals Policy Research and Development Act of 1980. These acts require the federal government to facilitate the development of mineral resources to meet national, regional, and local civilian and defense needs. Under other laws, mineral exploration and development are conducted in a manner that minimizes environmental damage and provides for the rehabilitation of affected lands.

The 1920 Mineral Leasing Act, as amended, authorizes the Secretary of the Interior to lease oil and gas resources on all public domain and acquired lands. Lands excluded from such leasing by legislation or secretarial policy are listed in the Code of Federal Regulations (CFR) Title 43, Part 3100.0-3. The excluded lands include units of the National Park Reserve; incorporated cities, towns, and villages; and lands recommended for wilderness designation or wilderness study, as well as lands within the National Wilderness Preservation System.

LEASE ISSUANCE

The BLM, as agent for the Secretary of the Interior, is responsible for leasing and managing the oil and gas resource where the mineral estate is

federally owned. Before issuing a federal oil and gas lease, the BLM must, however, decide what lands are to be leased and whether special management constraints are needed to protect the environment and other resources. BLM Lease Form 3100-11, Offer to Lease and Lease for Oil and Gas, contains STCs that grant the leaseholder the right to develop the oil and gas resource and provide for the general protection of surface and subsurface resources under normal operations (refer to Appendix B). *Many of the stipulations and management constraints are designed to reduce erosion and sediment production, as well as protecting the road and well pad. These soil and water practices reduce the impacts to both soil resources and water quality.* In addition to the STCs, lease operations are guided by operating regulations found at 43 CFR 3160, as well as applicable Notices to Lessees and Onshore Oil and Gas Orders.

Occasionally, STCs are not adequate to protect resource values and uses, and a management constraint is necessary to modify the lease. A management constraint places additional restrictions on the lessee in conducting operations on a lease. Constraints are appended to a lease parcel at the time of lease offer, providing the bidder the opportunity not to bid on a lease if he/she does not want to comply with the constraints.

It is assumed that, after consultation, lease holders would comply with the management constraints for leases located in SMAs and Areas of Critical Environmental Concern (ACECs). These constraints would be applied to existing leases in the form of lease stipulations, or as COAs on APDs.

In addition to those constraints, presently the Farmington Resource Area has developed a cooperative agreement with U.S.F.S., Game and Fish, and the State Land Office which provides a comprehensive surface management guideline for permitting wells and pipelines on state and federal lands (see Appendix B-9).

Appendix B contains examples of oil and gas management constraints that modify STCs. The Timing Limitation (TL) Constraint (often called seasonal) prohibits exploration and development activities for time periods of less than a year. A TL Constraint is not necessary if the time limita-

tion involves the prohibition of new surface-disturbing operations for periods of less than 60 days (43 CFR 3101.1-2).

The Controlled Surface Use (CSU) Constraint is intended to be used when occupancy and use are generally allowed on all or portions of the lease area, year-round, but because of special values or resource concerns, lease activities must be strictly controlled. The CSU Constraint is used to identify restrictions on surface use or operations that may otherwise exceed the mitigation provided by Section 6 of the STCs, regulations, and operating orders. The use of this constraint is limited to areas where restrictions or controls are necessary for specific types of activities rather than all activity.

The No Surface Occupancy (NSO) Constraint is intended for use only when other constraints are determined insufficient to adequately protect the public resource values and uses. An NSO Constraint is not needed if the desired protection would not require relocation of proposed operations by more than 200 meters (43 CFR 3101.1-2). A discretionary closure of land to leasing and development is normally implemented only after less restrictive measures are considered and found inadequate to provide appropriate protection for other resource values and uses that cannot share land use with oil and gas development.

LEASE EXCEPTIONS, MODIFICATIONS, AND WAIVERS

Exceptions to, modifications of, and waivers of a management constraint are explained in the federal regulations at 43 CFR 3101.1-4. Generally, an exception, waiver, or modification may be approved if the record shows that circumstances or protected resource values have changed. Alternatively, the lessee must demonstrate that operations can be conducted without causing unacceptable impacts, and that less restrictive constraints will protect public resource values and uses.

Exceptions, waivers, and modifications can only be granted by the BLM. If the proposed exception, waiver, or modification is inconsistent with the land use plan, the plan will be amended or changed or the exception, waiver, or modification will be disallowed. Management con-

straints attached to a lease as a condition of consent by another surface managing agency are not subject to exception, waiver, or modification by the BLM.

Exceptions are considered on a case-by-case basis and are subject to an environmental assessment. Exceptions to a management constraint are granted by the BLM if the reason for the exception is consistent with the environmental assessment. No public notice is required for exceptions to management constraints that conform to the plan. Exceptions that do not conform to the plan may be granted only upon amendment and public notification.

A waiver is the complete elimination of a constraint from a particular lease. A constraint can be waived by the BLM after an environmental assessment is prepared and a decision is made that the constraint in question is no longer required for a particular lease. The decision to waive a substantial constraint requires a plan amendment and a 30-day public notice period before the waiver is approved.

Modifications to a management constraint are made if and when BLM resource managers determine the constraint is no longer effective as written. This situation can occur when new information obtained by inventory or monitoring indicates that the constraint is unnecessarily restrictive. Modification of a constraint requires the preparation of an environmental assessment (to determine the potential impacts) and/or a plan amendment. If the modification is determined to be substantial by the BLM, a 30-day public notice is required before the constraint is modified.

LEASE DEVELOPMENT ACTIVITIES AND MANAGEMENT CONSTRAINTS COMMON TO ALL ALTERNATIVES

After a lease has been issued, a number of on-the-ground actions and surface-disturbing activities occur with lease development. A detailed discussion of oil and gas exploration, leasing, permitting, and development activities is presented in Appendix C. Before on-the-ground actions and activities can take place, the following permits or approvals are normally required:

1. Notices of Intent (NOIs) for geophysical operations.
2. Applications for a Permit to Drill (APDs).
3. Rights-of-way (ROWs) for off-lease operations.
4. Sundry notices for other lease operations.

At the field development stage, a site-specific environmental assessment for a proposed well site is generally prepared. During this review, environmental impacts and management constraints are identified. The management constraints, referred to as Conditions of Approval (COAs), are used to mitigate impacts to the environment, public health, and safety. BLM staff and managers choose among a number of constraints.

Authority to apply the COAs stems from and must be consistent with the lease rights granted. The BLM may not give a lease holder the right to extract minerals, and then at the time of development, require constraints not specified in the lease that would disallow part or all of the mineral extraction. Reasonable measures under lease rights are defined at 43 CFR 3101.1-2 as allowing the movement of a proposed well up to 200 meters, and restriction of the timing of the operation by as much as 60 days. These measures allow the BLM to protect public land resources (e.g., riparian zones along streams) while development is occurring.

COAs are attached to permits that involve surface-disturbing activities. These most commonly include APDs, sundry notices, ROWs, and NOIs. These COAs are used on a site-specific basis at the discretion of the BLM. COAs are applied at specific sites to protect resources that would otherwise be impacted by an operation. A given COA is always applied to protect a resource affected by the specific operation being approved, even on existing leases. COAs common to all alternatives are listed in Appendix B-3.

GEOPHYSICAL EXPLORATION

In this plan amendment, the leasing and field development constraints identified for oil and

gas operations would also apply to geophysical exploration activities. Because geophysical exploration techniques vary, geophysical NOIs are evaluated on a case-by-case basis. [Specific geophysical methods are described in Appendix C. Standard mitigation requirements (COAs) attached to permits are presented in Appendix B-3.]

Generally, geophysical exploration activities would not be authorized in "No Lease" areas. In areas with management constraints [i.e., controlled surface use, timing limitation, and no surface occupancy (NSO)], geophysical exploration activities could be affected by off-road vehicle restrictions and seasonal or permanent closure (NSO).

MANAGEMENT CONSTRAINTS TO ALLOW FOR MULTIPLE MINERAL DEVELOPMENT

The BLM has a statutory requirement to conserve and protect all federal minerals. When federal oil and gas development could conflict with the development of another federal mineral, the BLM may control development of either or both minerals through COAs to carry out this statutory requirement and provide for simultaneous development.

The only area of known potential conflict with oil and gas development is the coal mining area of the southern San Juan basin where limited oil and gas development has occurred. Coal gas is produced in the northern part of the basin at depths that are presently uneconomical for coal development. Studies show that the extraction of coal gas does not adversely affect the mineability of the coal.

MANAGEMENT CONSTRAINTS BY OTHER SURFACE MANAGEMENT AGENCIES OR LANDOWNERS

Federal mineral resources underlying lands administered by surface management agencies other than the BLM are subject to each agency's specific management constraints. This is true regardless of which management alternative is selected by the BLM in this RMP Amendment. Other surface management agencies in the Albuquerque District include the Army Corps

of Engineers, the Department of the Army, the Department of the Air Force, the Bureau of Reclamation, the Bureau of Indian Affairs (BIA), and Indian tribes (refer to Map 3).

Usually, other surface management agencies develop management constraints to address site-specific concerns such as bodies of water, dams, embankments, and surface facilities. Upon consent to lease, the BLM incorporates these constraints along with additional BLM constraints into a lease it proposes to issue. Copies of oil and gas management constraints of other surface management agencies are presented in Appendix B-2.

When an APD is filed, the BLM notifies the appropriate surface management agency or landowner and schedules an on-site inspection. This provides an opportunity for the surface management agency or landowner to make known needs and concerns that are then incorporated as COAs attached to the APD.

In the Farmington Resource Area, numerous public land orders and executive orders have transferred the jurisdiction of federally owned surface to the BIA, tribal entities, and individual Indian allottees. The mineral estate, however, has been retained by the federal government.

Approximately 296,000 acres of these lands (Indian surface with federal minerals) are available for oil and gas leasing and development (Map 3). As with the surface management agencies, the Indian surface landowner is contacted for concurrence with the lease and management constraints. (Refer to Appendix B-2 for management constraints established by the BIA and the Navajo Nation.)

The BLM processes APDs for Indian surface/federal mineral (split estate) lands. A copy of a filed APD is sent to the appropriate Indian agency or landowner for concurrence, followed by an on-site inspection by the BLM and the Indian agency or landowner. Mitigation requirements are identified and made part of the APD.

VISUAL RESOURCES

Legislation such as the Federal Land Management and Policy Act of 1976 (FLPMA), the

National Environmental Policy Act of 1969 (NEPA), and the Surface Mining Control and Reclamation Act of 1977 outline the BLM's responsibilities for protecting the quality of the visual (scenic) values of public lands. Additional and more specific policy and management guidance are provided in the BLM's 8400 Manual for Visual Resource Management (VRM).

Public lands have a variety of visual values. These different values warrant different levels of

management. Because providing the same level of management for all visual resources is neither desirable nor practical, the BLM systematically identifies and evaluates these resources to determine an appropriate level of management.

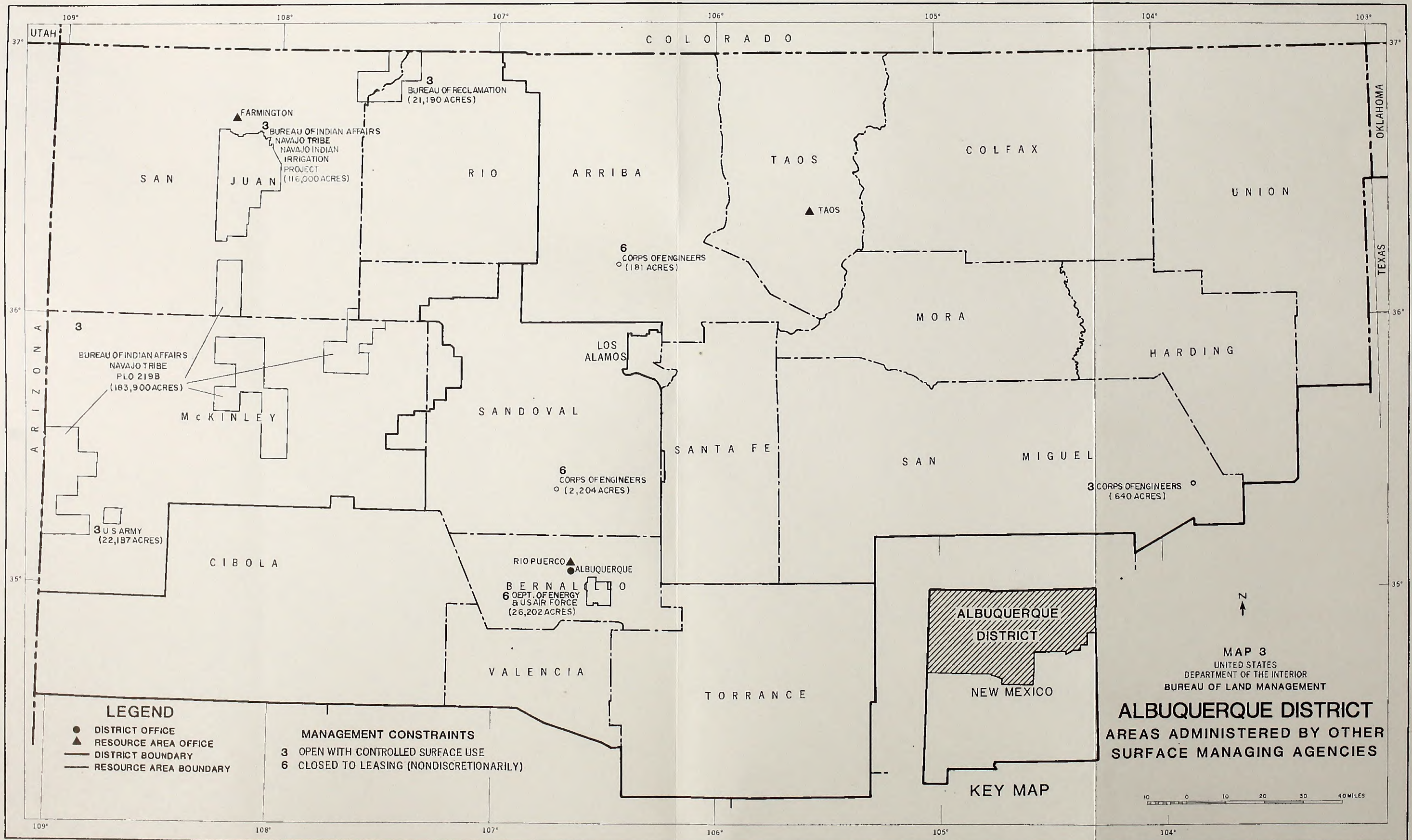
Visual values are identified through the standard BLM VRM inventory procedures and are considered with other resource values in the RMP process. Visual management classes are established through the RMP or amendment process for all BLM-administered lands. Visual management objectives, by class, are based on and established from land use allocations established in the RMPs. These area-specific objectives provide the standards for planning, designing, and evaluating future management projects.

VISUAL RESOURCE INVENTORY

The visual resource inventory process consists of a scenic quality evaluation, a sensitivity level analysis, and a delineation of distance zones. Based on these three factors, BLM-administered lands are placed into one of four visual resource inventory classes (Class I through Class IV).

These inventory classes represent the relative value of the visual resources. Class I is assigned to those areas where a management decision has been made to maintain a natural landscape. This class covers areas such as national wilderness areas, the wild section of national wild and scenic rivers, and other congressionally and administratively designated areas. Classes II, III, and IV are assigned based on a combination of scenic quality, sensitivity level, and distance zones.

These classes are informational in nature and provide the basis for considering visual values in



the RMP process. They do not establish management direction and are not used as a basis for constraining or limiting surface-disturbing activities. The importance of visual values and the impacts to these values from changes in land use must be considered during RMP preparation. Management decisions in the RMP must reflect visual resources value. In fact, this value is the driving force for some management decisions.

VISUAL RESOURCE MANAGEMENT CLASSES AND OBJECTIVES

The overall objective of visual resource management is to manage public lands in a manner that will protect the quality of the visual (scenic) values in accordance with Section 102(a)(8) of FLPMA. In addition to inventory classes, management classes are also assigned to public lands. These classes are based on the overall visual resource management objective stated above, and serve as management tools for future planning and environmental considerations of these resources.

The visual resource management classes and their corresponding management objectives are:

Class I -- Preserve the existing character of the landscape. The level of change should be very low and must not attract attention.

Class II -- Retain the existing character of the landscape. The level of change should be low, and management activities may be seen but should not attract attention.

Class III -- Partially retain the existing character of the landscape. The level of change should be moderate, and management activities may attract attention but should not dominate.

Class IV -- Provide for activities that require major modification of the landscape. The level of change can be high.

RECREATION

The recreation program is managed according to multiple use principles unless otherwise specified by law or BLM policy. The mission of the program is to ensure the continued availability of quality outdoor recreation oppor-

tunities and experiences that are not readily available from other sources. Recreation use is managed to protect the health and safety of visitors; to protect natural, cultural, and other resources values; to stimulate public enjoyment of public lands; and to resolve user conflicts.

FLPMA provides for management of outdoor recreation on public lands. Section 202(c)(9) calls for land-use planning consistent with statewide outdoor recreation plans. The Federal Cave Resources Protection Act of 1988 requires federal lands to be managed in a manner that protects and maintains, to the extent practical, significant caves.

The Wild and Scenic Rivers Act of 1968, as amended, provides for protection of outstanding river resources. It requires the identification and study of rivers or portions of rivers (wild and scenic, recreational) and directs federal agencies to cooperate with state governments.

Other national laws that govern recreation management include the National Trails System Act of 1968, as amended; the Land and Water Conservation Fund Act of 1964, as amended; the Recreation and Public Purposes Act, as amended; the Wilderness Act of 1964, as amended; and the Sikes Act.

Most public lands are managed to maintain a freedom of recreational choice with a minimum of regulatory constraints. Few BLM recreational facilities or supervisory efforts exist on these lands, which are sometimes referred to as Extensive Recreation Management Areas.

Where the nature of the resource attracts intensive recreational use, public lands may be managed as a Special Recreation Management Area (SRMA). These are areas where the BLM makes major investments in recreational facilities and visitor assistance. Specific management direction in a SRMA is formulated by the BLM to provide for resource protection and public health, safety, and enjoyment.

DEVELOPED RECREATION

The Simon Canyon Recreation Area Management Plan (USDI, BLM 1985) provides detailed management direction for Simon Canyon Recrea-

tion Area and Area of Critical Environmental Concern in the Farmington Resource Area. The Farmington Resource Management Plan (USDI, BLM 1988) provides general management direction for Angel Peak Recreation Area.

Management direction for Taos' Wild Rivers Recreation Area is provided in the Wild Rivers Recreation Area Management Plan (USDI, BLM 1988). The recreation area had previously been managed under the 1984 Rio Grande Wild and Scenic River Recreation Area Management Plan. Approximately 12 miles of trail at the recreation area are included in the National Recreation Trail System.

The Santa Cruz Lake Recreation Area Management Plan (USDI, BLM 1989) provides detailed management direction for the second recreation area in the Taos Resource Area. The Orilla Verde Recreation Area (formerly the Rio Grande Gorge State Park) is covered by management direction provided in the Orilla Verde Recreation Area Interim Management Plan (USDI, BLM 1989).

DISPERSED RECREATION

Current management direction for dispersed recreation opportunities is provided for in the Code of Federal Regulations (Title 43, Part 8300) and BLM manuals. Detailed direction for primitive and unconfined types of recreation can be found in the Bisti, De-na-zin, Cebolla, and West Malpais Wilderness Management Plans. Recreation opportunities in the 13 wilderness study areas in the district are administered under the BLM's Interim Wilderness Management Policy.

Congress established the El Malpais National Conservation Area (NCA) near Grants, New Mexico, with the passage of Public Law 100-225 on December 31, 1987. A General Management Plan (USDI, BLM 1990) provides direction on how the area will be managed. The BLM's challenge in the NCA is to provide for a multitude of uses (such as recreation, wildlife, wilderness, cultural resources, and livestock grazing) while preserving the values for which the conservation area was established.

MOTORIZED RECREATION

All public lands under BLM management are designated as "open," "limited," or "closed" to motorized vehicle use. These designations have been made in the RMPs for public lands in each resource area. The off-road vehicle (ORV) designations are:

1. Open areas and trails.

Areas and trails on public lands where ORVs may be operated, subject only to the operating conditions set forth in 43 CFR 8341 and 8343.

2. Closed areas and trails.

Areas and trails on public lands where the use of vehicles is permanently or temporarily prohibited.

3. Limited areas and trails.

Use of vehicles is subject to restrictions considered to be appropriate to correct a problem or to provide a specific recreation opportunity. Limited designations in New Mexico also



apply to areas devoted to intensive ORV use. Management efforts are more intensive under this type of designation than under the open designations that affects the majority of public lands. Restrictions may limit the number and types of vehicles allowed, dates and times of use, locations within the area where vehicles can be operated, and similar situations.

Emergency ORV "limited" and "closed" designations are made on a case-by-case basis to prevent unnecessary degradation of resources, ensure visitor safety, and resolve user conflicts. Emergency closures remain in effect only until an interim or standard designation can be made, or until the adverse effects are eliminated and

measures to prevent their recurrence have been implemented.

PROGRAM DIRECTION

The outdoor recreation program uses the Recreation Opportunity Spectrum as the basic tool for inventory and management to ensure the general public a continued variety of quality recreational opportunities. Providing opportunities for back-country recreation and for more developed types of recreation close to major urban areas is stressed. Motorized vehicle recreation, including off-road and off-highway vehicle use, is maintained to the greatest extent possible under existing policy. A concentrated effort is made to locate and establish use areas and trails compatible with social and natural environments in close proximity to heavily populated areas.

A broad range of outdoor recreation opportunities such as backpacking, camping, sight-seeing, fishing, floatboating, picnicking, horseback riding, viewing wildlife, off-highway vehicle use, mountain biking, and motorcycling is provided for all segments of the public. Access is maintained and developed where necessary to enhance recreation opportunities and allow public use.

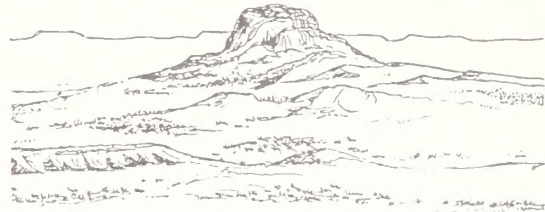
WILDERNESS STUDY AREAS

In 1976, Congress enacted FLPMA. Section 603(c) of FLPMA directs the BLM to identify and inventory its roadless areas and to make recommendations to Congress for areas that qualify for wilderness designation. When the BLM completed its inventory, the agency classified as Wilderness Study Areas (WSAs) those units that possess the minimum wilderness characteristics and values as defined in Section 2(c) of the Wilderness Act.

Within the Albuquerque District, 12 WSAs totalling approximately 139,000 acres were designated by the BLM State Director in 1980. In addition to these BLM-designated areas, Congress designated the 18,300-acre area known as the Chain of Craters (in the El Malpais National Conservation Area) as a WSA by passing the El Malpais legislation (PL 100-225).

The BLM must study each WSA to analyze all its values, resources, and uses. Based on the findings of each study, the BLM determines whether an area or portions of an area are recommended as suitable or non-suitable for designation as wilderness.

When the studies are completed, recommenda-



tions are submitted through the Secretary of the Interior to the President and finally to Congress. Reports on all WSAs must reach the President no later than October 21, 1991, and Congress by October 21, 1993. Only Congress can designate an area as wilderness. (Note: The study on the Chain of Craters WSA is not restricted to the 1991 date because of its designation separately and after other Albuquerque District WSAs.)

All WSAs are managed under the Interim Management Policy and Guidelines for Lands Under Wilderness Review (USDI, BLM 1987c) until they are added to the National Wilderness Preservation System or released from further wilderness consideration. Areas released from further wilderness consideration are managed under the principles prescribed in the appropriate RMP or plan amendment for the Resource Area where the WSAs are located.

If designated as wilderness, areas are managed under the Wilderness Management Policy (USDI, BLM 1981), as amended (43 CFR 8560), provisions of the Wilderness Act of 1964, and the enabling (specific wilderness designation) legislation. Subject to valid existing rights as of January 1, 1984, minerals in wilderness areas are withdrawn from all forms of appropriation under the mining laws and from deposition under all laws and amendments pertaining to mineral leasing. No new leases can be issued after an area is designated as wilderness.

Section 603(c) of FLPMA requires the BLM to manage any lands under wilderness review to maintain their suitability for possible wilderness

designation. The purpose of the BLM's Interim Management Policy is to protect existing wilderness values, manage valid existing rights, and allow "grandfathered" mining and grazing activities to continue until final wilderness suitability determinations have been made. The management policy places special emphasis on monitoring ongoing actions in wilderness study areas to ensure that wilderness values are not impaired or unnecessarily degraded.

Interim management of WSAs is further constrained by the Federal Onshore Oil and Gas Leasing Reform Act of 1987, which prohibits leasing in WSAs. Exceptions to this prohibition may be made only to prevent depletion of the federal oil and gas resource, and then only under a management constraint that prevents surface occupancy to protect wilderness values.



WILDLIFE

The BLM wildlife program focuses on wildlife habitats in general, fish habitats, habitats for listed and candidate species, and rare or representative habitats and ecosystems. FLPMA, the Endangered Species Act of 1973, the Public Rangelands Improvement Act of 1978, as amended, BLM Manual Section 6840, and recent program policy emphasizing "Fish and Wildlife 2000" and biological diversity, direct the BLM to improve the management of wildlife habitat to

meet wildlife needs. (Appendix F shows habitat types and species occurrence). This mandate exists along with increasing demands for basic energy supplies, building materials, and food products from public lands. The Albuquerque District's wildlife habitat management program is also influenced by various memoranda of understanding, cooperative agreements, and contributed funds agreements.

BLM District and Resource Area staff must identify opportunities to maintain, improve, and expand wildlife habitats on public lands consistent with these themes for consumptive and non-consumptive use. The staff must also identify and manage rare or representative wildlife habitats, plant communities, and ecosystems.

The need to manage these habitats, communities, and ecosystems has led to management decisions in existing RMPs to protect T&E or rare species through the protection of populations and environments that encourage population growth. A survey is currently underway to determine if the Mexican spotted owl exists in the District.

Management actions that pursue wildlife management goals are ongoing. Activity plans known as Habitat Management Plans (HMPs), and similar plans to institute actions and/or developments to enhance wildlife habitat, are being written. These plans contain wildlife habitat goals, objectives, and management actions. HMPs are revised as needed to satisfy changes in law, policy, and RMP decisions.

Since 1977, riparian area management has received increasing national attention. Riparian areas are unique and among the most productive and important ecosystems managed by the BLM. Because riparian areas only constitute about 1 percent of the public lands, they are also one of the most limited wildlife habitats managed by BLM. In 1987 the BLM adopted a Riparian Area Management Policy (USDI, BLM 1987b).

The BLM's goals in riparian management are to maintain, restore, or improve riparian values to achieve a healthy and productive ecological condition for maximum long-term benefits. The BLM pursues these goals in the oil and gas pro-

gram by following STCs and COAs (refer to Appendices B-2 and B-3).

THREATENED AND ENDANGERED (T&E AND OTHER SPECIAL STATUS PLANT AND ANIMAL SPECIES)

The BLM policy is to ensure the implementation of the Endangered Species Act of 1973 (16 U.S.C. 1531 et.seq.) as amended; and the Federal Land Policy and Management Act of October 21, 1976 (43 U.S.C. 1701). Because the BLM is committed to complying with the ESA, other applicable laws, regulations, policies, and manual requirements, the development of oil and gas under any alternative will not be allowed to occur where such development would effect T&E or other Special Status Species or their habitats.

This commitment would be met by carrying out an environmental assessment prior to any action being permitted. This includes: identifying any Special Status Species in or near the permitted area, adjusting the project design, size, or location, by applying appropriate stipulations (timing, location, seasonal, etc.), or by not authorizing the action altogether.

The BLM has a complex set of responsibilities for managing the habitat of special status animals and plants. Special status species are those plants and animals that (1) are listed as endangered or threatened under the Endangered Species Act (ESA); (2) are proposed for listing as endangered or threatened under ESA; (3) are under review or qualify for listing as endangered or threatened (Category 1 and 2 candidates); (4) have been designated by the BLM State Director as sensitive; or (5) have been listed by the state government as endangered or threatened (state listed). (*Appendix H provides a list of threatened & endangered species*). Section 7 of the ESA and regulations in 50 CFR Parts 17 and 402 specifically require all federal agencies to use their authorities in furtherance of ESA to carry out programs for the conservation of listed species, and to ensure that any agency action will not jeopardize the continued existence of a listed species or adversely modify critical habitat.

BLM Manual Section 6840 contains policy and guidance for all special status species. It estab-

lishes that species proposed for federal listing be managed at the same level of protection as listed species. For Category 1 and 2 candidate species, Manual Section 6840 requires the BLM to carry out management, consistent with the principles of multiple use, for the conservation of the species and their habitats, and to ensure that actions authorized, funded, or carried out do not contribute to the need to list any of these species as threatened or endangered.

It is also BLM policy to carry out management for the conservation of state-listed plants and animals. State laws protecting these species apply to all BLM programs and actions to the extent that they are consistent with FLPMA and other federal laws. Where the state government has designated species in categories that imply local rarity, endangerment, extirpation, or extinction, the BLM State Director develops policies to assist the state in achieving its management objectives for those species.

The BLM will use the following approach in reviewing actions proposed on Bureau administered lands and programs in dealing with T&E and other Special Status Species.

- a. All proposed actions will be analyzed to determine if T&E and other Special Status Species or their habitats may be effected.
- b. Section 7 consultation will be initiated with the FWS for actions where an evaluation indicates a "may affect" situation (may affect includes both beneficial and adverse impacts) on a federally listed species or their habitats and the adverse impacts cannot be eliminated. During or as a result of the Section 7 consultation process, BLM will not authorize any action that would affect a federally listed species.
- c. BLM will initiate an informal conference and may request technical assistance from the FWS (Federal Candidate) or State of New Mexico (State Listed) for actions where an evaluation indicates species or their habitats and the adverse impacts cannot be eliminated. During or as a result of the conference process, BLM will not authorize any action that would affect a federal candidate or state listed species.

d. Ensure that no BLM action or authorization will adversely affect the likelihood of recovery of any T&E or other Special Status Species.

Protection efforts for T&E and other Special Status Species are ongoing in the Albuquerque District (Append I). Decisions regarding oil and gas leasing and development will not be allowed to interfere with these efforts. All oil and gas activities proposed within areas of suspected T&E and other Special Status Species (Appendix H) occurrence will be evaluated for their potential impacts. All standard wildlife stipulations and mitigative measures will be used to ensure that no "may affect" situations to T&E and other Special Status Species will occur.

Presently we are in Section 7 consultation with the FWS concerning the Colorado River Squawfish in the San Juan River system. The BLM is committed to protecting all T&E and other Special Status Species and will not authorize any action that would effect the Colorado River Squawfish.

SOILS AND HYDROLOGY

The BLM's soil and watershed program has a legislative mandate for the protection, restoration, and improvement of these resources. Recently certain aspects of the program have received new emphasis; the Clean Water Act's Nonpoint Source Pollution program which emphasizes improving water quality in degraded stream systems; the riparian program which is concerned with restoration of riparian zones both vegetatively and hydrologically; and the Colorado River Basin Salinity Control Act which intends to reduce salt loading throughout the Basin. All three programs have parallel or similar goals and accomplishments in any one usually is beneficial to the others.

The legislative mandates for protection, maintenance, and enhancement of soil and water resources are implemented in the oil and gas program through lease stipulation, management constraints, lease modifications, conditions of approval, a new roads policy, and approved disposal of produced water. All of these contain accepted erosion control practices that have been proven for a long time. All of these soil and water conservation practices that will

be used to develop site-specific Best Management Practices (BMPs) at the project level to prevent or reduce the amount of pollution to a level compatible with water quality goals. The existing interdisciplinary process for project development will continue but with several modifications: first, practices for the prevention of erosion and water quality degradation will be specifically identified in project documentation; and an opportunity for public comment and input will be provided. Also each soil disturbing activity plan will contain a monitoring plan.

Soil information, in particular suitability for rehabilitation and erosion hazard, is used in planning, mitigation, support, and implementation for all resource activities. Emphasis is also placed on preventing and/or avoiding further degradation of soil and water resources, as well as their conservation. Continual evaluation and updating of older soil surveys is necessary to maintain a current database. The BLM funds and participates with the Soil Conservation Service in the National Cooperative Soil Survey. In the late 1970's BLM contracted for erosion surveys in the San Juan Planning Area using methodology specifically developed for large planning areas. This data is the foundation for estimating potential erosion impacts from land use activities, including oil and gas.

Moderately saline to slightly saline soils from marine shale parent materials found throughout the San Juan Basin (Farmington Resource Area) are another source of salt. Surface disturbing activities, agriculture, resource extraction industries and natural erosion on these soils throughout the Basin (including Colorado) have been designated as sources of water quality impairment in the San Juan River and its tributaries. The 1974 Colorado River Basin Salinity Control Act (as amended, 1984) directs the Secretary of the Interior to "...develop a comprehensive program for minimizing salt contributions to the Colorado River from lands administered by the Bureau of Land Management." Although the BLM is the largest landowner in several subwatersheds of the San Juan, other owners and agencies must be involved in improving environmental conditions. Coordinated Resource Management Plans (CRMPs) are the most successful vehicle

for the participation of a diverse group in improving resource management. The BLM initiated several CRMPs on the upper Rio Puerco to improve water quality, control erosion, and restore the riparian zone, and participates in a CRMP on the upper Chama for water quality improvement. The BLM will utilize CRMPs within the San Juan Basin to improve resource conditions including water quality.

CULTURAL RESOURCES

Federal laws such as the National Historic Preservation Act of 1966 (NHPA), as amended, the Archeological and Historic Preservation Act of 1974, the Archeological Resources Protection Act of 1979 (ARPA), the American Indian Religious Freedom Act of 1978, and FLPMA provide for the protection and management of cultural resources. The BLM manages cultural resources on the public lands in a manner that protects and provides for the proper use of these resources.

Cultural resources include archeological, historic, and socio-cultural properties. The degree of management is commensurate with the scientific or socio-cultural values of the resource, the degree of threat, and the resource's vulnerability. Under this concept, the BLM attempts to protect a representative sample of the full array of cultural resources, both prehistoric and historic, found on BLM-administered land.

The BLM's cultural resources management program consist of two main functions, primary program management and support (compliance). Primary program management includes the ele-

ments of inventory and evaluation, nomination, planning, protection, and utilization. The support function of the BLM's cultural program is driven by the needs of the agency's many other programs that require cultural clearances for the various actions that BLM initiates itself or authorizes for the public. Support also includes input to environmental and planning documents such as environmental impact statements, environmental assessments, and RMPs.

INVENTORY AND EVALUATION

The BLM undertakes and maintains a cultural resources inventory for all agency-administered lands. The purpose of this inventory is to analyze the scientific, socio-cultural, and public values of cultural resources. These values provide the basis for allocating these resources.

The allocation of cultural resources by the BLM is based on the actual or potential use of individual sites or properties within the following categories: (1) current scientific use, (2) potential scientific use, (3) conservation for future use, (4) management use, (5) socio-cultural use, (6) public use, and (7) discharged use.

PLANNING

The BLM prepares Cultural Resource Management Plans (CRMPs) to implement objectives developed through the BLM land use planning system. CRMPs are developed for specific cultural resource properties (i.e. sites or districts), areas of critical environmental concern, other specifically selected areas identified in land use plans (e.g., SMAs), and specific classes of cultural resources. These plans establish the specific nature and sequence of actions to achieve identified management objectives.

CRMPs have been prepared and are being implemented for Guadalupe Ruin in the Rio Puerco Resource Area; La Caja Pueblo and Ojo Caliente ACEC in the Taos Resource Area; and for the Salt Point Religious SMA, Navajo Refugee ACEC and SMA, Chacra Mesa ACEC Complex, and five Chacoan Outlier sites (Casamero, Kin Nizhoni, Halfway House, Twin Angels, and Pierre's Ruin) in the Farmington Resource Area. A CRMP to manage all sites within the Farmington Resource Area has also been



prepared and approved. Several other CRMPs are in preparation within the district.

PROTECTION AND UTILIZATION

The BLM's cultural resource management program provides primarily for the protection of cultural resources through the application of both administrative and physical measures. These measures are determined by a cultural resource's scientific and socio-cultural value, vulnerability, and degree of threat. Patrol and surveillance plans are currently being followed in all three resource areas.

Additional measures considered to reduce or eliminate impacts to cultural sites are listed below. These measures are considered at the APD stage, and some or all may be implemented.

1. Well spacing would be maintained at 320 acres (federal oil and gas estate).
2. Wells and facilities would not be allowed on any SMA (surface) smaller than 300 acres.
3. New development would not be allowed within the canyon bottom or on benches above the bottom of the Crow Canyon Archeological district.
4. New facilities would not be allowed on the top of the Huerfano Mesa Sacred Area,
5. New ROWs will follow roads, existing ROWs, or disturbed ROW corridors.
6. Consult with local Navajo Chapters, regarding any proposed development, within or near the Sacred Areas SMAs in accordance with the American Indian Religious Freedom Act.
7. Restrict the period of entry for energy development in the Sacred Areas SMAs so as to not coincide with traditional times of use by American Indians (established by consultation with local chapter houses).
8. Revegetation and reclamation practices will ensure re-establishment of any plant varieties destroyed that are currently collected by American Indians (particular plant seed

mixtures used would be established through consultation).

9. Existing roads that cut through cultural sites will not be maintained until specific directions and requirements are stipulated by the BLM.
10. Reclamation of any allowed facility must include planting of trees and shrubs to mask the disturbance and retain visual qualities.
11. Gate and lock all access roads into SMAs and ACECs.
12. Restrict areas of disturbance to absolute minimum required for safe operation and construction of facilities.
13. Restrict any future drilling near SMAs and ACECs to existing disturbed areas (twinning of well pads).
14. Do not allow any land-disturbing geophysical operations within the SMAs and ACECs.

SUPPORT FUNCTION (COMPLIANCE)

Compliance is the support function of the BLM's cultural program. Three compliance requirements must be met:

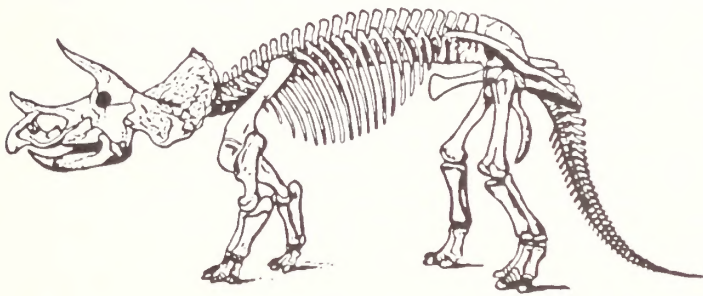
1. BLM obligations under law, regulations, and executive order.
2. Enforcement of cultural resource use permit conditions and stipulations issued by the BLM.
3. Pre- and post-construction stipulations attached to use authorizations.

The first aspect of compliance relates to the BLM's obligations under NHPA and its implementing regulations at 36 CFR 800, which implement Section 106 of NHPA. In accordance with this legislation, cultural sites affected by BLM authorizations for land use must be considered before specific actions are approved. To accomplish this aspect of compliance, the BLM is aided by the New Mexico State Historic Preservation Officer (SHPO). The SHPO, whose position was established by NHPA, as-

sists the BLM with review of individual actions to ensure adequate consideration of impacts on cultural properties.

Adverse impacts on cultural resources are avoided whenever possible or practical. When adverse impacts caused by BLM projects or authorized actions cannot be avoided, mitigation is considered. The nature of the mitigation implemented depends on the impact and the scientific and socio-cultural values of the resource involved. As required, recommended mitigation is coordinated with the SHPO and the Advisory Council on Historic Preservation.

Consultation is facilitated by procedures outlined in a New Mexico State Office memorandum (NMSO 168), which contains an agreement



between the BLM and the SHPO issued in accordance with 36 CFR 800. NMSO 168 has resulted a streamlined consultation process, allowing the BLM to approve actions that have no impact or no adverse impact on cultural properties before formal consultation with the SHPO. The agreement also speeds mitigation of impacts in cases where the SHPO and the BLM concur on a course of action, because this concurrence eliminates consultations with the Advisory Council on Historic Preservation.

PALEONTOLOGY

Management of paleontological resources in the Albuquerque District is directed by FLPMA and the San Juan River Wilderness Protection Act of 1984. The effective management and protection of these resources depends on several elements: (1) the ability of the BLM to identify the resour-

ces where they occur; (2) the BLM's planning system, which provides a process for the resolution of user conflicts; and (3) a spirit of cooperation and informed restraint among public land users.

Objectives for the management of paleontological resources include the following:

1. Identify and evaluate paleontological resources so they may be adequately addressed through the BLM's planning and environmental analysis system.
2. Develop activity plans that carry out the objectives of RMPs or other approved land use plans to protect those paleontological resources considered to be of scientific interest.
3. Provide for uses such as scientific collection and research, recreational hobby collecting, and educational and interpretive activities.
4. Increase the awareness of federal land managers and the public regarding paleontological resource management.
5. Promote consistency among federal agencies having paleontological resource management responsibilities, and facilitate the exchange of information between federal, state, and local governments and scientific organizations concerned with the management, study, and protection of these resources.
6. Accord the protection provided under law to fossils of scientific interest.

Consideration of paleontological resources is integrated into the BLM's planning system, which includes RMPs, activity plans, and plan amendments. Major components of the paleontological resource management program are implemented by:

1. Developing and maintaining paleontological information to allow analysis of the impacts on the resource from competing land uses.

2. Developing policy and guidance for avoidance and mitigation of impacts to paleontological resources of scientific interest.

3. Developing volunteer and cooperative management agreements and associations with individuals, local organizations, universities, museums, and government agencies to facilitate the management and protection of paleontological resources.

4. Monitoring management decisions and actions to ensure that program objectives are met.

5. Promoting awareness among users of the public lands of the importance of paleontological resources; this awareness complements management and protection objectives.

The BLM is in the process of developing a comprehensive set of federal regulations for the management of paleontological resources on public land. The BLM is coordinating this effort with the U.S. Forest Service, the National Park Service, the U.S. Geological Survey, representatives of various state governments and professional societies, and amateur and commercial collectors. Regulations should be drafted by Fiscal Year 1993. When finalized, these regulations will not alter policy based on other existing forms of legislation and regulation such as the National Environmental Policy Act of 1969 (NEPA), ARPA, the Historic Preservation Act of 1966 (as amended in 1976), 40 CFR 1500, and 43 CFR 1600, 2740, 2800, and 3000.

FORESTRY

Legal authority for the management of forest and woodland acres on the public lands is contained in the Materials Sales Act of 1947 and in FLPMA. A recent BLM initiative, the Public Domain Forest Management Policy of 1989, provides guidelines for managing forest and woodland resources. Other laws that directly affect forest and woodland management are the Classification and Multiple Use Act of 1964, NHPA, NEPA, the Federal Water Pollution Control Act of 1969, and the Archeological and Historical Data Preservation Act of 1974.

The forestry program offers forest and woodland products consistent with the principles of sustained yield and multiple use. A balanced management program is achieved by (1) maintaining long-term site productivity and ecological diversity in the forest and woodland ecosystem, (2) meeting public demand for minor forest products at a fair market value, (3) preparing activity plans for forests and woodlands to provide management continuity, (4) designing harvest levels within the capability of essential support activities, and (5) using sound management prescriptions to reforest recently harvested areas. The forestry practices and investments that are implemented reflect the long-term cycle of forest management to maintain the desired ecosystem.

The long-term goal of forest management in the Albuquerque District is to encourage natural regeneration and increase individual tree vigor through implementing forestry practices. This goal includes controlling and reducing the encroachment of undesirable tree species into forest sites. The goal also emphasizes maintaining and protecting the existing forest for the enhancement of forest stands, rather than maximizing the importance of providing forest products to the wood-using industries.

FOREST RESOURCES

Forest inventories and activity plans are completed as funding and time allows, and recommended "allowable harvest" levels are maintained. Multiple use values are considered for wildlife habitat, recreation, range, watershed, and cultural resources. Recommended forestry actions conform to standard practices and the Environmental Assessment for the Timber Management Plan (USDI, BLM 1981), which applies to the Albuquerque and the former Socorro districts. All activity plans and subsequent recommended actions are examined through the NEPA process and are subject to public review and participation.

PINON-JUNIPER WOODLANDS

The woodlands of the district require specific management techniques unique to their species. The ultimate goal of woodland management in the Albuquerque District is to achieve and main-

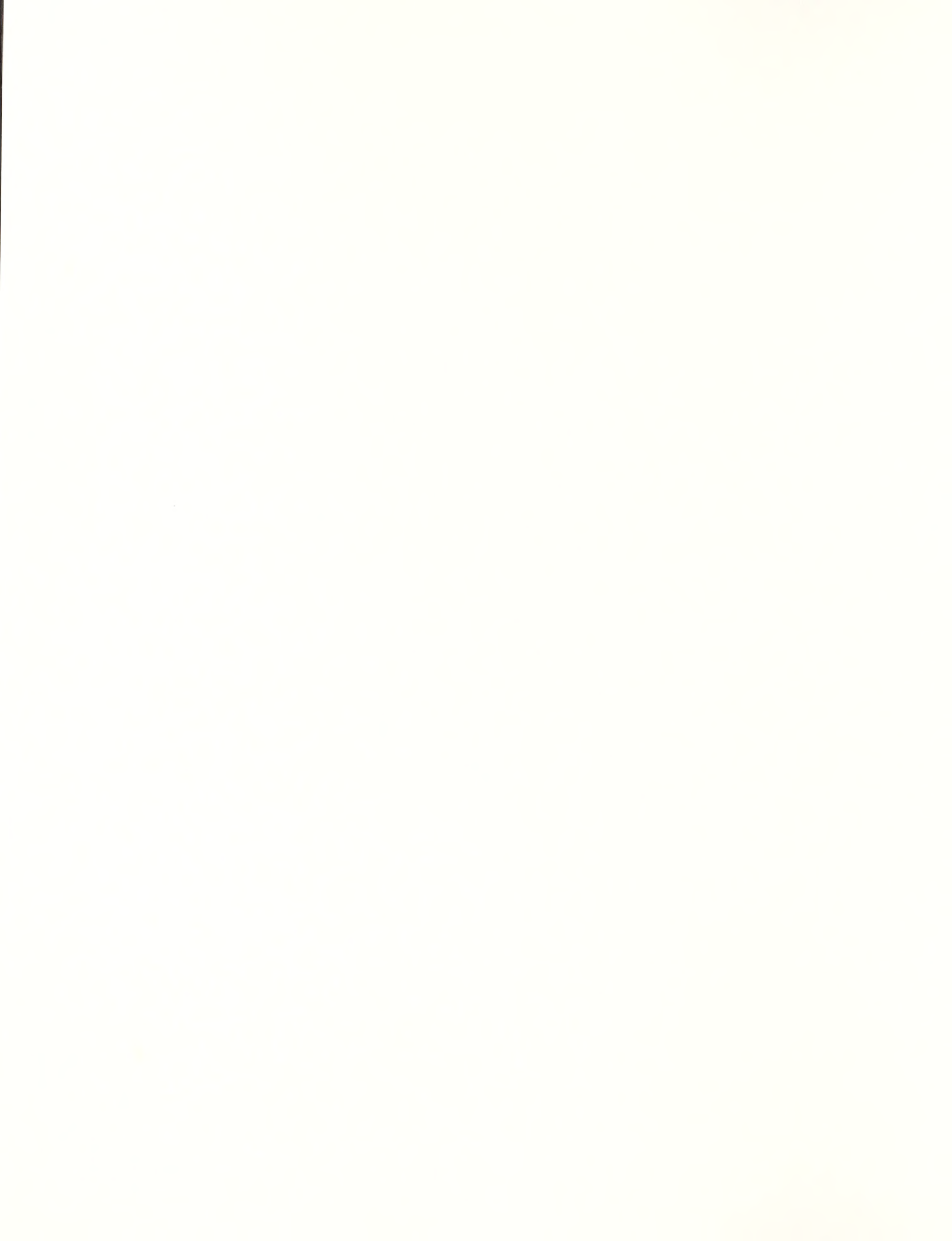
tain a natural mixture of tree species over a wide range of age classes. Management is based on the Public Domain Forest Management Policy of 1989. The goals of the woodland management program are to maintain healthy stands produc-

ing wood products on a sustained yield basis, to reduce trespass cutting throughout the district, and to manage stands while considering other resource values.

Affected Environment

Chapter 3





CHAPTER 3

AFFECTED ENVIRONMENT

OIL AND GAS

ALBUQUERQUE DISTRICT

The BLM administers the rights to oil and gas development for 2,260,100 acres of federal oil and gas in the Farmington Resource Area, 1,873,800 acres in the Rio Puerco Resource Area, and 1,473,600 acres in the Taos Resource Area. The potential (low, moderate, or high) for oil and gas occurring in the Albuquerque District is shown on Map 4 in the map section. Regions of high-intensity development are shown on Maps 5, 6, and 7.

An average of 600 to 800 Applications for Permits to Drill (APDs) are received annually, nearly all of which are received in the Farmington office. Since 1987, Fruitland (coal) Formation gas drilling has been the primary activity in the Farmington Resource Area. Some drilling has been conducted in the Rio Puerco Resource Area during this time, but it has been marginal with less than 50 APDs being processed. Less than 10 APDs have been submitted to the Taos Resource Area.

Oil and gas production in the Albuquerque District occurs primarily in the San Juan Basin. Total production within the district for 1989 for all mineral ownership categories was 6,415,600 barrels (bbl) of oil and 390,124,800 thousand cubic feet (Mcf) of gas. The value of the oil produced in 1989 was \$112,722,000. This is an average of \$40,043 for each of the 2,815 producing oil wells (16 percent of the total producing wells in the district). Royalties paid on the oil production amounted to approximately \$11,360,000. The value of the gas produced in 1989 was \$624,199,700. This is an average of \$39,367 for each of the 15,856 producing gas wells (84 percent of the producing wells in the district). Royalties paid on the gas production amounted to \$57,240,000.

A review of New Mexico Employment Security Department's Quarterly Reports for Covered Employment and Wages shows that employment in the oil and gas sector averaged 2,452 jobs annually for the period 1985 through 1989. This is less than 1 percent of the total covered employment district-wide for the same period. Wage income from this employment is reported to average \$70,657,800 per year. This is slightly over 1 percent of the total covered wage income in the district for the same period.

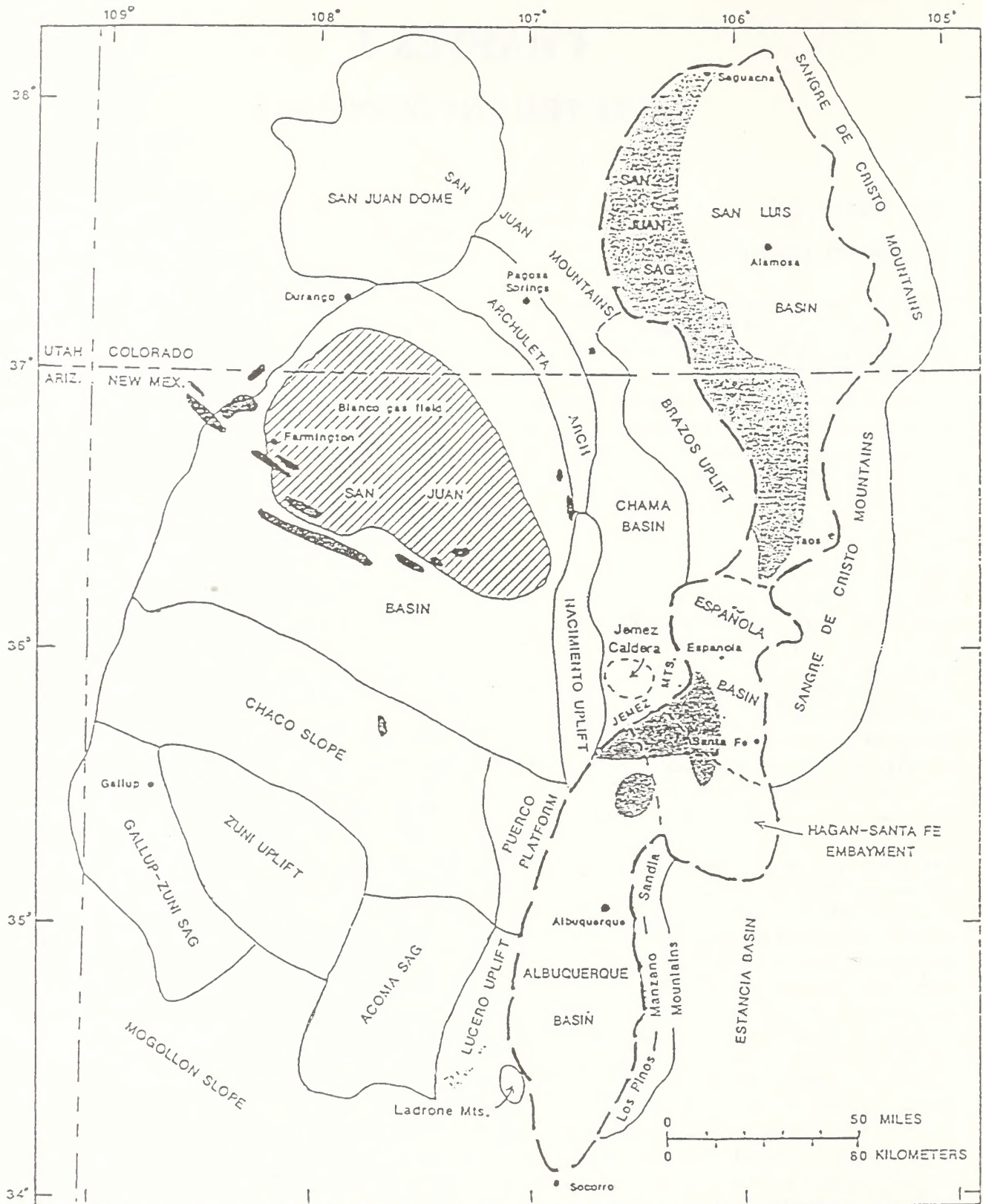
Occasional requests (less than ten per year) are submitted to the district for seismic surveys. Carbon dioxide exploration and drilling activity has occurred within the Taos Resource Area. However, these development activities occur primarily on private and state lands in Union, Colfax, and Harding Counties.

FARMINGTON RESOURCE AREA

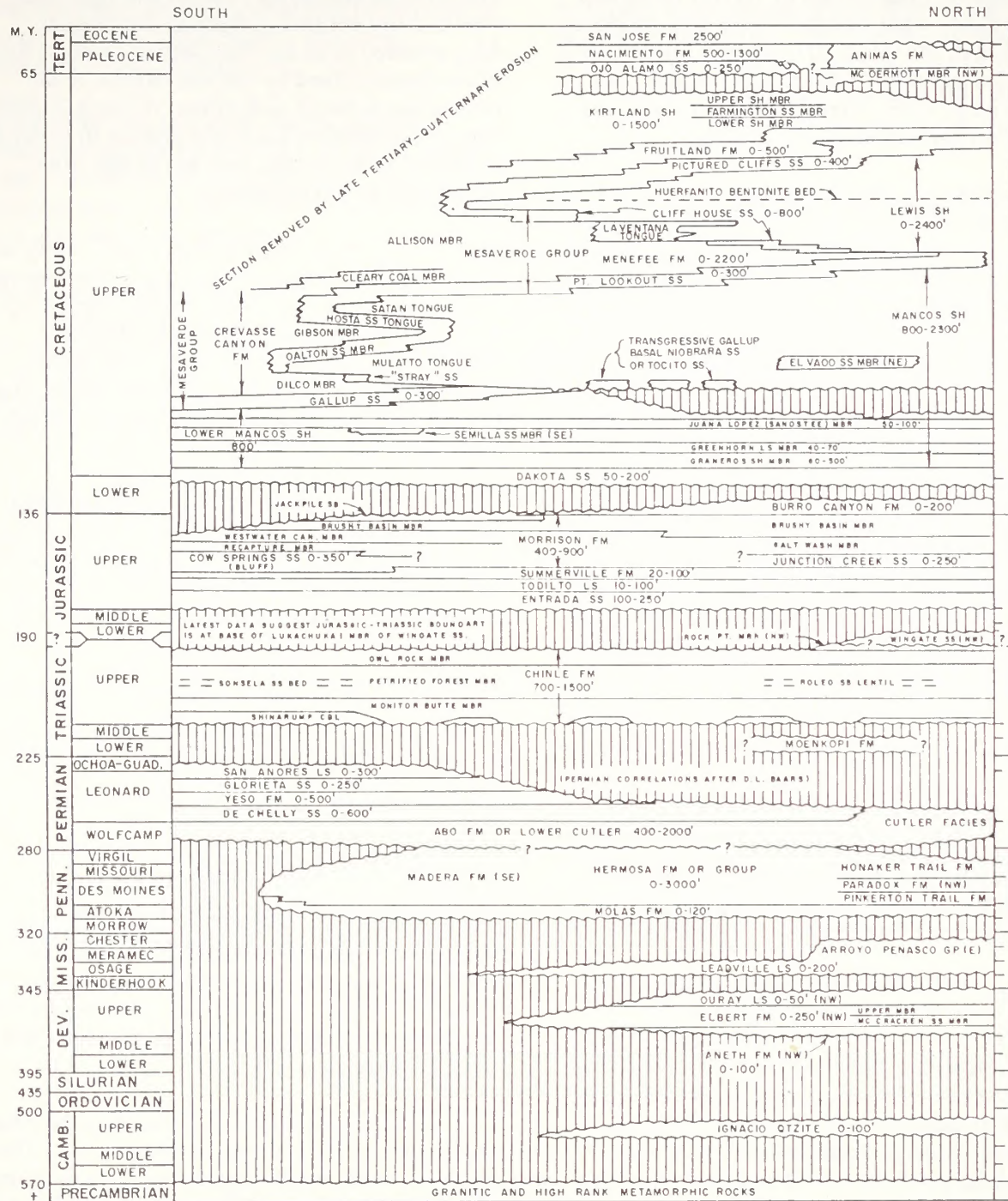
Geologically, the Farmington Resource Area is dominated by the presence of the San Juan Basin, which lies predominantly in northwestern New Mexico in McKinley and San Juan counties and the west half of Rio Arriba County (refer to Figure 3-1). This basin, a physiographic subdivision of the Colorado Plateau Province, is 90 to 100 miles in diameter and is bounded by uplifts or monoclinical structures with as much as 15,000 feet of relief. The basin structure is asymmetric, with the northwest-trending axis located near the steeply dipping northeastern rim. Maximum stratigraphic column includes 14,000 feet of section from Cambrian through Tertiary aged rocks (see Figure 3-2).

Of the conterminous United States, the San Juan Basin is second in gas production only to the Hugoton field in Oklahoma, Texas, and Kansas. Most of the oil and gas production has been from Cretaceous rocks, which are a series of marine and nonmarine sequences resulting from advancing and retreating stages of the Cretaceous Western Interior Seaway.

Figure 3-1
Albuquerque - San Luis Rift Basin



--Index map showing Albuquerque-San Luis rift basin (heavy-dashed outline), sub-basins within rift basin, adjoining tectonic or topographic features, significant Cretaceous oil fields (dark-shaded areas), and large Blanco gas field (cross-hatched area) in San Juan Basin. Light-shaded patterns within rift basin are areas covered by volcanic rocks.



MOLENAAR, 1977

FIGURE 3-2
 SAN JUAN BASIN TIME-STRATIGRAPHIC
 NOMENCLATURE CHART

By the end of 1989, a total of 160 oil fields and 114 gas fields were reported. This area produces 96 percent of the oil (6,207,000 bbl) and 99 percent of the gas (386,224,000 Mcf) reported for the district in 1989. Royalties from oil and gas production amounted to \$66,280,000.

Approximately 2,286 oil-and-gas-related jobs generate about \$65,727,300 of income annually. Oil and gas production supports nearly 7 percent of the covered employment jobs and 10 percent of the income.

RIO PUERCO RESOURCE AREA

The Rio Puerco Resource Area straddles a transition zone between the Colorado Plateau Province and the Rio Grande Rift (refer to Figure 3-1). The geologic structures found within this resource area create an extremely varied and complex geologic environment. However, this complexity can be simplified into two structural settings that affect the occurrence of oil and gas. These settings include basin development and faulting associated with Colorado Plateau dynamics and rift development.

The Colorado Plateau Province in New Mexico is generally characterized by flat-lying or gently dipping sedimentary rock outcrops that were deposited in structural basins, including the San Juan Basin discussed above. Strata deposited in these basins include both source and reservoir rocks of Paleozoic, Mesozoic, and Cenozoic age.

The high-intensity oil and gas development in this resource area occurs primarily in the Colorado Plateau Province. The potential for both stratigraphic and structural traps exists over a large portion of the province. However, local geologic conditions have in many instances destroyed trapping structures and negatively affected the potential for oil and gas occurrence.

The southeastern margin of the Colorado Plateau transitionally grades into the Rio Grande Rift through a series of north- to northeast-trending faults. The north-south trending rift, which extends from Colorado to Texas, bisects the Albuquerque District.

The rift and associated volcanic features are the result of the pulling apart of the earth's crust.

This extensional activity began in Oligocene time and has continued through the present. Also referred to as the Rio Grande Trough, the rift is characterized by vertical offsets, some measuring as much as 6 miles. At least 20,000 feet of sedimentary rocks are present in various locations in the trough, varying in age from Mississippian to Quaternary.

The Albuquerque Basin in Sandoval County is part of the Rio Grande Rift system. Forty-seven exploratory wells have been drilled from 1914 through 1984 to test Tertiary and Mesozoic rocks in the Albuquerque Basin. Gas shows were reported in all (nine) test holes deeper than the Tertiary, with numerous oil and gas shows reported in the remaining Tertiary tests.

Oil and gas in the resource area is produced in Sandoval County. The resource area's production was 3 percent (209,000 bbl) of the oil and less than 1 percent (1,716,300 Mcf) of the gas reported for the Albuquerque District in 1989. Royalties amounted to \$2,230,000.

Seventy-eight oil-and-gas-related jobs generate about \$2,212,200 of income annually. Oil and gas production generates less than 1 percent of the resource area's covered employment jobs and income.

TAOS RESOURCE AREA

The high-intensity oil and gas development in this resource area occurs on the Bravo Dome geologic structure. Formations range in age from Ordovician to Quaternary, with production occurring principally from the Cretaceous and early Tertiary.

Carbon dioxide was first discovered in the Bravo Dome area in 1916 during drilling for oil. The discovery well, the Bueyeros No. 1 [in Section 32, Township 20 North, Range 31 East (Harding County)], had a reported potential of 25 Mcf of gas per day but was plugged because no market existed. The field was developed in the 1930s and has been producing since then. Enhanced recovery projects in Permian Basin oil fields created a higher demand for carbon dioxide and resulted in increased activity in the 1980s. By the end of 1985, 240 producing wells were developed in the Bravo Dome field and 18 in the

Bueyeros field. Carbon dioxide production in 1989 amounted to 85,391,000 Mcf of gas with a market value of \$28,105,000. Royalties amounted to \$1,069,900.

Eighty-nine jobs related to carbon dioxide production generate about \$2,718,300 in annual (wage) income in the resource area. This represents less than 1 percent of the covered employment jobs and wage income.

With the exception of the Bravo Dome carbon dioxide field, the Taos Resource Area has experienced little drilling activity. No significant oil and gas production is reported in this resource area. The discovery well for the Wagon Mound field (in the low-intensity development region) was completed in 1973 at a total depth of 480 feet. Production was from the Dakota Sandstone and the Morrison Formation. Last production for the field was reported in 1979, with a total of 97,281 Mcf from eight wells.

VISUAL RESOURCE MANAGEMENT

ALBUQUERQUE DISTRICT

The BLM administers visual resources on public lands according to four Visual Resource Management (VRM) Class objectives. Three components, scenic quality, sensitivity, and viewing distance, are compiled to formulate three of the four assigned management classes.

VRM classes have been assigned through Resource Management Plans (RMPs) for only a portion of the district, the Farmington and Rio Puerco resource areas. Because VRM objectives have not been determined for all public lands in the Taos Resource Area, VRM classes were not assigned in the Taos RMP.

Table 3-1 displays the amount of acreage in VRM Classes I and II for public lands in the Farmington, Rio Puerco, and Taos Resource Areas. VRM classes for the Taos Resource Area are assigned only to certain special management areas. For those areas not assigned a VRM class, VRM objectives will be applied on a specific case-by-case basis during environmental analysis of actions proposed in those areas.

Areas to be managed under VRM Class I and II management objectives are areas where special considerations are given to the protection of visual resources, and where visual resources are the most sensitive to impact. VRM Class I applies to all special areas where the current management situation requires maintaining a natural environment essentially unaltered by humans. VRM Class II is applied to management areas where the current management situation requires the retention of the existing high-quality scenic values of the landscape. Human-introduced features to the existing characteristic landscape should not attract attention, and should repeat the basic elements found in the natural features of the landscape.

**TABLE 3-1. ALBUQUERQUE DISTRICT
VRM CLASS I AND II ACREAGE**

Class	Albuquerque District	Farmington Resource Area	Rio Puerco Resource Area	Taos Resource Area
Class I	157,300	36,880	102,400	8,000
Class II	318,600	26,980	237,610	54,000
Totals	475,900	63,860	340,010	72,000

FARMINGTON RESOURCE AREA

The landscape composition is quite diverse in this resource area, where most of the oil and gas activity in the Albuquerque District is occurring. In general, the resource area is characterized by a large depression in the earth's surface referred to as the San Juan Basin, which is partially surrounded by mesas and mountains.

The San Juan Basin contains steep colorful escarpments, broad vistas, pastel-colored badlands, and rugged canyons, which are prominent features of the southern portion of the resource area. Sagebrush and grassland expanses are prominent in the central portion of the resource area. Pinon-juniper woodlands, rivers, reservoirs, and other man-made structures dominate the northern portion of the resource area. Mountain ranges include the San Juan and La Plata Mountains to the north, the San Pedro Mountains to the east, the San Mateo and Zuni mountains to the south, and the Chuska Mountains to the west.

Scenic vistas from major highway arterials, river fronts, high places, and special management areas are important because of the associated sightseeing values. Sculpted landscapes of mesas and canyons along State Highways 371 and 44 offer high scenic values to a large number of people. Two major attractions to recreationists are water and high places. The San Juan and Animas Rivers and the numerous mesas and mountain ranges offer views both uncommon and typical in this region.

Special Management Areas (SMAs) in the high-intensity oil and gas development *area* of the resource area are Angel Peak and Simon Canyon Recreation Areas and Areas of Critical Environmental Concern. These SMAs exist partially because of their high scenic qualities, so protecting vistas within these areas from outside influences is a concern.

Management objectives for the maintenance of existing high-quality visual resources have been developed for five SMAs (25,019 acres) in the high-intensity oil and gas development region. These SMAs are Simon Canyon, Angel Peak, Carracas Mesa, Thomas Canyon, and Negro Canyon. Management prescriptions have

resulted in the assignment of VRM Class I management objectives to 11,000 acres in three SMAs (Carracas Mesa, Thomas Canyon, and Negro Canyon) and VRM Class II management objectives to 14,000 acres in two SMAs (Simon Canyon and Angel Peak).

The remaining four SMAs (Chacra Mesa, Ah-shi-sle-pah WSA, and Bisti and De-na-zin Wilderness Areas) are located in the low-intensity development region. Approximately 23,600 and 17,800 acres in these management areas are VRM Class I and II lands, respectively. Of this acreage, Class I lands are protected under the wilderness designations in Bisti and De-na-zin.

RIO PUERCO RESOURCE AREA

Management objectives for the maintenance of existing high-quality visual resources have been developed for seven SMAs located in the high-intensity oil and gas development region of this resource area. These SMAs include Cabezon Peak SMA, Canyon Jarido SMA, Elk Springs SMA, Empedrado WSA, Ignacio Chavez SMA, Jones Canyon SMA, and La Lena SMA. Approximately 86,600 acres in these SMAs/WSAs are VRM Class II lands.

Nine SMAs (Cebolla Wilderness, West Malpais Wilderness, Manzano WSA, Chain of Craters WSA, Bluewater Canyon SMA, Tent Rocks SMA, Ojito SMA, El Malpais NCA, and Petaca Pinta WSA) are located in the low-intensity development region of the resource area.

Approximately 102,400 and 151,000 acres in these nine SMAs/WSAs are VRM Class I and II lands, respectively. Of this acreage, all VRM Class I lands are protected under wilderness designations.

TAOS RESOURCE AREA

Eight of the SMAs established in the Taos RMP (Wild Rivers Recreation Area, Racecourse, Rio Chama, Santa Cruz Lake Recreation Area, San Antonio, Sabinoso, and the Rio Grande and Rio Chama Wild and Scenic areas) have specific management objectives for maintaining the high-quality visual resources in these areas. About 18,000 acres of VRM Class I scenery are

protected as the result of wild and scenic river designations. VRM Class II management objectives have been developed for 54,000 acres (six SMAs). All VRM Class I and II acreage is located in the low-intensity oil and gas development region of this resource area. VRM classes are not assigned to the limited, scattered tracts of public land in the high-intensity development region.

RECREATION

ALBUQUERQUE DISTRICT

A wide variety of recreation opportunities and settings is available in the Albuquerque District. Recreation settings range from undeveloped and wild lands to campgrounds and visitor centers. Public lands provide Congressionally recognized areas for recreation activities in four designated wilderness areas, two wild and scenic rivers, segments of the Continental National Divide Scenic Trail, a national conservation area, and components of the National Recreational Trail System.

Most of the public lands are undeveloped and provide settings for numerous dispersed recreational activities. Visitors can engage in caving, fishing on quality trout waters, rafting wild and scenic rivers, camping at a developed camp-ground, and visiting interpreted cultural sites. Other activities include hunting, camping, float boating, rockhounding and collection, picnicking, fishing, hiking, horseback riding, nature study, viewing wildlife, viewing cultural and historical sights, sightseeing, photography, and use of off-highway vehicles (OHVs) and off-road vehicles (ORVs).

Through the RMP process, an inventory was conducted to quantify and define the recreation opportunities available in the district's three resource areas. This inventory utilized the BLM's Recreation Opportunity Spectrum (ROS). Most public lands within the district fall into the roaded natural (43 percent) and semi-primitive (38 percent) classifications. Recreation opportunities in these classes can be described as facility- or equipment-dependent and vehicle-dependent, in a natural-appearing but modified environment. A breakdown of the inventoried ROS classes is given in Table 3-2.

**TABLE 3-2. ALBUQUERQUE DISTRICT
RECREATION OPPORTUNITY SPECTRUM (ROS) CLASSIFICATIONS
(acres)**

ROS Class	Farmington	Rio Puerco	Taos	Total
Primitive (P)	43,034	0	0	43,034
Semi-primitive non-motorized (SPNM)	149,142	133,840	19,000	301,892
Semi-primitive motorized (SPM)	577,702	218,415	180,000	976,117
Roaded natural (RN)	124,774	99,842	901,400	1,126,016
Rural (R)	1,838	2111,790	30,000	143,628
Urban (U)	0	0	0	0
TOTALS	896,490	563,887	1,130,400	2,590,777

FARMINGTON RESOURCE AREA

Outdoor recreation resources in the Farmington Resource Area range from predominantly natural, low-use areas to developed, intensive-use areas. In most cases, the physical environment influences the types of activities that can occur, determines where they occur, and ultimately determines the experiences that can be achieved.

Public land attributes that enhance recreation opportunities and attract visitors include badlands, rivers, canyon settings, and woodland environments. Badlands such as those in the Angel Peak Recreation Area offer an unusual scenic opportunity with the occurrence of spires, "hoodoos," and other unusual rock formations. The opportunity to see fossils and petrified wood enhances the visitor's experience.

The La Plata, San Juan, and Animas rivers provide a welcome contrast to this southwest region where a semi-desert climate dominates and little flowing water exists. The many canyons in the resource area, such as those in the Simon Canyon Recreation Area and Thomas Canyon Special Management Area, afford visitors an opportunity to seek solitude in the sandy wash bottoms and offer sweeping panoramic views from the rims.

Pinon-juniper woodland, with occasional pockets of oak and ponderosa, dots a landscape that contains big-game habitat. These areas provide opportunities for wildlife viewing and cover for campers, hikers, and hunters.

Opportunities are available to enjoy a variety of outdoor recreation activities. Water-related activities include river floating, canoeing, kayaking, swimming, and fishing. Trail-based activities include horseback riding, mountain biking, day hiking, and off-highway vehicle driving. Dispersed recreation includes backpack camping, big-game hunting, rockhounding, hang gliding, off-road vehicle use, cross-country skiing, and sightseeing related to cultural, wildlife, geological, and paleontological resource values.

Developed recreation opportunities are available at the Angel Peak and Simon Canyon Recreation

Areas. Activities at Angel Peak include day hiking, vehicle camping, picnicking, rockhounding, and sightseeing, while Simon Canyon provides opportunities for fishing, tent camping, and day hiking.

Recreation Management Areas

Four Special Recreation Management Areas (SRMAs) are found in the high-intensity oil and gas development region of the resource area. They are the Angel Peak Recreation Area, Simon Canyon Recreation Area, Dunes Vehicle Recreation Area, and Head Canyon Off-Road Vehicle Competition Area (refer to Map 5 in the map section). These areas attract moderate to heavy visitor use and require intensive management to protect sensitive resources, resolve user conflicts, and provide for visitor safety.

Two Areas of Critical Environmental Concern (ACECs) are located within SRMAs and require special measures to protect sensitive resources. The Simon Canyon ACEC, within the Simon Canyon Recreation Area, has been designated to protect natural, scenic, and cultural values. The Angel Peak ACEC, within Angel Peak Recreation Area, has been designated to protect natural and scenic values (refer to Map 5 in the map section).

Four SMAs also exist in the high-intensity development region. They are Carracas Mesa, Thomas Canyon, Negro Canyon, and the Glade Run Trail System (refer to Map 5 in the map section). These SMAs incur low visitor use, and require a moderate level of management attention to meet goals and carry out ROS semi-primitive motorized and non-motorized objectives.

The remaining public lands in the Farmington Resource Area are designated as an Extensive Recreation Management Area (ERMA). The ERMA overlaps both the high- and low-intensity oil and gas development regions. Recreation resources and use are routinely monitored, and periodic patrol provides the necessary information for appropriate management and feedback for planning.

Motorized recreation on public lands includes opportunities for OHVs (off the pavement, on

existing maintained or primitive roads) and ORVs (for cross-country travel, off existing routes). Motorized vehicle use by various classes and types of motorcycles, dune buggies, all-terrain vehicles, and four-wheel-drive vehicles occurs mainly near population centers and major highway arterials. Concentrated use is known to occur in the glade north of Farmington and on the bluffs south of Farmington (in the high-intensity development region). Four-wheel driving, associated with woodcutting, hunting activities, mineral exploration and development, livestock operations, and administrative use of the lands occurs throughout the resource area.

In the RMP for this resource area (1988), 1,393,900 acres of public land were designated as "open" to ORV use. A "limited" designation was applied to 109,000 acres. This means that vehicle use is restricted to designated roads and trails, or vehicle use in a specific area is limited to authorized users. Approximately 39,000 acres were designated as closed.



RIO PUERCO RESOURCE AREA

The Rio Puerco Resource Area provides recreational opportunities for two of the largest metropolitan areas in New Mexico, Albuquerque and Santa Fe. The majority of the public land in the resource area is located within 1 1/2 hours' drive from Albuquerque. Population projections for the next 20 years forecast significant growth for both cities, with the major increases occurring in the Albuquerque metropolitan area. These population increases and the proximity of these population centers to this resource area will result in an increased demand for the recreation opportunities provided by the Rio Puerco Resource Area.

The majority of the resource area's recreation use is dispersed in nature. A wide variety of recreation activities is available, including hunting, camping, picnicking, backpacking, horse-back riding, climbing, caving, hang gliding,

motorcycling, four-wheel driving, observing nature, rockhounding, and photography. A higher concentration of these uses occurs in several of the areas identified as SMAs.

The recreational opportunities are predominantly undeveloped in a low elevation, semi-arid landscape. Although some are similar to opportunities provided by other land management agencies, the character of the landscape in this resource area provides a different type of setting, which provides an expanded range of recreation opportunities. The lower elevation permits the continuation of certain types of recreation activities precluded in mountainous areas by seasonal climatic changes.

Recreation Management Areas

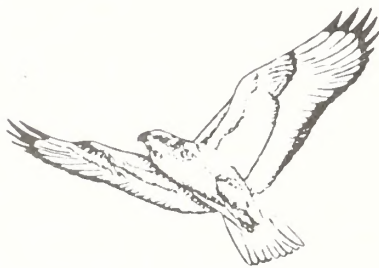
Six SMAs (Azabache Station, Cabezon WSA, Canyon Jarido, Empedrado WSA, Ignacio Chavez WSA, and La Lena WSA) are located in the high-intensity oil and gas development region of this resource area (refer to Map 6 in the map section). Eight other SMAs (Continental Divide National Scenic Trail, Historic Homesteads, Ojito WSA, Petaca Pinta, Tent Rocks, 1870s Wagon Trail SMA, El Malpais NCA, and Manzano) are located in the low-intensity development region (refer to Map 6). Management goals pertaining to the protection of existing recreation values and opportunities have been developed for all these areas.

Additional areas oriented towards motorized recreational use in the low-intensity development region are the San Ysidro Motorcycle Trials Area and the Competitive Dune Buggy Event Area. There is also an off-road vehicle recreation trail system, composed of about 124 miles of existing roads and trails, that is available for public use. An ongoing, organized, and permitted competitive event, the "Oh-My-God-100" motorcycle race, occurs in the upper Rio Puerco Valley, also in the low-intensity development region.

In the Rio Puerco RMP (1986), 260,500 acres of scattered public lands were designated as "open" to ORV use. A "limited" designation was applied to 735,700 acres. Approximately 10,340 acres and 16 miles of road were designated as closed.

TAOS RESOURCE AREA

No SMAs occur in the high-intensity development region of this resource area (Bravo Dome). Three SMAs (the Wild Rivers Recreation Area, Orilla Verde Recreation Area, and Santa Cruz Lake Recreation Area) are located in the low-intensity oil and gas development region (refer to Map 7 in the map section). Because most of the surface estate in the Bravo Dome area is private, ORV designations (open, limited, or closed) do not apply and have, therefore, not been assigned to the high-intensity development region.



WILDERNESS STUDY AREAS

ALBUQUERQUE DISTRICT

Wilderness resources on BLM-administered lands were identified through inventories completed in 1980 and later through Congressional action. Areas found to possess wilderness characteristics were identified as wilderness study areas (WSAs).

A total of 13 WSAs exist in the Albuquerque District (refer to Map 8 in the map section). Twelve of these WSAs are the result of inventories and studies performed in accordance with Section 603 of the Federal Land Policy and Management Act of 1976. Table 3-3 displays by resource area the name of each WSA, its approximate size, and its location within the high- or low-intensity development region.

Whether recommended suitable or not by the BLM, all WSAs are under interim wilderness management to protect their wilderness qualities. Congress will act on these recommendations to either release the areas from further wilderness consideration or designate them as wilderness.

FARMINGTON RESOURCE AREA

Farmington Resource Area manages only the Ah-shi-sle-pah WSA (6,563 acres). This WSA is located in the low-intensity oil and gas development region.

RIO PUERCO RESOURCE AREA

The Rio Puerco Resource Area contains five Wilderness Study Areas (totalling 70,475 acres) in the high-intensity oil and gas development region. The Boca del Oso, or Bear's Mouth, is the central topographic feature of four WSAs located northwest of Albuquerque, in McKinley and Sandoval Counties. These are the Ignacio Chavez (32,266 acres), Chamisa (10,605 acres), Empedrado (9,007 acres), and La Lena (10,438 acres) WSA's.

Visual appeal and the diversity of land forms and vegetation are perhaps the most outstanding special features of the WSAs. The ponderosa pine, Douglas fir, and pinon and juniper woodlands on the mesas contrast sharply with the sandstone bluffs and arroyos at the lower elevations. This diversity of ecotypes forms a varied and productive wildlife habitat.

The Ignacio Chavez WSA is considered critical winter range for deer and elk. Tassel-eared squirrels, sharpshinned hawks, red-tailed hawks, jays, and juncos also inhabit the WSA. San Luis Mesa, in the La Lena WSA, is considered to be an important raptor nesting area.

The fifth WSA was featured as a reference point in virtually all early explorations of the region. Cabezón Peak is the key feature of the Cabezón WSA (8,159 Acres). Located in Sandoval County, the WSA is dominated by flat grassy plains, pinon-and juniper-covered foothills, and



a volcanic plug that rises more than 2,000 feet above the surrounding Rio Puerco valley. Popular as a non-technical rock climbing area, the WSA is also home to a variety of raptors including golden eagles, red-tailed hawks, sparrow hawks, prairie falcons, and great horned owls.

The Rio Puerco Resource Area contains four Wilderness Study Areas (totalling 41,752 acres) in the low-intensity oil and gas development region. These four are the Chain of Craters

(18,300 acres), Manzano (881 acres), Ojito (10,903 acres), and Petaca Pinta (11,668 acres).

TAOS RESOURCE AREA

The Taos Resource Area contains three Wilderness Study Areas (totalling 33,000 acres) in the low-intensity oil and gas development region. These three units are the Rio Chama (10,000 acres), Sabinoso (16,000 acres), and San Antonio (7,000 acres).

TABLE 3-3. ALBUQUERQUE DISTRICT WILDERNESS STUDY AREAS^{1/}

Resource Area	WSA	Development Region	Size (acres)
Farmington	Ah-shi-sle-pah	Low-Intensity	6,563
	Subtotal		6,563
Rio Puerco	Cabezon	High-Intensity	8,159
	Empedrado	High-Intensity	9,007
	Ignacio Chavez	High-Intensity	32,266
	Chamisa	High-Intensity	10,605
	La Lena	High-Intensity	10,438
	Manzano	Low-Intensity	881
	Ojito	Low-Intensity	10,903
	Petaca Pinta	Low-Intensity	11,668
	Subtotal		93,927
	Chain of Craters ^{2/}	Low-Intensity	18,300
Taos	Rio Chama	Low-Intensity	10,000
	Sabinoso	Low-Intensity	16,000
	San Antonio	Low-Intensity	7,000
	Subtotal		33,000
	TOTAL		151,790

Notes: ^{1/}The acreage figures used in this table have, in some cases, been rounded and adjusted. They do not in all cases match those figures for the WSAs shown in the Statewide Wilderness EIS.

^{2/}The wilderness suitability study for this WSA is being conducted separately from the Statewide Study.

WILDLIFE

ALBUQUERQUE DISTRICT

Areas of Special Management Concern

All ACECs, Research Natural Areas (RNAs), and SMAs have some value for plants and wildlife. However, 11 areas have been singled out for their wildlife values in the high-intensity

oil and gas development regions of the district. Table 3-4 provides information about the wildlife values in these ACECs/SMAs.

The BLM is currently preparing to inventory selected areas for the Mexican spotted owl. These areas have been selected because they appear to have characteristics of owl habitat or because the BLM is proposing activities that may affect owl habitat, (refer to Appendix G).

**TABLE 3-4. ALBUQUERQUE DISTRICT
WILDLIFE AREAS OF SPECIAL MANAGEMENT CONCERN^{1/}**

Resource Area	Development Region	Management Area	Area Designation	Size (acres)
Farmington	High-Intensity	Bald Eagle (20 use areas)	ACEC	1,700
Farmington	High-Intensity	Carracas Mesa	SMA	7,000
Farmington	High-Intensity	Laguna Seca	SMA	2,400
Farmington	High-Intensity	Negro Canyon	SMA	1,600
Farmington	High-Intensity	Thomas Canyon	SMA	4,630
Farmington	High-Intensity	River Tracts (39 tracts)	SMA	2,953
Rio Puerco	High-Intensity	Canon Jarido	SMA	1,803
Rio Puerco	High-Intensity	Elk Springs	ACEC	10,300
Rio Puerco	High-Intensity	Ignacio Chavez	SMA	43,182
Rio Puerco	High-Intensity	San Luis Mesa Raptor Area	ACEC	10,447
Taos	Low Intensity	Winter Range	ACEC	6,688

Note: ^{1/} Refer to Appendix F for a list of habitat types and species.

FARMINGTON RESOURCE AREA

Selected Species

Approximately 100,000 acres of the resource area are considered important big game winter habitat. The pinon-juniper habitat of the northern La Plata River Valley and the areas adjacent to the Carson and Santa Fe National Forests support significant wintering populations of mule deer and elk (*critical range for mule deer, elk and antelope is shown on Map 9 in the map section*). Typically the higher elevations provide summer range and are often located on Forest Service (USFS) land, and the lower elevations provide winter range and are often located on BLM land. However, in mild winters, relatively few deer or elk concentrate in the higher areas.

Elk numbers have been increasing in the area adjacent to the Carson National Forest. Twelve hundred resident deer and 500 resident elk exist in the Farmington Resource Area. Most of the resource area south of State Highway 44 is not treated as deer or elk habitat although mule deer are occasionally observed.

A small herd of pronghorn antelope can be found in the sagebrush and desert shrub-grassland types. However, though large areas of apparently suitable habitat exist in the resource area (Albee 1982), the population is very low and is considered to be declining, possibly due to poaching. To take advantage of the available habitat, about 85 antelope were released on Ensenada Mesa in March 1989.

Bald eagle winter use around Navajo Reservoir is well-documented (Grubb 1984, Green 1980, Hubbard 1978). Renwald (personal communication 1985) estimates 80 to 100 bald eagles roost adjacent to the reservoir between November and March each year. An additional 20 to 30 bald eagles winter in the Animas River Valley. Probably less than 10 winter in the La Plata River Valley.

Areas that have received special attention in the Farmington Resource Area are nesting areas for golden eagles, prairie falcons, and ferruginous hawks; bald eagle wintering areas; and riparian habitat areas. Monitoring of golden eagle, prairie falcon, and ferruginous hawk nests has

been conducted since 1981, primarily to provide data for the coal leasing program.

As of July 1986, 95 raptor nests have been recorded. It is estimated these nests represent at least 43 territories. Up to 71 percent of the known territories have been occupied by paired birds during a single breeding season. Many of the raptor nests are located in the low-intensity oil and gas development region of the resource area.

Areas of Special Management Concern

Six areas of special management concern occur in the high-intensity oil and gas development region of the Farmington Resource Area (refer to Table 3-5 and Map 10). Major wildlife concerns with regard to oil and gas leasing and development in this resource area are summarized in Table 3-5.

RIO PUERCO RESOURCE AREA

Selected Species

Mule deer range throughout the Rio Puerco Resource Area. Populations are down, consistent with the trend for mule deer throughout northern New Mexico. The major concentration in the high-intensity oil and gas development region is in the northern part of the Rio Puerco Resource Area.

Rocky Mountain elk reside on public land in the northern portion of the resource area. All herds are expanding and are competing with cattle for forage in these areas. A map of deer, elk, and antelope occupied and critical winter ranges (Map 11 in the map section) has been adapted from the New Mexico Game and Fish Comprehensive Plan (NMDG&F 1980). No antelope are known to occur in the resource area.

Areas of Special Management Concern

Four areas of special management concern exist in the high-intensity oil and gas development region of the Rio Puerco Resource Area (refer to Table 3-6). The major wildlife concerns with regard to oil and gas leasing and development in the Rio Puerco Resource Area are summarized in this table.

TAOS RESOURCE AREA

Because most of the high-intensity oil and gas development region is private surface (Bravo Dome; refer to Map 12), BLM habitat management objectives and constraints do not apply.

Selected Species

No selected species occur in the high-intensity development region.

Areas of Special Management Concern

No areas of special management concern exist in the high-intensity development region.

**TABLE 3-5. FARMINGTON RESOURCE AREA
WILDLIFE AREAS OF SPECIAL MANAGEMENT CONCERN^{1/}**

Management Area	Area Designation	Resource Concern	Major Resource Attributes
Bald Eagle	ACEC	Wildlife	Winter use for bald eagles (20 use areas)
Carracas Mesa	SMA	Wildlife	Featured species (elk and mule deer; winter use; mountain lion)
Negro Canyon	SMA	Wildlife	Botanical sightseeing Species richness (Watchable Wildlife)
Thomas Canyon	SMA	Wildlife	Featured species (mule deer winter use)
River Tracts	SMA	Riparian	Riparian habitat for wildlife Fishing access Nursery pond potential for listed fish River access Species richness (Watchable Wildlife) (39 separate tracts)

Note: ^{1/}Refer to Appendix F for a list of habitat types and species.

**TABLE 3-6. RIO PUERCO RESOURCE AREA
WILDLIFE AREAS OF SPECIAL MANAGEMENT CONCERN**

Management Area	Area Designation	Major Resource Attributes
Canon Jarido	SMA	Featured Species (mule deer) Raptor nesting & feeding habitat Spring habitat
Elk Springs	ACEC	Elk Spring (riparian stream, water source) Featured species (elk & mule deer winter use)
Ignacio Chavez	SMA	Featured species (black bear, elk, Merriam's turkey, mule deer, mourning dove, tassel-eared squirrel) Habitat diversity Species richness (raptors, songbirds, and other Watchable Wildlife)
San Luis Mesa	ACEC	Cliff nesting habitat (raptors) Raptor area Raptor feeding habitat

THREATENED & ENDANGERED (T&E) AND OTHER SPECIAL STATUS PLANT AND ANIMAL SPECIES

ALBUQUERQUE DISTRICT

An estimated (16) federally listed Threatened and Endangered and (68) other Special Status Species (Federal Candidate and State Listed) are known or potentially could occur on public lands within the Albuquerque District. Any action that may effect T&E listed species is subject to formal consultation with the U.S. Fish and Wildlife Service under Section 7 of the Endangered Species Act. BLM gives federal candidate and State listed species special consideration to ensure that their populations do not decline to the point where listing as threatened or endangered becomes necessary. Consequently, any action that "may affect" a

federal candidate or state listed species is subject to informal conference with the U.S. Fish and Wildlife Service or the State of New Mexico under the BLM (New Mexico) policy.

The following serves only as an example of the general habitat types and potential T&E and other Special Status Species that could occupy these habitats within the EIS area. Many of the more mobile species (birds, large mammals) can use several different habitat types. For a complete list of Special Status animals and plants, see Appendix H.

Grassland:

Threatened and Endangered Species of the grassland ecosystem include: Black-footed Ferret, Bald Eagle, American Peregrine Falcon, Whooping Crane, Least Tern, Piping Plover, and Colorado River Squawfish. Other Special Status Species include: Ferruginous Hawk,

Long-billed Curlew, Mew Mexico Meadow Jumping Mouse, Swift Fox, and Grama Grass Cactus.

Desert Shrub (Sagebrush):

Within this habitat type the T&E species that occur include: Bald Eagle, American Peregrine Falcon, and Mancos Milk-Vetch. Other Special Status Species include: Aztec Gilia, Swift Fox, Spotted Bat, and Mesa Verde Cactus.

Pinon/Juniper:

None of the endangered or threatened animal species appear to be limited or especially dependent upon Pinon/Juniper habitat, however, Knowlton Cactus and Zuni Fleabane are found primarily within this habitat type.

Coniferous/Deciduous Forest:

This habitat type is very limited on lands administered by the BLM, however, some T&E and other Special Status Species which could occur include: Goshawk, Spotted Owl, Occult Little Brown Bat, Pine Martin, River Otter and Gray Wolf.

SOILS AND WATERSHEDS

ALBUQUERQUE DISTRICT

Soil Surveys

Published soil survey information is available for a portion of the Farmington Resource Area. Updated versions have been completed for Rio Arriba, Sandoval, McKinley, and San Juan Counties. Although not yet available, a soil survey is being prepared for McKinley County, but most public lands in the county are covered in other existing soil surveys.

Soil survey information is available for the Rio Puerco and Taos Resource Areas. Soil surveys cover either individual counties or soil survey areas, and not all are published. Although unpublished, the Rio Arriba County soil survey was completed in 1988. Information from this survey can be obtained through requests to the U.S. Department of Agriculture, Soil Conserva-

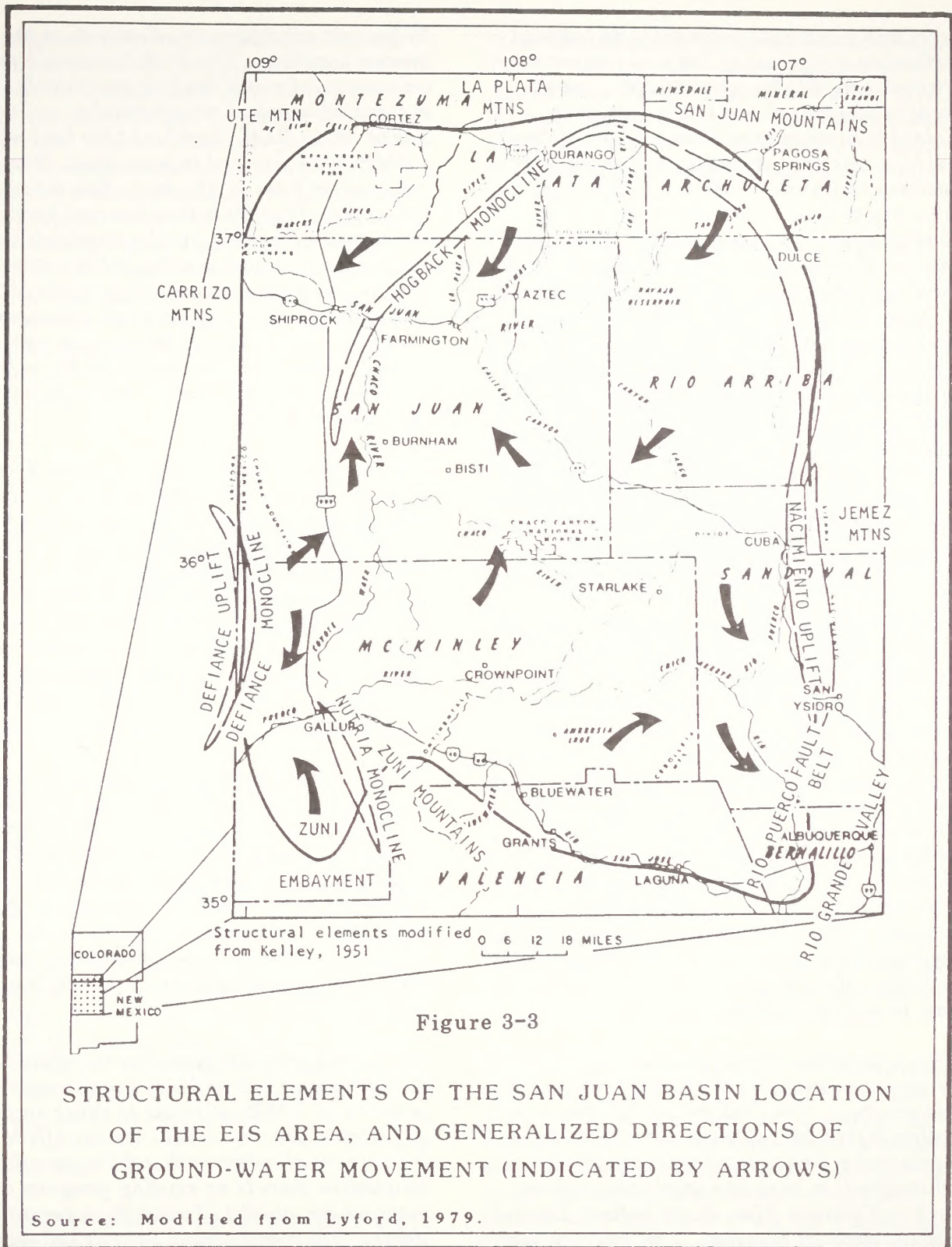
tion Service. A draft soil survey for Sandoval County was completed in 1988.

Watersheds

In the 1970's, the Soil and Watershed Conservation program completed an inventory and interpretation of watershed condition on all major BLM watersheds and developed land management and treatment plans for most of the high priority watersheds. Scattered tracts on the east side of Taos Resource Area and in McKinley County were not inventoried. The BLM has conducted sediment yield studies in the San Juan Grazing EIS Area, and research into runoff, and ground water models within potential coal mining areas. The sediment yield data provides the basis for estimating potential impacts of each alternative. The BLM has provided support and funding to USGS for operating stream gaging stations and water quality sampling. Data for many areas, especially ephemeral streams, is lacking.

The most widely known erosion problems occur on the Rio Puerco drainage and were the subject of the Frail Lands Program-Rio Puerco Project. Hundreds of erosion control structures were built to control headcutting and store sediment, along with a variety of revegetative treatments on thousands of acres. Since then changes in grazing management have been used to achieve improved vegetative and hydrologic conditions. Sediment delivery per volume of flow to the mouth of the Rio Puerco has dropped to about half of its former load of the 1960's. The large erosion control structures are now beyond their design life. Many are full of sediment and in need of maintenance. Erosion in the San Juan Basin is similar to that in the Rio Puerco but has not received the structural or revegetative treatments nor the attention of the research community. Based on the 1978 study of sediment yields, an estimated 1500 acre feet of sediment per year was produced or available for transport to a live stream from all sources, natural and manmade, and all land ownerships within the 1.2 million acres of the San Juan Grazing EIS Area.

Disturbance associated with existing long-term oil and gas development is estimated at 65,630



Adapted from San Juan River Regional Coal EIS, USDI, BLM, 1984.

acres and a potential sediment yield (without mitigation measures) of 148 acre feet per year. Undoubtedly this has contributed to impairment of designated uses in the San Juan/Colorado River system. However, BLM does not have any data or studies that specifically partitions sediment yields or any other contaminant by land ownership, activity, or percentage of the contaminant that reaches a live stream. Estimates of sediment yield are based on a watershed rating method designed to make general sediment classifications for areas greater than 10 square miles and segregate landscapes into 5 sediment yield ranges for comparison purposes. Examples of soil and water conservation practices that are designed to protect these resources during oil and gas activities are found in Appendix B-6. These practices are used to design site-specific mitigation measures and are part of the "Conditions of Approval" COAs) for permitted activities, and are subject to regular compliance inspections.

In recent years certain aspects of the watershed program have received added emphasis through special interest legislation or initiatives. The State of New Mexico Nonpoint Source Pollution program for improving water quality in degraded streams, the riparian program for restoring the vegetative and hydrologic function to live streams, and the Colorado River Basin Salinity Control Act which directs reductions in salt loading from all sources in the Basin, are providing major program direction for the soil and watershed program. Water quality is the common theme amongst these programs and reinforces BLM's institutional water quality objectives of prevention, protection, and improvement.

Efforts to reduce nonpoint source pollution will continue most aspects of existing erosion control practices. They will be identified as such in project level environmental assessment documents and provide coordination and linkage to other efforts in environmental improvement, such as Colorado River Basin Salinity Control and the riparian program. This will also apply across other resource programs including range and wildlife management. Each Resource Area develops 3 to 5 new or revised allotment management plans (AMPs) per year with the objective of improving vegetative and

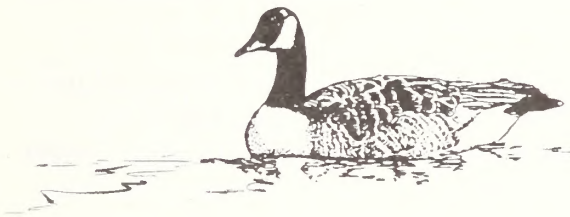
hydrologic conditions on allotments in the poorest condition. The BLM has completed an assessment of public lands in watersheds with designated impaired stream reaches and determined where BLM should take the lead with CRMPs for watershed improvement. Because most waters from public lands flow through ephemeral channels before entering perennial streams and the water quality standards are set for perennial stream reaches, BLM water quality objectives are twofold: first, the prevention of further degradation of all waters, and secondly to produce the cleanest water possible from permitted activities under BLM control thereby assisting the State in meeting stream standards and goals.

The strategy for monitoring compliance with lease stipulations is developed each year by the Farmington Resource Area (See Appendix B-7). Environmental protection begins with the development of special stipulations that are attached to the Application for a Permit to Drill. Inspection teams from the Environmental Protection Unit and the Inspection and Enforcement Unit monitor and enforce the stipulations through site visits on both scheduled and unscheduled basis.

The teams include surface compliance specialists for well pads, roads and pipeline rights of ways, and reclamation and abandonment as well as archaeologists and wildlife biologists. Other specialists can be utilized as needed. Facility abandonment receives the same level of compliance scrutiny as the production operation and the leasee remains responsible for completing all stipulations (see Appendix B-8).

No existing program measures the effectiveness of stipulations (soil and water conservation practices or BMPs) in terms of either amount of sediment prevented from moving offsite or the amount of sediment that did move offsite. In addition there is no existing program to measure the quality of water from permitted activities. The Albuquerque District will initiate a monitoring plan in FY92 to examine the effectiveness of soil and water conservation practices over a range of permitted activities. A second objective will be to attempt to segregate natural contributions to water quality from im-

pacts induced by permitted activities. As the designated management agency responsible for nonpoint source pollution control on Public Lands, the Albuquerque District BLM will coordinate with and seek guidance from the New Mexico Environment Department (NMED) in developing and implementing the monitoring plan. The plan will provide management with assessments of soil and water conservation practices and recommendations for modification. All data will be shared with NMED. This will improve both BLM and other agencies capability to design BMPs and predict impacts from specific activities.



HYDROLOGY

FARMINGTON RESOURCE AREA

The resource area extends over three hydrologic regions; the Upper Colorado River (San Juan), Rio Grande (Middle Rio Grande), and Lower Colorado River (Little Colorado). Most of the resource area is located within the San Juan River Basin.

The New Mexico portion of the San Juan River generally flows west through the resource area. The major perennial tributaries to the San Juan are the Animas and La Plata Rivers, while the Chaco River, Gallegos Canyon and Largo Canyon are the larger ephemeral drainages (refer to Figure 3-3).

Surface Water

The San Juan drainage basin upstream from Shiprock covers 12,900 square miles and is the second largest tributary to the Colorado River. The water is used for agriculture, power generation, industrial and public supply and recreation. Water use has increased with increasing population.

Mean annual discharge for the period 1964 to 1985 on the San Juan after regulation by Navajo Dam was 1221 cfs at Archuleta, 1376 cfs near Blanco, 2011 cfs at Farmington, and 2001 cfs at Shiprock. The Animas contributes 881 cfs, and the La Plata about 28 cfs to the San Juan.

Streamflow variations are the result of snow-melt and seasonal storms. The absence of substantial quantities of precipitation in most of the basin results in a correspondingly small quantity of water available for dry periods when streamflow is totally base flow. Base flow is that part of stream flow that is ground water discharged into the stream. Base flows for areas drained by Canyon Largo and the Chaco River are zero. The La Plata also has no base flow. The Animas has a base flow of less than 0.05 cfs/sq. mile, while the San Juan at Archuleta is 0.10 cfs/sq. mile, it is reduced to only 0.05 cfs/sq. mile at Shiprock.

Polycyclic Aromatic Hydrocarbons (PAHs) have been found in tissue of the fish from the San Juan River and are known to have serious effects on various species in the aquatic environment. Unfortunately PAHs have become nearly ubiquitous and are found even in pristine areas. There are no established threshold levels for triggering chronic symptoms in any aquatic species. Sources of PAHs include wildfires, catalytic cracking in the petroleum industry, heating and power generation, refuse incineration, open burning, emissions from internal engines, industrial and urban effluent, runoff from asphalt roads, natural oil seepage, petroleum spillage, oil and gas production, and chemical preservatives such as creosote.

The San Juan contributes approximately one million tons of salt annually to the Colorado River Basin. A significant amount of the salt loading occurs between Shiprock, New Mexico and Four Corners. Most of the natural source of salt is contributed by surface runoff and ground water discharges from the Nacimiento Formation and Mancos Shale. Mancos Shale is exposed to the rivers alluvium from the Hogback to near the confluence of the Mancos River near Four Corners. The many thousands of acres of salt-concentrating riparian vegetation also worsen conditions. Irrigation

projects, powerplants, mining operations, oil and gas fields and refinery operations have been identified as contributors to the salinity problems. The Hammond Project, Navajo Indian Irrigation Project and the Hogback Irrigation Project are the principal irrigation sources of salt in the Basin with over 18,500 tons contributed annually.

Water quality upstream from Shiprock is also quite variable. In the Northeastern part of the basin most streamflow is from snowmelt and is characterized as calcium bicarbonate water, while in the northwestern and southern part of the basin the streams have calcium sulfate and sodium sulfate water. Metal mining in the north contributes sulfates while irrigation return flow contributes sodium. Porous sandstones and interbedded shales increase the dissolved-solids concentration in runoff.

Predominant ions near Archuleta are Ca & HCO₃, while Na, SO₄ dominates Largo Canyon waters, Ca & SO₄ dominates the Animas at Farmington. Below Farmington Na, Ca, and So₄ dominate.

The highest median values of specific conductance and dissolved sodium found on the San Juan are from point source effluents. One area near Waterflow is attributed to dissolution of salts from sandy and shaly soils where channels and canyons are incised into sandstone and shales. Irrigation return flows have elevated specific conductance in the north central and north eastern part of the basin. The high values of dissolved sodium at Largo Canyon are probably due to a small saline-water spring that discharges to the normally ephemeral channel.

An analysis of water quality data from 1973 to 1981 detected trends at 14 of 36 stations tested, 5 of these stations were downstream from point sources. The most consistent temporal trend was a decrease in pH at six stations.

A decreasing trend in suspended sediment occurred on the San Juan near Bloomfield and on the Animas River at Farmington. The latter was assumed to be a result of sediment retention through improved farming practices and changing some farms to resort property. Largo

Canyon had an increasing trend in dissolved iron while the San Juan River above Animas River at Farmington showed a decrease in dissolved iron from 1974 to 1981. The San Juan at Farmington showed an increase in dissolved orthophosphate phosphorus while the La Plata at the Colorado-New Mexico border had an increase in dissolved sulfate.

The lack of detectable trends at the Shiprock station is probably the result of an integration of upstream trends cancelling each other out, since upstream stations show both increasing and decreasing trends. A number of trends could not be attributed to any single cause, such as expanded metals mining, oil and gas activities, changes in agricultural practices or increased urbanization.

Dissolved solids and sediment are water quality attributes that control most aspects of the aquatic environment and human uses of water in the Basin.

Dissolved solids are inorganic ions of sodium, potassium, calcium, magnesium, bicarbonate, chloride, and sulfate. Dissolved solids concentration are usually highest in drainages such as Largo and Shumway Arroyo with 3000-10,000 mg/l, which is rated as moderate salinity. The perennial streams range from less than 500 to 3000 mg/l or very low to slight salinity. Salinity and sodium hazards to irrigation are both low from waters of perennial streams while waters from ephemeral arroyos have moderate to high salinity and sodium hazards for irrigation uses.

Dissolved iron and manganese are normally present in trace amounts. The natural environment of the Basin contains Fe & Mn as oxide coatings on sands, silt, and clay, as inorganic minerals or organic compounds in the soils, shales, and coal; and in plant and animal detritus. Generally they are relatively soluble in acidic waters and insoluble in alkaline waters. The natural surface waters are alkaline due to the presence of bicarbonate ion, with ephemeral streams exhibiting stronger alkalinity than perennial streams. Large concentrations of Fe/Mn are not a toxicity problem but may indicate a potentially serious acidic condition in which many trace elements are

more soluble and may appear in toxic concentrations. Strongly acidic values have been observed occasionally in locations such as Shumway Arroyo.

The range of average concentrations of several trace elements have exceeded standards for drinking water, Surface Mining Control and Reclamation Act (SMRCA), or irrigation criteria on all major drainages: arsenic in upper San Juan tributaries; gross-alpha radioactivity on the Animas, La Plata, Shumway Arroyo, and Chaco River; selenium on Chaco; and fluoride and boron on the La Plata, Shumway Arroyo, and Chaco River.

The water quality aspect of suspended sediment is that it is a vehicle for transporting chemical constituents in streamflow. A greater proportion of many trace elements are found in association with sediments than in the dissolved phase. Suspended sediments may serve as a "sink" for trace elements by adsorbing dissolved chemical constituents in a water-sediment mixture, or they may serve as a "source" for these same elements by desorbing from the suspended sediments.

The ephemeral streams in the central and southern part of the basin have suspended-sediment concentrations that are usually several orders of magnitude greater than those in perennial streams in the northern part of the basin. Average suspended sediment concentrations for the south and central basin range from 10,000 to 100,000 mg/l, while the perennial streams of the north are less than 1000 mg/l. Generally more than 70% (by weight) of these particles are smaller than 62.5 micrometers in diameter and considered to be clay and silt size. Surface deposits in the south and central area are composed of unconsolidated fine grained clays, silts, and sands, which are readily suspended and transported in overland runoff. Most arroyos are deeply incised into this material and the beds and banks are a major source of suspended-sediment. In comparison, SMRCA in 1979 set a limit of 70 mg/l of suspended sediment or a 30 day maximum average concentration of 35 mg/l for effluents from surface mining operations.

During the 1990 water quality survey on the San Juan by NMED a large runoff event occurred from Largo Canyon. Prior to the event nutrients, dissolved constituents, and suspended solids were low to moderate in concentration increasing gradually downstream. The Largo flood raised all sediment-associated constituents, phosphorus, and nitrogen levels dramatically as far downstream as Farmington.

The 1989 water quality survey on the Animas River by New Mexico Environmental Improvement Division found no water quality standards exceeded, all designated uses were attained, but the macroinvertebrate habitat was degraded. However water quality on the La Plata varied with site and time and was limited by low streamflows. In addition both habitat and water quality were degraded at the Colorado-New Mexico border. The San Juan, La Plata, Animas, and Chaco Rivers are designated as waterbodies with designated uses not fully supported. The designated probable sources of nonsupport are irrigated crop production, rangeland, surface mining, petroleum activities, and road construction/maintenance.

Ground Water

The resource area coincides approximately with the San Juan Structural Basin. This basin is larger than either the San Juan River Basin or the San Juan Underground Water Basin declared by the New Mexico State Engineer. Within the river basin the areas of greatest ground water recharge are in the north, primarily Colorado. The source of virtually all ground water in transient storage is precipitation. Only about 4 percent of precipitation becomes groundwater. In the higher elevations of the south and central parts of the basin precipitation is barely sufficient to contribute recharge. At lower elevations recharge occurs to shallow water tables along stream channels from storm runoff. Groundwater discharge occurs as water moves down slope towards the basin center in the Four Corners area. Large quantities of groundwater are consumed by phreatophyte vegetation along the San Juan River and its tributaries. Most of the population is dependent on surface or shallow ground water. Ground water is present under both water-table and artesian conditions. South of

the San Juan water is often at depths of 100 to 500 feet with very shallow water tables along streams. While the volume of water in storage is large (0.6 to 1.3 thousand acre feet per square mile) the permeability is often low, reducing yields to the 5 to 50 gallon per minute range. Many of the deeper aquifers have much higher yields, often in the 100 gallon per minute range. These include the San Andreas-Glorieta system, the Entrada Sandstone, the Morrison Formation, the Gallup Sandstone, the Ojo Alamo Sandstone, the Nacimiento Formation, and the San Jose Formation. Water quality in many of these is better along the southern rim of the basin and becomes poorer, usually saline, towards the center.

RIO PUERCO RESOURCE AREA

Portions of the resource area are located within the Rio Grande (Middle Rio Grande and Pecos sub-basins), Upper Colorado (San Juan sub-basin), and Lower Colorado (Little Colorado sub-basin) hydrologic regions. Most surface water in the resource area flows into the Rio Grande and its tributary, the Rio Puerco. A limited amount of surface water flows into the San Juan sub-basin in Sandoval County.

Surface Water

Gaging station records on the Rio Puerco (above Guadalupe) indicate low winter flows with peak periods of summer flow from April through May and August. The average discharge at this location is more than 10,000 acre-feet per year, with a maximum daily discharge of nearly 7,000 cubic feet per second (cfs; 1967). Station flows below the confluence of Arroyo Chico indicate peak flows in August (in the Arroyo Chico drainage) with a maximum discharge of more than 15,200 cfs (1972).

The potential exists for reducing erosion and sediment in the Rio Puerco watershed. However, the Rio Puerco remains the major contributor of sediment to the Rio Grande above Elephant Butte Reservoir.

Ground Water

The quality of ground water in the Rio Puerco Resource Area varies greatly, ranging from good

to extremely saline. Nearly all waters can be used by livestock.

TAOS RESOURCE AREA

Surface Water

The scattered parcels of public land in the high-intensity oil and gas development region are located in the Arkansas-White-Red River hydrologic region (Canadian River sub-basin). This sub-basin is drained mostly by the Canadian River and its tributaries (the Purgatory, Dry Cimarron, and North Canadian rivers, and Carrizozo and Carrizo creeks).

The quality of Canadian River water (above Conchas Reservoir) is good to excellent. An increase in total dissolved solids (tds) results in a deterioration of water quality downstream. In periods of low flow, tds concentrations average about 4,000 mg/l at the state line.

Ground Water

Ground water quantity and quality in the Canadian River sub-basin vary widely between aquifers. Ground water is used to supply water to a number of municipalities and rural households, and for irrigation and livestock purposes. In most areas, ground water is difficult to obtain and has not been extensively developed.

Generally, the depth to ground water is less than 200 feet, but ranges between 200 and 500 feet. Except for a 600-square-mile area (approximate), most wells yield 25 gpm or less. Wells drilled in isolated areas of the sub-basin yield an estimated 25 to 100 gpm.

CULTURAL RESOURCES

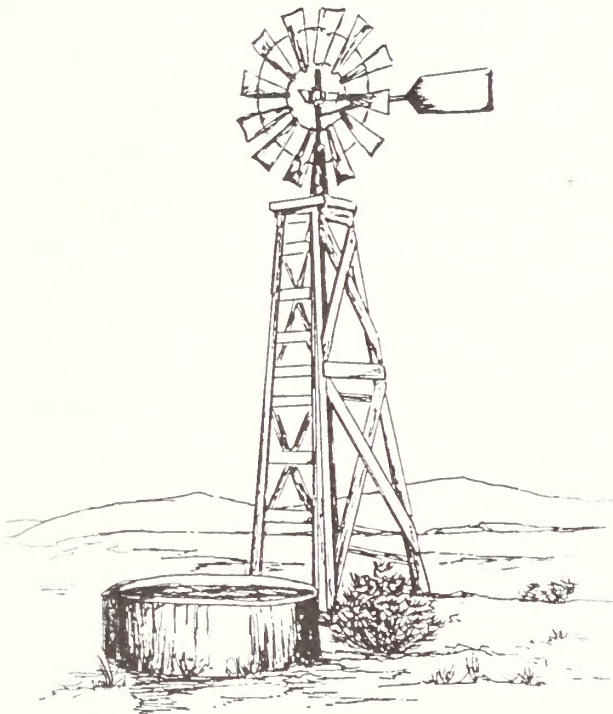
ALBUQUERQUE DISTRICT

The Albuquerque District contains cultural resources of major significance spanning at least the last 12,000 years. Sites present are attributed to PaleoIndians, Archaic hunters and gatherers, transitional Basketmakers, and sedentary Anasazi. Historic period sites present were

created by people of Spanish, Hispanic, Puebloan, and other ethnic groups.

PaleoIndians (10,000 - 5,000 BC)

The earliest occupants of the Albuquerque District were nomadic hunters/gatherers who relied on mammoths, extinct bison, giant sloths and camels as well as other species for their survival. PaleoIndian sites are not numerous, and identification is based primarily on projectile point typology.



Archaic (5,000 - 1,000 BC)

Subsistence adaptations shifted upon extinction of the animals exploited by PaleoIndians. Hunting and gathering focused on medium and small animals and a broad range of plants. People of the Archaic Period utilized plants and animals from many environmental zones as they became available. Sites are characterized by scatters of lithic artifacts, soil stains, and hearths.

Basketmaker (1,000 BC - AD 700) - Developmental Period (AD 100- 1200)

Across most of the Albuquerque District, the sequence used to describe the transition from a

hunting, gathering nomadic lifestyle to a more sedentary existence is termed Basketmaker. Agriculture became far more dominant in lifestyles by AD 700. Site features such as artifact scatters, storage cists, and subterranean pit-houses with associated trash middens including pottery are indicators of decreased mobility.

In the Rio Grande Valley the Developmental Period extends ahead in time to AD 1200. Well-known Anasazi domiciles range from pithouses to surface structures of wattle and daub, to impressive masonry pueblos with later sites having hundreds of rooms.

Pueblo I, II, and III (AD 700 - 1300) - Coalition Period (AD 1200 - 1325)

With the exception of the Rio Grande Valley, the Pueblo sequence is divided into periods I, II, and III. During the Pueblo I period, a sedentary lifestyle was well-established and subsurface pit structures evolved into kivas.

Pueblo II saw the most widespread occupation, with small masonry pueblos as the dominant form of habitation. The large pueblos of Chaco Canyon were in the final stages of construction, as well as outlying sites of the Chacoan system with its interconnecting system of roadways. Variations in architecture and lifestyles were in evidence in various geographic regions.

The Pueblo III period saw the collapse of the Chacoan system with brief re-occupation by Mesa Verdean people. Newly built sites appeared on areas of higher elevation, but were smaller. By AD 1300, the Anasazi appear to have abandoned the San Juan Basin, many moving east to the Rio Grande Valley.

Within the Rio Grande Valley, the Coalition Period is marked by a rapid influx of population just before AD 1300. Pueblos increased in size, with the appearance of above-ground kivas built into surface roomblocks.

Classic (AD 1325 - 1510) - Historic Period (AD 1500 - Present)

The Classic Period represents the culmination of the prehistoric pueblo tradition along the Rio Grande Valley. A thriving trade network

existed, linking the Rio Grande region with pueblos to the west and with Plains Indians groups.

In the far northern part of the district, peoples of Athabaskan cultural identity are believed to have taken up residence. An exact time of arrival is not clear, but they may have been present as early as the thirteenth century. By the 1500s the cultural evidence is clearly identifiable as Navajo.

European knowledge of the area began with the arrival of the expeditions of Vasquez de Coronado (1540), Chamuscado (1581), Espejo (1582), and Castano de Sosa (1591). The first authorized settlement by Europeans, however, was not until 1598, when Juan de Onate was instructed to form a community, initially located at San Gabriel de Yunque, near San Juan Pueblo.

Attempts to colonize northern New Mexico were met with opposition. In 1680, Rio Grande Puebloans revolted against Spanish rule and the Spaniards retreated. In 1692, the Spaniards returned to northern New Mexico. To escape Spanish retaliation, the Pueblo Indians departed, many fleeing westward where they joined the Navajo. Control was again enforced by the Spanish in 1692. Intermittent local hostilities continued between Europeans and Puebloans, but it was the depredation of the Apaches, Navajos, Utes, and Comanches that became a constant and serious problem for the smaller Hispanic settlements.

Throughout the 18th and the early 19th centuries, increasing numbers of French and American trappers and explorers arrived as the harbingers of westward expansion from the European colonies on the eastern seaboard. An invasion by the Republic of Texas in 1841 preceded the Mexican War of 1846, which led to the successful military campaign of the United States in that year, and signaled the end of Hispanic political dominance.

Following New Mexico territorial status in 1850, relatively rapid change affected the area, especially with the vast increase in westward immigration after 1865 and the influx of population and material goods after the arrival of the Santa Fe Railroad in 1879. In 1912, New Mexico be-

came a state with an established agricultural and grazing economy.

Inventory and Summary

Information from the three resource areas that comprise the Albuquerque District indicates that 282,900 acres of land have been surveyed for cultural resources. About 7,900 sites have been recorded. This data is rapidly increasing, based mainly on the amount of information that has become available from coal bed methane gas activity in the Farmington Resource Area, work on backlogs (for data entry) to the BLM's computerized systems, and the New Mexico Laboratory of Anthropology's Archaeological Records Management System.

Of the total sites recorded, 80 are listed on the National Register of Historic Places. Figures suggest that 80 percent of the sites identified warrant protection under the National Historic Preservation Act.

FARMINGTON RESOURCE AREA

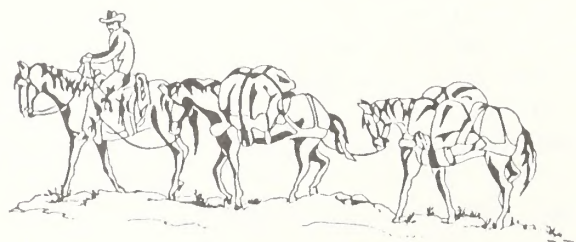
PaleoIndian to Historic periods are represented in this resource area.

RIO PUERCO RESOURCE AREA

PaleoIndian to Historic periods are represented in this resource area.

TAOS RESOURCE AREA

PaleoIndian to Historic periods are represented in this resource area.

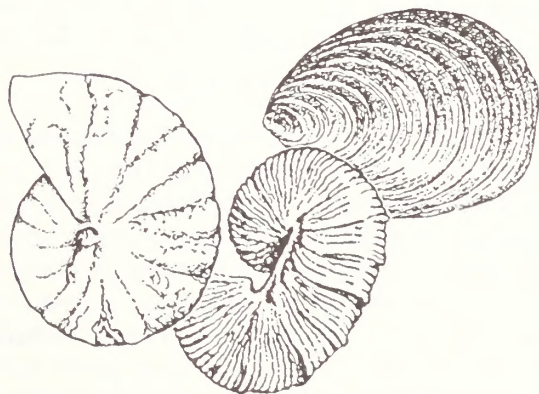


PALEONTOLOGY

ALBUQUERQUE DISTRICT

The Albuquerque District contains a rich diversity of geologic structures and formations. Within these geologic provinces lie exposed approximately 70 geologic formations whose rocks range in age from almost 2 billion years to the present. Sedimentary rocks exposed in the district represent almost every geologic period from the Cambrian to the present. Most of these formations contain fossils representing the very beginning of life to the complicated organisms we know and recognize today.

Study of the layers and life forms present in formations exposed within the district have produced much important information concerning the sequential changes in depositional environments in response to oscillating sea levels, shifts in land forms, and volcanic and seismic activity. The paleontology of these units plays an important part in these interpretations because these fossils almost perfectly reflect specific depositional environments.



FARMINGTON RESOURCE AREA

The most noteworthy formations exposed in the Farmington Resource Area are those containing the dinosaur beds (Fruitland/Kirtland formations) and fossils of early land mammals (Nacimiento Formation and San Jose Sandstone) that mark the beginning of the Age of Mammals on this continent. The presence of dinosaur-bearing Late Cretaceous rocks beneath the Early

Paleocene mammal-bearing deposits are the focus of much scientific attention.

Of the total outcrop exposure area in the Farmington Resource Area (approximately 190,000 acres), about 25 percent has been adequately surveyed for paleontological resources. The only intensive field inventory conducted thus far in the Farmington Resource Area has been the work done in the Fossil Forest by the BLM and the New Mexico Bureau of Mines and Mineral Resources.

These surveys and inventories have played an important role in establishing the basis for the determination of potential critical locations in the resource area. Some specific areas of concern have been identified, including the Bisti Badlands; the Fossil Forest; Ah-shi-sle-pah Wash; the headlands of De-na-zin, Alamo, and Willow washes; and Escavada, Kimbeto, and Betonnie Tsosie washes, in addition to those areas mentioned above. Also noted as paleontologically sensitive are the Gobernador and Santos Peak areas, which contain important paleobotanical and vertebrate fossil remains in the Eocene San Jose Formation.

Of these locations, three areas in the high-intensity oil and gas development region of Farmington Resource Area have been designated for special management. They are the Torrejon Fossil Fauna ACEC (west flank), the Kutz Canyon Paleontological Area, and Betonnie Tsosie Wash.

RIO PUERCO RESOURCE AREA

Formations exposed in the Rio Puerco Resource Area represent a wide spectrum of geological time and biological evolution. With few exceptions, the lower (older) end of the time scale is represented by the same stratigraphic units exposed in the Farmington Resource Area. Although the areal extent of these fossil-bearing strata is quite large, only a limited number of paleontological assessments have been completed.

Exposures of the Morrison Formation have produced significant dinosaur remains. At least two dozen sites have been located, some of which have a high probability of containing ar-

ticated skeletons of these giant creatures. Outcrops of the Morrison Formation, Dakota Sandstone, and Mancos Shale in the resource area are a favorite hunting ground for amateur collectors and rockhounds. Outcrops of the Mancos Shale south of Cuba as far as Cabezon Peak include a key reference section of the Juana Lopez Member of the Mancos Shale (Dane, Cobban, and Kauffman 1966).

The Nacimiento Formation outcrops along mesas and cuestas in the headlands of Torrejon Wash. The formation contains mammal fossils considered to be the standard for the North American Middle Paleocene land mammal age "Torrejonian" (Wood, et al. 1941). Northwest of Cuba, near Regina, lie exposures of the San Jose Formation. These have contributed virtually all of the vertebrate fossils known from this formation.

Outcrops of the Miocene and Pliocene Santa Fe Group lie exposed in small areas in and around Albuquerque, mostly adjoining the Zia Indian Reservation and along the Rio Puerco drainage system. Along the Rio Grande, fossils found in the sand and gravel river terraces represent Pleistocene times (2 million-12 thousand years ago), when many animals resembling those we know today roamed the grasslands that now are the sparsely vegetated, eroded hills on either side of the Rio Grande.

Through the planning process and limited surveys and inventories, certain areas in the high-intensity oil and gas development region have been identified which have especially important paleontological value and will be managed to protect these sensitive resources. They are the Torrejon Fossil Fauna ACEC (east flank), the Elk Springs ACEC, and the Pronoun Cave Complex.

TAOS RESOURCE AREA

The Taos Resource Area contains fossil-bearing geologic formations of Jurassic, Cretaceous, Tertiary, and Quaternary age. These are limited primarily to the Cretaceous Mancos Shale and the overlying Mesa Verde Group, the Eocene Galisteo Formation, and the Miocene-Pliocene

Santa Fe Group. These areas are located in the low-intensity oil and gas development region of the resource area.

The most prominently exposed formations in the Taos Resource Area are those of the Santa Fe Group. These exposures are found from Abiquiu south to Espanola, Santa Fe, and Albuquerque, outside the high-intensity oil and gas development region. These were the first fossil formations named in New Mexico; consequently they have had a long and complex nomenclatural history. They also have the longest history of continuous collection of fossil vertebrates of any Tertiary fauna in the world.

FORESTRY

ALBUQUERQUE DISTRICT

The Albuquerque District supports an extensive vegetative climax forest type known as "woodland." This type dominates about 731,000 acres of public lands in the district, being scattered throughout the district at higher elevations and on mesa tops. The type is now expanding its range by encroaching into open parks and ponderosa pine forests. According to the latest forest and woodland inventory, woodlands contain a high number of young trees per acre.

Forest acres within the Albuquerque District are limited to isolated tracts scattered over the higher elevations and mesas. These forests are composed of ponderosa pine, Douglas fir, and white fir, with understory of various shrubs and forbs. Oak brush, bitterbrush, and mountain mahogany occupy the small open areas within the forest. Cooler, wetter, and more protected sites are needed to support these larger conifers and oaks.

The presently available merchantable timber volume-per-acre is quite low, due to the poor stocking rate in all of the age classes. Except for a few stands, most of the forest is "marginal" for intensive timber production. Based upon normal yield tables for these species, many areas are understocked or non-stocked. A declining trend has been observed on many of the poorer sites where harvesting has taken place, and where pinon pine has rapidly invaded the site to further

preclude the opportunity for natural regeneration to take place. Some sites are abnormally rocky and contain more undesirable species or they are barren of any vegetation.

Approximately 28,000 acres of forest remain open to management, according to the forest and woodland inventory conducted recently by the USFS. Many more acres have restrictions on management actions pending decisions on WSAs, scenic rivers, and other special designations. Some forested acres are poorly stocked due to the overcutting that took place under private ownership and the drought years that followed. Some acres of former ponderosa pine stands have succumbed to gradual encroachment of woodland or sagebrush. Generally, the woodland is widespread and thriving, while the ponderosa pine forests are gradually disappearing from much of their former range.

FARMINGTON RESOURCE AREA

This resource area contains 169,000 acres of pinon-juniper woodland extending over most of the eastern sector. The low productive woodlands composed principally of juniper are growing on poor sites with fragile soils. Some wood products are harvested from this forest type, mainly fence posts and fuelwood.

The more productive woodland in the resource area contains a larger percentage of pinon pine to juniper. This woodland is thriving and has adequate regeneration over about 268,400 acres, mostly in San Juan County. A substantial amount of wood products are taken from these acres each season in the form of fuelwood, fence post, and Christmas trees.

The ponderosa pine-Douglas fir forest type occupies about 11,000 acres scattered across the resource area. The Laguna Seca SMA was specifically designated in the Farmington RMP for forest management and development. It contains a substantial amount of commercial timber in pine and fir. The SMA shows evidence of logging in the past, but about 50 percent of the forest land has not been disturbed. Pine and fir regeneration has become established on the old

cutover lands and will require thinning in the future.

RIO PUERCO RESOURCE AREA

In this resource area, the three major forest types are juniper woodland, pinon-juniper woodland, and ponderosa pine-Douglas fir forest. The juniper woodlands occupy the lower, dryer sites on about 63,000 acres. Limited amounts of firewood and fence posts are harvested from these juniper tracts.

Pinon-juniper woodlands are found at the higher elevations covering about 116,200 acres. A significant amount of firewood, Christmas trees, and fence posts are collected each year from the accessible acreage of this woodland type.

The productive ponderosa pine-Douglas fir forest is limited to 6,000 acres at higher elevations on northern and eastern slopes. These forested areas were once homesteaded, but reverted back to the BLM through the Bankhead-Jones Farm Tenant Act. Many trees were cut for domestic uses or cleared for agricultural purposes.

Generally, this forest type presents a wide-open, scattered appearance due to past overcutting and the lack of successful natural regeneration. Over 80 percent of this type has been withdrawn from forest management to protect other resource values. The balance of the forest is located on the upper drainage of the Rio Puerco.

TAOS RESOURCE AREA

Two forest types occur in this resource area, with pinon-juniper woodlands occupying the larger area (about 114,500 acres). The second forest type, composed of ponderosa pine, Douglas fir, and white fir, covers about 10,500 acres. Both forest types are located in the low-intensity development region of the resource area. No forest or woodland areas administered by the BLM exist in the high-intensity oil and gas development region in this resource area (Bravo Dome).

Environmental Consequences

Chapter 4



CHAPTER 4

ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

The impacts resulting from the development of new wells on existing and new oil and gas leases are identified and analyzed in this chapter. This analysis is needed to guide future decisions concerning the leasing and development of this resource.

Approximately 90 percent of future oil and gas development is expected to occur in the high-intensity development region in the northeast quarter of San Juan County and the west half of Rio Arriba County.

In the Rio Puerco Resource Area, the high-intensity development region is the northern portion of Sandoval County. The high-intensity development region (the Bravo Dome area) in the Taos Resource Area is located in portions of Harding and Union Counties.

Conventional gas well development will occur throughout the district. Fruitland (coal) Formation gas development will occur in the Farmington and Taos Resource Areas. Based on current development, coal gas development will

continue to occur in Rio Arriba, Harding, San Juan, and Union Counties. Other assumptions used in developing the reasonably foreseeable development (RFD) projections and impact analyses are listed in Table 4-1.

The impacts described in this chapter would result from the drilling, development, and production of a maximum of 4,812 federal wells in the Albuquerque District in the next 20 years. Development of these oil and gas resources will result in surface impacts on federal land managed by the BLM and other agencies and on Indian, state, and private lands.

Long-term impacts are projected to occur for 20 to 30 years. Short-term impacts generally range from 1 to 3 years in duration. The projected acres per well (well density) is presented in Chapter 2 by county within the district. These numbers have been used for impact analysis.

This chapter assesses the impacts of the three alternatives described in Chapter 2 of this RMP Amendment/EIS. The impacts are assessed for each resource area and then totalled for the impact to the Albuquerque District.

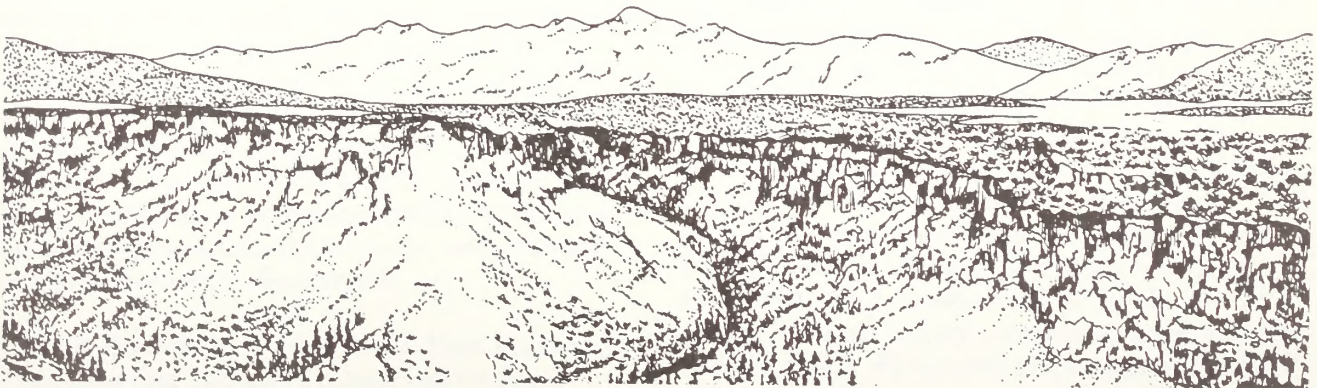


TABLE 4-1. REASONABLY FORSEEABLE DEVELOPMENT ASSUMPTIONS BY RESOURCE AREA

Resource Area	Roads		Pipelines ^{1/}		
Average Dimensions of Roads and Pipelines (acres)					
Rio Puerco	1.0 miles x 40 ft = 4.8	2.0 miles x 30 ft = 7.3			
Taos	1.5 miles x 40 ft = 7.3	5.0 miles x 30 ft = 18.2			
Farmington					
	Conventional	0.5 miles x 40 ft = 2.4		1.0 miles x 30 ft = 3.6	
	Coal Gas	1,000 ft x 40 ft = 0.9		1,000 ft x 30 ft = 0.7	
	Disposal	0.5 miles x 40 ft = 2.4		20 miles x 30 ft = 72.7	
Resource Area	Roads	Pipelines	Drill Pads	Misc.	Total
Average Disturbance (acres)					
Rio Puerco	4.8	7.3	1.0	0.1	13.2
Taos	7.3	18.2	2.0	0.1	27.6
Farmington	---	---	---	---	6.3 ^{2/}
Conventional	2.4	3.6	2.0	0.1	8.1
Coal Gas	0.9	0.7	2.0	0.1	3.7 ^{2/}
Disposal	2.4	72.7	3.3	0.1	78.5 ^{4/}

Notes: ^{1/} Includes only those needed to access existing system. New system will be addressed in separate NEPA documents.
^{2/} The average acreage of disturbance for wells in Farmington is 6.3 based on an assumption that 60% of wells drilled will be conventional and 40% will be coal gas.
^{3/} Disturbances are less due to 60% of locations being twinned with existing facilities.
^{4/} Forty disposal wells associated with coal gas wells are anticipated in Farmington.

ALTERNATIVE A: CURRENT MANAGEMENT (NO ACTION)

OIL AND GAS

Impacts projected to occur on oil and gas development are based on the number of wells that would not be drilled and the resulting financial loss. Impact analysis for oil and gas development is based on the following assumptions.

1. Oil and gas activity would occur in accordance with continuing management guidance.
2. Oil and gas leasing laws and regulations would not change substantially over the next 20 years.
3. New leasing and/or development is based on RFD projections.

Albuquerque District

Management constraints to oil and gas leasing and/or development include lease stipulations, conditions of approval (COAs), and lease closures. The constraints, where implemented, generally increase costs for lease operators through more expensive construction methods, the need to meet minimum performance requirements and standards, and timing limitations, which affect the implementation of ongoing exploration and development programs. The immediate and/or long-term effects of management constraints would include lost production opportunities, increased costs of production, and a loss in royalties.

RFD projections indicate that 4,527 wells would be drilled in the Farmington Resource Area, 47 in Rio Puerco, and 30 in Taos in the next 20 years (refer to Table 2-2). Both the Rio Puerco and Taos Resource Areas are considered to be "frontier" areas for oil and gas development. Although exploration activities continue to occur in these resource areas, significant oil and gas reservoirs have not been discovered.

Carbon dioxide production in the Taos Resource Area (Harding and Union Counties) occurs primarily on state and private lands. Based on

an average projected growth rate of 5 percent per year and a production success rate of 15 percent, marketable production from wells drilled and placed into production in the Rio Puerco and Taos Resource Areas will be negligible.

It is assumed that the majority of wells in the Farmington Resource Area will be drilled in known reservoirs where present-day drilling activities are concentrated. In-field drilling activities, which occur primarily on existing leases, generally operate under standard terms and conditions (STCs) and applicable mitigation requirements.

It is also assumed, for purposes of analysis, that areas under the management constraints of No Surface Occupancy (NSO) and Closure to Leasing would not undergo development and recovery of oil and gas resources. It is recognized that under the NSO constraints, directional well drilling and oil and gas recovery could occur in areas 40 acres or less in size, or in areas up to 1/4 mile in width. However, the number of wells that could be developed under these circumstances is deemed negligible.

The recovery of oil and gas resources assumed to be lost under the No Action Alternative could also occur with changes in future management policies or through exceptions, modifications, or waivers of management constraints. (Refer to the discussion on exceptions, modifications, and waivers in Chapter 2.)

Under this alternative, 230 wells would be developed per year for the life of the plan (refer to Table 4-2). Based on the historic data used to develop the RFD, it is estimated that 13.4 percent of these wells (31 wells) would be dry. The other 199 wells are expected to produce approximately 74,200 barrels of oil (bbl) and 5,124,400 thousand cubic feet (Mcf) of gas per year. Based on 1989 oil and gas prices, this production would have a value of approximately \$9,538,600. Royalties paid on oil and gas production would amount to an estimated \$1,181,500. Based on 1989 county revenues (per well), it is estimated that 199 wells would generate annual county revenues of approximately \$892,400, a .99 percent increase over the 1989 revenue figures.

**TABLE 4-2. OIL AND GAS IMPACT SUMMARY
BY DISTRICT/RESOURCE AREA AND ALTERNATIVE ^{1/}**
(annual projection)

Alternative/Item	Albuquerque District	Farmington Resource Area	Rio Puerco Resource Area	Taos Resource Area
No Action Alternative				
Wells drilled/year	230	226	2	<2
Dry percent	13	13	70	19
Number	31	29	<2	<1
Producing percent	87	87	30	81
Number	199	197	<1	<2
Production - barrels of oil (bbl)	74,241	73,858	383	0
Thousand cubic feet of gas (Mcf)	5,124,448	4,771,641	8,122	344,685
Value of production (\$)	9,538,566	9,404,305	20,515	113,746
Royalties (\$)	1,181,514	1,175,538	2,564	3,412
County revenues (per well 1989-\$)	N/A	4,491	1,767	5,324
Increase in county revenue (\$)	892,415	884,727	1,219	6,469
Over 1989 (%)	<1	<2	<1	<1
Increase in jobs, direct (number)	175	174	<1	<1
(%)	8	9	<1	<2
Indirect (number)	210	209	<1	<2
Total (number)	386	383	<1	<2
(%)	<1	1	<1	<1
Increase in oil and gas wage income (\$)	5,503,604	5,464,470	8,520	30,614
(%)	8	9	<1	<2
Increase in total wage income (\$)	9,545,484	9,500,678	13,558	31,248
(%)	<1	<2	<1	<1
Production Alternative				
Wells - drilled/year	241	237	2	<2
Dry percent	14	13	70	19
Number	33	31	<2	<1
Producing percent	86	87	30	81
Number	208	206	<1	<2
Production - barrels of oil (bbl)	76,703	76,320	383	0
Thousand cubic feet of gas (Mcf)	5,365,013	5,000,223	8,475	356,315
Value of production (\$)	9,974,678	9,835,979	21,115	117,584
Royalties (\$)	1,235,664	1,229,497	2,639	3,528
County revenues (per well 1989-\$)	N/A	4,491	1,767	5,324
Increase in county revenue (\$)	933,085	925,126	1,272	6,687
Over 1989 (%)	<2	<2	<1	<1
Increase in jobs, direct (number)	183	182	<1	<1
(%)	9	9	<1	<2
Indirect (number)	220	213	<1	1
Total (number)	403	400	<1	2
(%)	<1	1	<1	<1
Increase in oil and gas wage income (\$)	5,755,509	5,715,710	8,164	31,635
(%)	9	9	<1	1
Increase in total wage income (\$)	9,972,930	9,925,726	14,913	32,291
(%)	<1	1	<1	<1

TABLE 4-2. (concluded)

Alternative/Item	Albuquerque District	Farmington Resource Area	Rio Puerco Resource Area	Taos Resource Area
Proposed Alternative				
Wells drilled/ year	227	223	2	<2
Dry percent	14	13	70	19
Number	31	29	<2	<1
Producing percent	86	87	30	81
Number	196	197	<1	1
Production - barrels of oil (bbl)	71,779	71,396	383	0
Thousand cubic feet of gas (Mcf)	5,067,303	4,714,496	8,122	344,685
Value of production (\$)	9,398,334	9,264,073	20,515	113,746
Royalties (\$)	1,163,979	1,158,003	2,564	3,412
County revenues (per well, 1989-\$)	N/A	4,491	1,767	5,324
Increase in county revenue (\$)	878,925	871,254	1,202	6,469
Over 1989 (%)	<1	<2	<1	<1
Increase in jobs, direct (number)	173	172	<1	<1
(%)	8	9	<1	1
Indirect (number)	207	206	<1	1
Total (number)	381	378	<1	<2
(%)	<1	1	<1	<1
Increase in oil and gas wage income (\$)	5,464,470	5,401,560	8,520	30,614
(%)	8	9	<1	1
Increase in total wage income (\$)	9,424,738	9,379,932	13,558	31,248
(%)	<1	<2	<1	<1

Note: ¹Figures may not sum because of rounding.

Development over 20 years would result in an increase of 175 jobs (direct employment) in the oil and gas sector. Assuming a 2.2 employment multiplier, an additional 210 jobs (indirect employment) would be created. The 385 jobs created would be an 8 percent increase over the 1989 oil and gas employment figure (a .13 percent increase over the total employment in the district in 1989).

Based on the average wage paid in the oil and gas sector in 1989, the 175 direct employment jobs would result in a personal income totalling \$5,503,600. This is an 8 percent increase in wage income in the oil and gas sector. The total 386-job increase is expected to generate an additional \$9,545,500 of income in the district (a .17 percent increase in the total covered wage income for the district in 1989). Based on the changes in oil and gas production, revenues, employment, and income, negligible changes

would occur to the economy at the production levels projected for this alternative.

Farmington Resource Area

Except for the amount, the impacts to oil and gas development would be the same type as those identified for the district. Impacts associated with the development and production of oil and gas resources under this alternative are quantified for the Farmington Resource Area in Table 4-2.

Rio Puerco Resource Area

Except for the amount, the impacts to oil and gas development would be the same type as those identified for the district. Impacts associated with the development and production of oil and gas resources under this alternative are quantified for the Rio Puerco Resource Area in Table 4-2.

Taos Resource Area

Except for the amount, the impacts to oil and gas development would be the same type as those identified for the district. Impacts associated with the development and production of oil and gas resources under this alternative are quantified for the Taos Resource Area in Table 4-2.



VISUAL RESOURCES

Albuquerque District

Loss of natural character and visual quality would be the primary visual impacts associated with oil and gas development activities. All landscapes are unique in their own right, and any change or loss of scenic values impairs the scenic quality of an area. When oil and gas activities intrude on the largely natural appearance of an area, its attractiveness to many people is lessened. The amount or extent of loss would depend upon the ability of the characteristic landscape to withstand loss or change of natural character, the nature and extent of the proposed activities, the existing scenic qualities, and the success of reclamation.

Loss of visual quality would occur during all phases of development (exploration, development, and production). This loss would be particularly important where roads, drill pads, facilities, and other surface-disturbing activities are located in areas of low visual absorption capabilities or where facilities are not com-

patible with the surrounding landscape features. Visual impacts would range from relatively minor to highly intrusive in nature, depending on the amount of disturbance, the amount of development, the location, and the scenic quality. None of the phases of oil and gas operations would meet the criteria for Visual Resource Management (VRM) Class I areas.

The total disturbance for 4,604 wells in the next 20 years would be 29,968 acres. Most of the disturbance and associated impacts to visual resources and scenic quality would occur in the Farmington Resource Area, as limited development is projected to occur the Rio Puerco and Taos Resource Areas.

Geophysical exploration may use existing roads and trails; this use would result in little or no impact to the landscape character. However, it is highly improbable that the existing roads and trails would be adequate to ensure complete mapping of subsurface structures. It has been projected that approximately 3,250 miles of seismic survey would be conducted by the year 2010. This projection is based on two to three surveys 30 to 70 miles long occurring each year. New trails, in many instances, would probably be made across undisturbed terrain by off-road travel of vehicles to conduct gravity, geomagnetic, and seismic reflection surveys. Motor graders and/or bulldozers may be required to provide access to remote areas.

Heavy equipment traveling across the land, especially if several trips are required, would destroy the protective vegetative cover. The new disturbances would create a strong color contrast between the newly exposed soil and adjacent undisturbed areas. Changes of this nature would directly impact the characteristic landscape by introducing new line, form, and color elements into the landform and vegetation features. Degradation of the landscape character in this manner would directly affect the scenic quality class, which would lower the rating and management class.

Impacts to the landform, vegetation, and structural features of the characteristic landscape would occur during the exploration and development phases. Land would be stripped of all vegetation, roads bladed, and drill pads leveled

to accommodate the drill rig and associated support equipment. All the structures and landform modifications required would be geometric in form. Generally, these modifications would not reflect any of the line, form, color, or texture of the characteristic landscape. The degree of surface disturbance and vegetation removal would depend on terrain and vegetation type and would vary on a case-by-case basis.

Above-ground structures located on skyline ridges and broad, flat areas with low vegetation screening would usually be seen in silhouette against the sky and would become visually dominant in foreground and middleground distances. Facilities may be painted and well site locations moved, but some viewsheds would still be degraded.

Direct impacts would occur in the form of continued long-term modifications of landscape character during the production phase. Indirect impacts would include the long-term degradation of sightseeing values while wells remain in production. These impacts would be caused by the addition of pump jacks, storage facilities, pipelines, power lines, and other production equipment.

During abandonment, all structures and equipment would be removed. If drill pads and portions of roads were recontoured to blend with the adjacent topography, the line and form contrast created in landform features would be decreased or entirely eliminated. Revegetation, if successful, would eventually mitigate the color contrast in landform and vegetation features. Depending on the extent of development and the success of rehabilitation direct and indirect impacts would decrease over time until each site met the requirements for the highest (or original) scenic quality and management class.

The management direction for the No Action Alternative is derived from decisions and guidance developed in the Farmington, Rio Puerco, and Taos Resource Management Plans (RMPs). Under this alternative, most of the oil and gas acreage available for leasing or development would be open. BLM standard terms and conditions (STCs) would be applied to leases in this category. Standard operating procedures would be employed under this alternative

without particular regard for visual resources. The STCs lack the minimum controls necessary for the achievement of VRM objectives and for the protection of visual resources.

However, because the quality of scenic resources found on lands open to leasing and development does not usually require special protection measures, significant failure to achieve VRM objectives is not likely to occur. Additionally, a portion of this acreage has been identified as having low or no potential for oil and gas occurrence. Little or no impact is expected to occur to the scenic quality in areas with limited potential for oil and gas development. Development is projected to occur in the high-intensity oil and gas development regions of each resource area.

The application of management constraints (Timing Limitation and Controlled Surface Use) would provide for VRM consideration, particularly where visual conditions requiring the constraint are widespread throughout the lease area. The application of the No Surface Occupancy and Closure Constraints would result in no new surface disturbance, so no changes would occur in existing visual conditions. These constraints would be applied to management areas to maintain scenic quality. On acreage removed from future leasing due to laws, Executive Orders, or similar actions, full achievement of VRM objectives would be possible. Changes in the existing visual conditions would not occur in special management areas where special attention to visual resource conditions is required.

Farmington Resource Area

Except in SMAs and ACECs oil and gas development would occur under the BLM's STCs. The STCs lack the controls necessary for the achievement of VRM objectives and the preservation of visual resources, especially in VRM Class I and II areas.

In addition to the protection conferred by wilderness designation (on 23,646 acres), visual resources on 11,452 acres in the Farmington SMAs are protected under both VRM Class I and II designations. Achievement of VRM Class I and II objectives would not be met on 28,762 acres of land that were leased before the areas were designated.

VRM Class I Areas

Management prescriptions developed for special management areas have resulted in the assignment of VRM Class I management objectives to approximately 36,876 acres in five SMAs. On 23,646 acres, VRM Class I has been assigned to protect the visual resources in two designated wilderness areas, Bisti and De-na-zin. With these areas legislatively withdrawn from future oil and gas leasing, the quality of the visual resources would be protected. No development is occurring inside the wilderness boundaries. Directional drilling to recover oil and gas resources under existing leases is occurring outside the De-na-zin Wilderness.

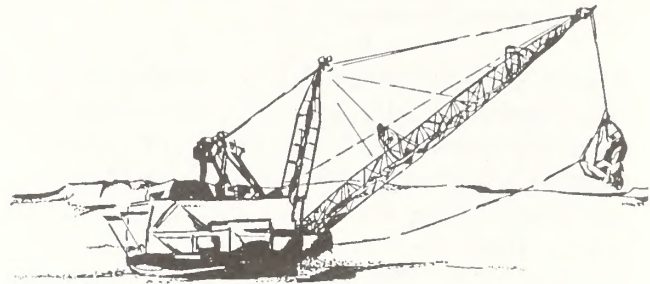
The remaining 13,230 acres of VRM Class I lands are located within the Carracas Mesa, Negro Canyon, and Thomas Canyon SMAs. The achievement of the assigned VRM Class I objective, which is to maintain a natural landscape, would not likely be met on the entire acreage because all three areas contain existing leases held by production when the areas were designated as SMAs.

Approximately 66 percent (4,654 acres) of the 7,000-acre Carracas Mesa SMA, located in the high-intensity development region, is leased. With 24 well locations, VRM Class I management objectives would not be met. The remaining 34 percent is closed to leasing under the Farmington RMP, protecting the scenic quality of the undeveloped portion of the SMA. VRM objectives would be achieved on the unleased portion (2,346 acres) of the SMA.

Approximately 19 percent (310 acres) of the 1,600-acre Negro Canyon SMA is leased and contains two wells. This SMA is located in the high-intensity development region. With the potential of additional wells being drilled on existing lease(s), the assigned VRM Class I management objectives would not be met. The remaining 81 percent (1,290 acres) is closed to leasing under the Farmington RMP to protect the scenic quality of the unleased public land.

Approximately 46 percent (2,108 acres) of the 4,630-acre Thomas Canyon SMA is leased and contains five wells. This SMA is located in the high-intensity development region. VRM Class

I objectives would not be met on the leased portion. On the unleased portion of this SMA (1,402 acres), the assigned VRM Class I management objectives would be met because this acreage is closed to oil and gas leasing. The remaining acreage in the SMA (1,120 acres) is state land.



VRM Class II Areas

Class II management objectives have been assigned as the result of Farmington RMP decisions to 26,984 acres in four SMAs (Simon Canyon, Chacra Mesa, Angel Peak, and the Ah-shi-sle-pah WSA). Of the total Class II acres, 5,294 (20 percent) are unleased.

The unleased acreage is located mostly in the Ah-shi-sle-pah WSA and the Chacra Mesa SMA in the low-intensity development region. Closing these two areas to leasing would allow the assigned VRM Class II management objectives to be met on the unleased lands. The leased lands within these two SMAs contain existing leases held by production when the areas were designated. Class II management objectives would be exceeded on the leased acreage due to the amount of contrast resulting from landform and vegetative disturbance, as well as the introduction of structures into the natural landscape.

Approximately 94 percent of the Angel Peak SMA is leased and contains more than 113 wells. Only the 500 acres of the Angel Peak ACEC, which lies within the SMA are closed to leasing. VRM Class II management objectives for the 10,240-acre SMA could only be met on the 500-acre ACEC. The current well density in the rough badlands terrain of the SMA causes contrasting changes in the characteristic landscape that exceed the management objectives for this visual class.

The Ah-shi-sle-pah WSA is presently assigned VRM Class II. If the area was designated wilderness, it would be reclassified as a VRM Class I area.

Rio Puerco Resource Area

Oil and gas development is expected to occur primarily in the northwest corner of the Rio Puerco Resource Area in Sandoval County. Except for specific areas that are designated as SMAs, WAs, WSAs, or ACECs or are managed for specific resource values, the resource area is open to leasing and development under the BLM's STCs. STCs lack the necessary controls for the achievement of VRM objectives and the preservation of visual resources, particularly in VRM Class I and II areas.

Management prescriptions developed for special management areas have resulted in the assignment of VRM Class I management objectives to 102,400 acres in two SMAs and VRM Class II objectives to 237,610 acres in fourteen SMAs. These management objectives were assigned to protect the existing visual values in these areas where special consideration is required.

The assigned VRM Class I and II management objectives would be met on 70,625 and 237,052 acres within the high- and low-intensity development regions, respectively. These objectives would be met through the continued leasing closure in thirteen SMAs. Future leasing and/or development with no surface occupancy would result in VRM Class II objectives being met on an additional 2,890 acres (in three SMAs) and 89 acres (in one SMA) in the high- and low-intensity development regions, respectively.

Future leasing and/or development with Timing and/or Controlled Surface Use management constraints would result in VRM Class II objectives being met for an additional 13,530 acres (two SMAs) in the high-intensity development region. With the projection of one well within the 13,530 acres, the amount of contrast would be minimal. Because the Timing and Controlled Surface Use Constraints are required and few wells would occur in the low-intensity development region, an additional 15,824 acres would likely not be disturbed to the extent that Class II limits would be exceeded.

VRM Class I Areas

Class I management objectives to preserve the existing natural character of the landscape have been assigned as the result of legislation, designating two areas as wilderness (102,400 acres). The Cebolla and West Malpais Wilderness Areas are closed to leasing as the result of their designation. The quality of the visual resources would be protected, and the assigned VRM Class I objectives would be met. Both wilderness areas are located outside the high-intensity development region.

VRM Class II Areas

Class II management objectives are assigned to 112,227 acres in nine WSAs. Of this acreage, 70,475 acres (63 percent) are located in five WSAs in the high-intensity development region. The remaining 41,752 acres (37 percent) are located in four WSAs in the low-intensity development region. If these WSAs were designated as wilderness, they would be reclassified as VRM Class I areas and permanently withdrawn from leasing. If they were not designated wilderness, they would be returned to multiple land use management and most would be managed under other special area designations.

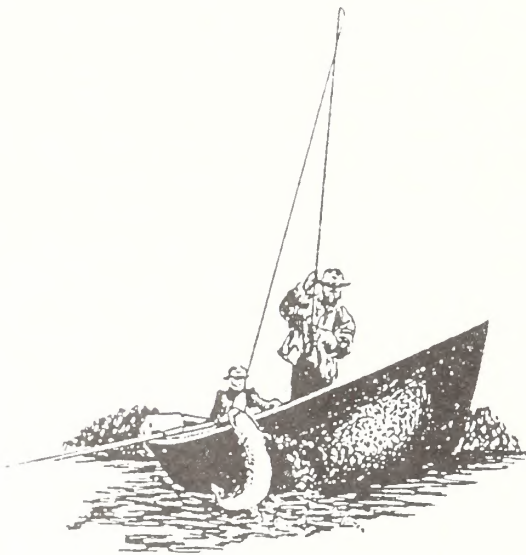
Class II management objectives (to retain the existing natural character of the landscape while allowing a low level of change that does not attract attention) have also been assigned to 86,607 acres in seven SMAs. These SMAs are Ignacio Chavez, Empedrado, La Lena, Cabezon, Canon Jarido, Jones Canyon, and Elk Springs, all located in the high-intensity development region. An additional 151,003 VRM Class II acres in seven SMAs occur in the low-intensity development region (Ojito, Petaca Pinta, Chain of Craters, El Malpais, Tent Rocks, Bluewater Canyon, and Manzano).

Taos Resource Area

With most of the surface estate being private, visual resource values have not been determined for the high-intensity development region of this resource area. The localized visual impacts in the high-intensity development region would be considered on a case-by-case basis in the permitting process for applications for permits to drill

(APDs). With the projected 10 wells and 276 acres of disturbance distributed over 95,600 acres in the high-intensity development region, the effects on sensitive visual resources would not be noticeable.

Within the region of low-intensity development, the maintenance of visual quality is a concern in some management areas. VRM classes have been assigned to these areas. Under this alternative, 15,000 acres of VRM Class II lands would be protected through the application of the No Surface Occupancy Constraint. An additional 6,000 acres would be protected through the continued nondiscretionary leasing closure. Approximately 18,000 acres under VRM Class I and 33,000 acres under VRM Class II designations are protected by legislative closure to leasing.



RECREATION

Albuquerque District

Oil and gas operations in the district could cause direct and indirect impacts to the recreation resource. Direct impacts would occur in areas where oil and gas leasing activities would displace a recreation activity, create the loss of land available for recreation, or cause the loss of recreational settings. Indirect impacts such as noise, dust, odors, night lighting, and increased human activity would not necessarily preclude

recreational use, but would decrease the quality of the recreation experience.

Exploration and most development activities would have relatively insignificant and short-term impacts on recreationists. The exception would be in fields where intensive oil and gas development occurs. Field development is anticipated to occupy a small percentage of the land within the district. In developed oil and gas fields, permanent support facilities such as roads, powerlines, pump jacks, and storage facilities would cause alteration of the landscape.

When facilities and activities cause extensive alteration of the landscape, the recreation setting shifts from undeveloped to developed. Recreation opportunity spectrum (ROS) classes in the district would shift from settings that are primitive, semiprimitive non-motorized, or semiprimitive motorized to modern urban or rural settings. Activities would change from resource-dependent (primitive) to facility-dependent (modern urban).

Once these changes occurred, the areas would probably never be returned to their original class, even with rehabilitation. Instead they might be changed to the roaded natural category or remain as modern urban or rural settings. The cumulative effect would be a decline in the area available to users who prefer undeveloped settings and an increase in the area available to users who prefer more developed settings.

Providing physical access to areas isolated from public use through the creation of new roads for oil and gas operations would help offset some loss of area. The access would generally be considered a benefit, except in areas being managed to provide primitive and semi-primitive non-motorized recreation. Some undeveloped campsites could be affected by the placement of oil and gas facilities. These impacts would be important to those users who prefer primitive and semi-primitive settings to engage in such activities as hunting, hiking, float boating, and backpacking.

Once exploration and development has ceased, rehabilitation would resolve many of the adverse impacts to recreation. However, the remaining production facilities would have a long-term

adverse impact on outdoor recreation. The remaining visual impacts and modifications to the landscape would cause a loss in the opportunity to engage in various activities. However, visitor use would return to predevelopment levels as opportunities to engage in other recreational activities result from the change in settings.

The recreational settings, opportunities, and values in SMAs identified in the RMPs would be maintained. The application of management constraints would prevent desired recreational settings and opportunities from being impaired or destroyed.

Farmington Resource Area

Under this alternative, eight special management areas in the high-intensity development region and one in the low-intensity development region would be affected. A total of 59,661 acres is included in these management areas. Leasing and development within these eight SMAs occurred before their designation. The extent of leasing ranges between 15 and 100 percent in the SMAs.

Of the unleased acreage in these SMAs (5,081 acres), 4,701 acres would remain closed to leasing. Closure would be beneficial to the existing recreation values and resources. The other 380 unleased acres would be open to leasing under STCs.

Development under STCs would result in greater surface disturbances. Recreational opportunities within areas open to leasing under STCs would be displaced or reduced. Depending on the location and magnitude of development and disturbance, the quality of the recreation setting and experience would be decreased during the life of the project. The perceived degree of impact would differ with each recreationist and would range from minimal awareness of oil and gas leasing activities to outright refusal to continue recreational use of a developed area.

The Farmington RMP designated corridors for the Continental Divide National Scenic Trail (CDNST). Based on these designations, rights-of-way will be acquired and the tread way will be constructed. Leases exist on approximately half of the corridor area (31,120 acres), but the CDNST SMA is located in the low-intensity

development region. The U.S. Forest Service Comprehensive Management Plan for the Continental Divide Trail allows for relocation of the tread way, if necessary, to provide a safe and environmentally acceptable route. STCs allow for the movement of well site locations; if applied, this adjustment could accommodate the trail location.

Rio Puerco Resource Area

Continued implementation of current management policy and objectives would result in minimal impacts on 76,553 acres (six SMAs) in the high-intensity development region. Minimal effects would also occur on an additional 254,675 acres (eight SMAs) in the low-intensity development region. A total of 70,585 acres (four SMAs) in the high-intensity development region, are closed to leasing. Leasing and/or development in the high-intensity development region, would occur under a No Surface Occupancy constraint on 80 acres in (one SMA) and under a Controlled Surface Use constraint on 5,888 acres in (two SMAs).

Field development is not expected to occur on 71,103 acres (five SMAs) in the high-intensity development region. Field development is expected to occur in areas of dispersed use with low visitation.

Within the low-intensity development region are 254,657 acres eight SMAs that require special management practices. Of the total, 95 percent or 241,043 acres in (five SMAs) would remain closed to leasing and development. Recreational opportunities and settings would be protected in these areas. Leasing and/or development would occur under a No Surface Occupancy constraint on 438 acres (in one SMA) and under a Controlled Surface Use constraint on 13,178 acres. Recreational opportunities and settings would also be protected in these areas.

Approximately 16 acres in a single SMA would be leased and/or developed under STCs. With development distributed widely over the resource area (one well for every 81,594 acres), relatively minimal surface disturbances would result from the drilling of 19 wells in the low-intensity development region. The overall recreational opportunities would not be affected

by the level of development projected to occur in this region.

Taos Resource Area

Within the high-intensity development region, most of the federal oil and gas acres underlie private surface. Ten wells are projected to be drilled in the high-intensity development region in the next 20 years, most likely on private land. Because recreation use on public lands in this area is minimal and dispersed, adverse impacts from oil and gas activities are not anticipated.

Recreation management areas are located in the low-intensity development region. A majority of these management areas are concentrated in Rio Arriba and Taos Counties. The RFD projection is for two wells in these counties during the life of this plan amendment.

Management areas such as the Rio Grande and Rio Chama Wild and Scenic Rivers are legislatively closed to leasing. The Wild Rivers Recreation Area, Santa Cruz Lake, Guadalupe Mountain ACEC, and Racecourse ACEC would be protected under leasing with a No Surface Occupancy Constraint or a discretionary closure of these areas to leasing.

The recreation setting and opportunities in this resource area are not likely to be adversely affected by oil and gas development. Even though oil and gas activities would likely occur in areas of dispersed recreation opportunities, the extent of recreational impacts would be minimal with the drilling of 20 wells in the next 20 years.

WILDERNESS STUDY AREAS

Albuquerque District

During the period of wilderness review for the thirteen Wilderness Study Areas (WSAs) in the Albuquerque District, and until Congress has determined otherwise, the BLM continues to manage these areas so their suitability for preservation as wilderness is not impaired. Since 1982, the Department of the Interior has been prohibited from issuing leases in these areas. These WSAs, totalling 151,790 acres, are closed to new oil and gas leasing activities while under

WSA status. No impacts to these areas would occur while they are under study.

Before the Congressional ban on oil and gas leasing in WSAs, the BLM continued to issue leases. The Federal Land Policy and Management Act (FLPMA) led to the establishment of a two-tiered standard for lands under wilderness review. First, leases issued after FLPMA are statutorily restricted to activities that will not impair the wilderness characteristics of a study area. Second, leases issued before FLPMA are subject to the non-impairment standard, unless that standard unreasonably interferes with the rights granted in the lease.

If the non-impairment standard interferes with lease development, the lease may be developed under the lease terms and conditions. Development would be subject to the less stringent standard that it not unnecessarily or unduly degrade the area.

Although development is allowable, the BLM cannot allow the wilderness characteristics of a WSA to be damaged, impaired, or destroyed by oil and gas exploration or development activity before Congressional action. It is considered unlikely that any development activity will occur on leases in WSAs.

Congressional designation of areas as wilderness withdraws them from leasing under the mineral leasing laws, subject to the provisions of the Wilderness Act. Leasing may occur in areas not designated as wilderness according to decisions made in the applicable RMP or amendment.

Should Congress decide to release areas from further wilderness study and designation, adverse impacts to the wilderness values may occur on a portion of those lands. Depending on the amount and type of activity that occurs with oil and gas leasing and development, the area's wilderness values of solitude, naturalness, and primitive or unconfined recreation opportunities could be impaired or lost.

Farmington Resource Area

The Farmington Resource Area contains one 6,563-acre WSA in the low-intensity development region. The Ah-shi-sle-pah WSA has been

closed to oil and gas leasing since 1982. Although the WSA is closed to leasing, leases were issued on 67 percent (4,400 acres) of the WSA before 1982. Unless they are suspended or held by production, the post-FLPMA leases are expected to expire by 1994. Section 603(c) of FLPMA provides that all leases issued after its enactment in areas with wilderness characteristics are subject to the non-impairment standard.

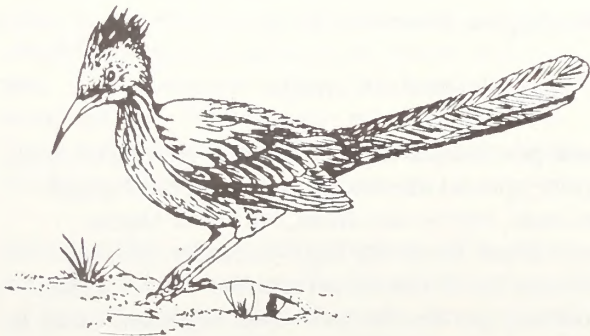
If this WSA was designated as wilderness, its 6,563 acres would be permanently withdrawn from mineral leasing. Any leases with valid existing rights would be managed under the principle of nondegradation of wilderness values. Section 4(b) of the Wilderness Act requires that the BLM preserve the wilderness characteristics of designated areas.

If Ah-shi-sle-pah is not designated wilderness by Congress, it would be open under STCs and wilderness values would no longer be protected.

Rio Puerco Resource Area

Of the nine WSAs (approximately 112,227 acres) in this resource area, five (approximately 70,475 acres) occur in the high-intensity development region and four (approximately 41,752 acres) in the low-intensity development region. These WSAs have been closed to oil and gas leasing since 1982, but leases were issued on a portion of them before 1982. Unless the post-FLPMA leases are suspended or held by production, they are expected to expire by 1994.

If these WSAs were designated wilderness, they would be permanently withdrawn from leasing. Any pre-FLPMA leases or leases with valid ex-



isting rights would be managed under the principle of nondegradation of wilderness values.

Should Congress not designate these areas (partially or wholly) as wilderness, the BLM would manage the nondesignated areas in accordance with the Rio Puerco RMP. Under this alternative, other overlapping special management designations and objectives apply to almost all of the acreage under WSA consideration. These areas would remain closed to leasing as SMAs or ACECs.

Taos Resource Area

Three WSAs (approximately 33,000 acres) are located in the low-intensity development region of this resource area. These WSAs have been closed to oil and gas leasing since 1982, but leases were issued on a portion of them before 1982. Unless the post-FLPMA leases are suspended or held by production, they are expected to expire by 1994.

If these WSAs were designated wilderness, they would be permanently withdrawn from leasing. Any pre-FLPMA leases or leases with valid existing rights would be managed under the principle of nondegradation of wilderness values.

Should Congress not designate these areas (partially or wholly) as wilderness, the BLM would manage them in accordance with the Taos RMP. Under this alternative, other overlapping special management designations and objectives apply to almost all of the acreage under WSA consideration. These areas would remain closed to leasing as SMAs or ACECs.

WILDLIFE

Albuquerque District

Wildlife are disturbed by the presence of people working in oil and gas fields through accidents, authorized actions, and unauthorized actions. Physical and chemical hazards and noise are produced by the operation of construction and well production equipment. The development of pipeline rights-of-way removes existing habitat, replacing it with a contrasting, artificially seeded habitat. Road development removes existing habitat, and road maintenance and use prevents

pre-impact habitat from returning. Traffic on roads disturbs wildlife and occasionally kills animals. Roads also increase the influence of poachers and lawful human disturbances. Well pads remove habitat; as long as a well is in production, the habitat will not return. *However, reseeding on well pads, cut-and-fill-slopes, pipeline routes and abandoned roads does provide forage for wildlife. The change in wildlife habitat from woodlands to grass and brush by surface disturbing activities (5-8 acres per well pad and access road), is minimized to the greatest extent possible. The pad and road areas are sited so as to remove as little woodland as possible. In many areas, due to the density of pinyon-juniper woodlands, a change in habitat produces an edge effect that benefits many species of wildlife, particularly deer and elk. Animal Inn trees, and old growth trees are protected for the numerous wildlife species (e.g. Spotted Owl, Goshawk) that use them. Forested areas (Ponderosa pine, fir trees), because they are scarce, are also protected from oil and gas development activities.*

Approximately 122,000 acres of critical deer, elk, and antelope winter habitat have been identified in the Albuquerque District (in the Farmington Resource Area are 105,000 acres; in the Rio Puerco are 10,000 acres; in the Taos are 7,000 acres). Based on the level of development, it is estimated that 2,800 acres of this habitat would be disturbed in the next 20 years. This figure is approximately 2.3 percent of the critical winter habitat and averages out to .11 percent of disturbance each year for the next 20 years.

Forage loss could result in the loss of wildlife from starvation or reduction in viable offspring. These losses would be based on the quantity and/or nutritional value of available forage and on other disturbance factors. Management constraints control the time of drilling and other developmental and disturbance factors that could affect wildlife. Therefore, displacement of big game species from critical winter habitat would be minimized.

Population numbers for deer, elk, and antelope could not be obtained for all BLM designated critical winter habitat in the district. Professional judgement and some game counts were

used to develop the estimates for big game populations dependent on forage on public lands. Based on this information, an estimated 2,690 deer; 2,700 elk; and 1,200 antelope use public lands in the district. A reduction in critical winter habitat could result in lower big game numbers. Under the No Action Alternative, the populations would be reduced by as many as 297 deer, 195 elk, and 59 antelope.

Examples of mitigation to avoid adverse impacts on wildlife include routing a right-of-way around a sensitive area, or placing a Timing Limitation constraint on construction actions to avoid excessively wet soil conditions, the habitat growing season, or a critical animal occupation period. The BLM requires mitigation to promote habitat recoverability through reducing the time involved in returning an area to its pre-impact condition. Examples of this type of mitigation are the closing and reseeding of abandoned roads and well pads. Seeding rights-of-way with a mixture designed to reproduce the habitat removed rather than waiting for natural regeneration is another example.

Under the No Action Alternative, STCs would continue to be applied for most non-sensitive wildlife areas. Under the STCs, the BLM would have limited ability to modify siting and design facilities, the timing of operations, and the specifications for interim and final reclamation measures. The proposed site could not vary more than 200 meters from that proposed by the lease holder. Seasonal stipulations designed to avoid disrupting the growing season or disturbing wildlife occupancy could not exceed a total of 60 days in any lease year. Where STCs were not adequate, this alternative could have a negative impact on wildlife.

Farmington Resource Area

Areas Of Special Concern

Three portions of the Farmington Resource Area require special attention, including bald eagle use areas, raptor use areas, and river tracts. These areas are in the high-intensity development region of the resource area. Development of oil and gas resources in bald eagle use areas is evaluated on a case-by-case basis according to

the consultation requirements of Section 7 of the Endangered Species Act.

Raptor use areas are located throughout the central portion of the resource area, which is open to leasing under STCs. Most of the raptor use areas are located in the resource area's low-intensity development region. Development of oil and gas resources in raptor use areas is evaluated on a case-by-case basis according to the candidate species policies and Section 7 consultation requirements. With few wells (543) projected to be drilled in the low-intensity development region (which totals 1,254,020 acres in size) in the next 20 years, it is assumed that well development would not occur near nesting sites.

The 39 tracts in the River Tracts SMA are managed under the No Surface Occupancy (NSO) Constraint. Because many of the riparian tracts are narrow and linear in shape, the NSO Constraint would still allow lease development outside of them. This constraint is supported by Farmington Resource Area Stipulation No. 25, dated August 1988. The BLM requires the lessee to provide berms, channels, dikes, and holding pits to prevent fluids and contaminated runoff from polluting riparian habitat.

Outside Areas Of Special Concern

In the San Juan Management Framework Plan (1979), the BLM identified 584,000 acres as winter range for deer and elk. However, resource considerations and field observations conducted by BLM biologists since then have resulted in a more limited amount of key critical wildlife (wintering/calving) habitat being identified. Under this alternative the Timing (Seasonal) Limitation Constraint is being applied to approximately 105,000 acres of critical wildlife habitat based on more recent information. This constraint allows the continued development of oil and gas resources and optimizes the BLM's ability to manage the habitat for these species.

Based on the level of development, it is estimated that 2,759 acres of critical habitat would be disturbed in the high-intensity development region in the next 20 years. This is approximately 2.6 percent of the critical winter habitat and

averages out to .13 percent of disturbance each year for the next 20 years.

Forage loss could result in the loss of wildlife from starvation or reduction in viable offspring. These losses would be based on the quantity and/or nutritional value of available forage and on other disturbance factors. Management constraints control the time of drilling and other developmental and disturbance factors that might affect wildlife. Therefore, displacement of big game species from critical winter habitat would be minimized.

Population numbers for deer, elk, and antelope could not be obtained for all BLM designated critical winter habitat in the district. Professional judgement and some game counts were used to develop the estimates for big game population numbers dependent on forage on public lands. Based on this information, an estimated 2,400 deer; 1,000 elk; and 100 antelope use public lands in the high-intensity development region of the Farmington Resource Area. A reduction in critical winter habitat could result in lower big game numbers. Under the No Action Alternative, the populations would be reduced by as many as 286 deer, 119 elk, and 12 antelope.

Areas outside critical wildlife habitat are open to leasing and development under STCs. Unrecognized or "new" elk use areas may occur. The effects of oil and gas development on elk herds in new use areas will be assessed as these areas are identified. As the Ensenada Mesa pronghorn antelope release stabilizes, these animals may also move into new use areas. The effects of oil and gas development on these areas will also be considered as they are identified.

Rio Puerco Resource Area

Areas Of Special Concern

Approximately 10,000 acres of critical wildlife winter habitat have been identified in the high-intensity development region of this resource area. Based on the projected level of development, it is estimated that 13 acres of critical habitat would be disturbed in the next 20 years, or approximately .13 percent of the critical winter habitat. This averages out to .0065 per-

cent of disturbance each year for the next 20 years.

Forage loss could result in the loss of wildlife from starvation or reduction in viable offspring. These losses would be based on the quantity and/or nutritional value of available forage and on other disturbance factors. Management constraints control the time of drilling and other developmental and disturbance factors that might affect wildlife. Therefore, displacement of big game species from critical winter habitat would be minimized.

Population numbers for deer, elk, and antelope could not be obtained for all BLM designated critical winter habitat in the district. Professional judgement and some game counts were used to develop the estimates for big game population numbers dependent on forage on public lands. Based on this information, an estimated 140 deer and 200 elk use public lands in the high-intensity development region. No antelope population is known to occur at this time. A reduction in critical winter habitat could result in lower big game numbers. Under the No Action Alternative, the populations would be reduced by as many as 4 deer and 5 elk.

Two management constraints apply to the critical use areas for deer and elk. The Timing (Seasonal) Limitation and NSO Constraints apply to the Elk Springs ACEC. The NSO Constraint limits development to areas immediately adjacent to the ACEC. Because of the size of this area (10,300 acres), this constraint closes most of the interior of the ACEC to development. However, these management constraints optimize the BLM's ability to manage the habitat for these species. Areas outside this ACEC could be leased and developed under STCs. If unrecognized use by these big game species was found during lease development, additional management constraints would be considered through plan revisions or amendments.

These management constraints are also being applied to the San Luis Mesa Raptor Area ACEC. The NSO Constraint limits development to areas immediately adjacent to this ACEC. Because of the size of this area (10,447 acres), this constraint closes most of the interior of the ACEC to development. However, these management con-

straints optimize the BLM's ability to manage for raptor nesting habitat.

Taos Resource Area

Special wildlife management areas and critical wildlife habitat are located in the low-intensity development region of this resource area. Approximately 10,000 acres of critical wildlife winter habitat have been identified in the low-intensity development region. Based on the projected level of development, it is estimated that 28 acres of critical habitat would be disturbed in the next 20 years. This is approximately .004 percent of the critical winter habitat, and averages out to .0002 percent of disturbance each year for the next 20 years.

Forage loss could result in the loss of wildlife from starvation or reduction in viable offspring. These losses would be based on the quantity and/or nutritional value of available forage and on other disturbance factors. Management constraints control the time of drilling and other developmental and disturbance factors that might affect wildlife. Therefore, displacement of big game species from critical winter habitat is not considered an impact.

Population numbers for deer, elk, and antelope could not be obtained for all BLM designated critical winter habitat in the district. Professional judgement and some game counts were used to develop the estimates for big game population numbers dependent on forage on public lands. Based on this information, an estimated 150 deer; 1,500 elk; and 1,000 antelope use public lands in the low-intensity development region. A



reduction in critical winter habitat could result in a lower big game numbers. Under the No Action Alternative, the populations would be reduced by as many as 7 deer, 71 elk, and 47 antelope.

THREATENED AND ENDANGERED (T&E) AND OTHER SPECIAL STATUS PLANT AND ANIMAL SPECIES

As discussed in Chapter 2, all BLM actions will be evaluated for potential effects on T&E and other Special Status Species (Federal Candidate and State Listed) see Appendix H.

If the evaluation indicates a "no effect" situation, the action may proceed. If the evaluation indicates a "may affect" situation (may affect includes both beneficial and adverse impacts) on a federally listed species or their habitats and the adverse impacts cannot be eliminated, Section 7 consultation with the FWS will be conducted. If the evaluation indicates a "may affect" situation on other Special Status Species (Federal Candidate or State Listed), and the adverse impacts cannot be eliminated, BLM will initiate an informal conference and may request technical assistance from the FWS or the State of New Mexico. During or as a result of the Section 7 consultation or informal conference process, BLM will not authorize any action that would affect a T&E or other Special Status Species.

Specific evaluation(s) of impacts cannot be made at this time because information is not available as to exactly where oil and gas development activities will occur. Until applications for permits are submitted to the BLM, site-specific (potential) impacts cannot be evaluated. Prospective development in areas with T&E and other Special Status Species would be purely speculative in nature at this time. However, because BLM is committed to protecting T&E and other Special Status plant and animal species, in particular under regulations of the Endangered Species Act and BLM policies, none of the alternatives should adversely affect T&E or other Special Status Species. This commitment would be met by carrying out an environmental assessment prior to any ac-

tion being permitted. This includes: identifying any Special Status Species in or near the permitted area, adjusting the project design, size, or location, by applying appropriate stipulations (timing, location, seasonal, etc.), or by not authorizing the action altogether.

The BLM Albuquerque District has been actively involved in protecting T&E and other Special Status plant and animal species. A total of 27,611 acres have been identified as SMAs and ACECs for the protection of these species.

SOILS AND HYDROLOGY

Albuquerque District

Oil and gas development is not expected to adversely impact soils or surface and ground water in the Taos and Rio Puerco Resource Areas. Applying management constraints such as Standard Lease Terms and Conditions, special lease stipulations, and site specific conditions of approval, would prevent degradation to soils, and surface and ground water.

Projected oil and gas development in the Farmington Resource Area would add to the existing network of lease roads, pipelines (both gas and water disposal), and well pads, in the Resource Area. Exploration and production activities would remove vegetation and increase soil disturbances that cause erosion and increase sediment delivery to surface waters. Oil spills and produced water discharges could contaminate soils, surface water, and near surface fresh water aquifers.

Ground water contamination during drilling operations could occur if circulation of the drilling materials is lost or water-bearing formations are improperly cemented and cause interaquifer mixing. Older wells, which were improperly cased and cemented, could leak and impact mineralized or ground water bearing formations.

The above potential impacts, in the Farmington Resource Area, are minimized or eliminated by the application of standard mitigation requirements and additional protective measures

developed to address drilling and operational problems encountered in the San Juan Basin.

The following appendices contain mitigation measures, operational requirements, and soil/water conservation practices, currently being implemented in the Farmington Resource Area:

Appendix B-1, Uniform Format For Oil And Gas Lease Stipulations and Form 3100-11, Offer To Lease And Lease For Oil And Gas.

Appendix B-3, Conditions of Approval (COAs), Common To All Alternatives.

Appendix B-6, Soil and Water Conservation Practices.

Appendix D, Fruitland Formation Produced Water Disposal.

Appendix L, Requirements to Operate On Federal And Indian Leases: Casing and Cementing Requirements.

Appendix D-2, Oil And Gas Spill Prevention Plan Requirements And Reclamation Procedures For Produced Water Spills From Fruitland Coal Wells.

Soil and Surface Water

The drilling of 47 wells in the Rio Puerco Resource Area and 30 wells in the Taos Resource Area would result in negligible soil and water impacts. However, the drilling of 4,527 wells in the Farmington Resource Area would result in long-term disturbances to soil and water. About 50% of the area disturbed in well development is not required for production and is rehabilitated. Mitigation measures for the protection of soil and water resources are implemented and continued for the life of the well. When a well is abandoned the site is rehabilitated. A model was used to estimate the potential for sediment yield in acre feet/square mile/year from a bare soil surface. While there is no data as to the actual amount of reduction in sediment yield from mitigation measures (soil and water conservation practices) an estimate of 50 to 70 per cent efficiency was assumed. Also 3 per cent of the sediment yield is assumed to be salts.

The Controlled Surface Use and No Surface Occupancy constraints limit or prohibit surface disturbing actions within SMAs. Under the No Surface Occupancy Constraint, a limited amount of development would occur adjacent to SMAs in areas open to leasing and/or development with mitigation practices applied. Even with the application of these constraints, long-term surface disturbances (well pads and roads) would remain for 20 to 30 years. However, for wells drilled under the Controlled Surface Use or No Surface Occupancy Constraints, such impacts would occur outside SMAs. In Farmington Resource Area an estimated 20 wells per year would be drilled on or adjacent to SMAs. This amounts to 9% of the total number of new wells with a projected sediment yield of 0.09 to 0.15 acre feet per year. The salt contribution would range from 4 to nearly 7 tons per year.

The drilling of an additional 4,604 wells (including 20 in SMAs) would result in 29,968 acres of new surface disturbance at the rate of 5 percent per year (1498 acres) for the next 20 years. Only 50 to 55 % of the disturbed area is needed for production after a well is completed. The unneeded area is rehabilitated and would reduce sediment yields. The potential sediment yield on the remaining acres, would be about 0.5 to 0.85 acre feet per year.

The salt contribution would range from 23 to 39 tons per year. Increased sedimentation could degrade water quality and affect the whole chain of aquatic life, from plants to invertebrates to fish. sediment also destroys spawning habitat, eggs and fry, as well as invertebrates which are the foundation of the aquatic food pyramid. Water temperatures could increase and dissolved oxygen concentrations could be reduced, both of which would cause direct mortalities to fish and other aquatic life. Salts and trace elements could have a significant and long-lasting effect by making the water unsuitable for livestock, wildlife, agriculture, industrial, and municipal drinking water.

Ground Water

The following actions associated with oil and gas development that could lead to ground

water impacts occur in the Albuquerque District and are common to all alternatives.

Because of the negligible number of wells projected for the Taos and Rio Puerco Resource Areas, no impacts to ground water are anticipated. Applying standard mitigation measures, i.e., lease stipulations and conditions of approval, would protect all useable ground water aquifers.

Within the Farmington Resource Area, because of existing development and the projected number of additional wells to be drilled during the next 20 years, activities associated with oil and gas development could have adverse impacts to ground water.

Produced water and waste fluids associated with oil and gas operations could potentially impact aquifers. Drilling fluids and/or produced water could percolate from unlined pits into shallow aquifers. Brine drilling mud and produced water contain high concentrations of salts (sodium and chloride); produced water may also contain heavy metals and aromatic hydrocarbons.

Further ground water impacts could occur from leaking well-casings, either from older wells with corroded casing or from new wells which are improperly cased or cemented.

Recent increased coal-bed methane development in the Farmington Resource Area has prompted concern in the proper disposal of large quantities of produced water. The preferred method of disposal for large quantities of produced water is by underground injection. Generally, produced water disposed into authorized disposal wells will not cause adverse impacts to shallow useable aquifers. (See Appendix D)

Farmington Resource Area

Soil and Surface Water

The drilling of 4,527 wells would result in 28,520 acres of new disturbance at the rate of 5 percent per year (1426 acres) for the next 20 years. This would produce an estimated 0.5 to 0.8 acre feet per year sediment yield from new

areas of production. The additional salt contribution would be 22 to 36 tons per year.

Ground Water

The United States Geological Survey has identified nine aquifers in the San Juan Basin which are a source of water for public-supply, commercial, private-domestic, and livestock use in areas where drilling depths and pumping levels are economically feasible and where water quality is suitable (USGS Regional Aquifer-System Analysis Program). Possible pathways for the contamination of the above aquifers from oil and gas development include: (1) reserve pit and/or produced water leakage and percolation into shallow aquifers, and (2) contamination of aquifers as a result of well-casing failure. The following mitigation measures, developed to protect ground water contamination, are currently being implemented in the Albuquerque District, with additional protective measures identified for the Farmington Resource Area.

Notice to Lessee - 2B (NTL-2B) specifies informational and procedural requirements for submittal of an application for the disposal of produced water, and the design, construction and maintenance requirements for disposal pits. Selected requirements for injection wells, lined and unlined pits, and other disposal methods include:

(a) Injection wells: An operator shall obtain an Underground Injection Control (UIC) permit pursuant to 43 CFR Parts 144 and 146 from the EPA or the State/Tribe where the State/Tribe has achieved primacy as listed in 43 CFR Part 147. The injection well shall be designed and drilled or conditioned in accordance with the requirements and standards described in Onshore Order No.2 and pertinent NTLs, as well as the UIC permit.

(b) Lined Pit: An operator shall submit schematics showing pit dimensions, cross section, leak detection device, and location. Water quality information must include: (1) Daily quantity of water to be disposed of and a water analysis that includes concentrations of chlorides, sulfates, pH, TDS, and toxic constituents that the authorized officer reasonably believes to be present, (2) method and schedule

for periodic disposal of precipitated solids, and a copy of the appropriate disposal permit, and (3) type, thickness, and life span of material to be used for lining the pit and method of installation.

(c) *Unlined Pits:* An operator shall submit schematics showing dimensions, cross sections, and location. Water quality information shall include: (1) daily quantity of water to be disposed of and a water analysis that includes TDS, pH, oil and grease content, the concentrations of chlorides and sulfates and other parameters or constituents toxic to animal or plant life as determined by the authorized officer, (2) estimated depth and areal extent of the shallowest aquifer with TDS of 10,000 ppm or less.

(d) *Other Methods:* For off-lease disposal of produced water, the operator must submit an application for removal of the water together with a copy of the approval for the disposal facility.

Protection of near surface aquifers during drilling operations is addressed in Onshore Order No. 2- Drilling Operations. In addition to the above order, the BLM, in cooperation with New

Mexico Oil Conservation Division (NMOCD), has developed special casing and cementing requirements specifically addressing the protection or isolation of all useable water zones (water quality with TDS of 10,000 ppm or less) and hydrocarbon bearing zones in the San Juan Basin. See Appendix L, NTL-FRA 90-1, Casing and Cementing Requirements, for casing and cementing details.

Casing integrity of older wells is monitored by NMOCD. NMOCD has a monitoring program that has been in place for approximately 10 years. This program conducts Bradenhead tests for all wells in the San Juan Basin. Each year approximately one third of all wells in the basin are tested. In addition to the NMOCD program, BLM Fluid Minerals Inspection and Enforcement staff regularly inspect Federal and Indian well facilities for environmental, site security, and safety-compliance (see Appendix B-7, Proposed FY92 Farmington Oil and Gas Inspection and Enforcement Strategy).

Well facilities found to be in noncompliance are identified for remedial action.

Rio Puerco Resource Area

Soils and Surface Water

The drilling of 47 wells would result in 620 acres of new disturbance, at the rate of 5 percent per year (31 acres) for the next 20 years. The sediment yield is estimated to be 0.009 to 0.015 acre feet per year. The salt contributions would be negligible, less than 1 ton per year.

Ground Water

Because of the negligible number of wells projected for the Rio Puerco Resource Area, no impacts to ground water are anticipated. Applying standard mitigation measures, i.e., lease stipulations and conditions of approval, would protect all useable ground water aquifers.

Taos Resource Area

Soils and Surface Waters

The drilling of 30 wells would result in 828 acres of new disturbance, at the rate of 5 percent per year (41 acres) for the next 20 years. The sediment yield is estimated to be 0.02 acre feet or less with salt contributions less than 1 ton per year.

Ground Water

Because of the negligible number of wells projected for the Taos Resource Area, no impacts to ground water are anticipated. Applying standard mitigation measures, i.e., lease stipulations and conditions of approval, would protect all useable ground water aquifers.

CULTURAL RESOURCES

Albuquerque District

Continued oil and gas development would result in increased impacts to the cultural resources, particularly in the high-intensity development region in the Farmington Resource Area. The RFD projection for disturbance in the Albuquerque District as the result of oil and gas development is 29,968 acres. Of this amount, 95 percent

(28,520 acres) is projected to occur in the Farmington Resource Area. Projected disturbed acres for the Rio Puerco and Taos Resource Areas are 620 and 828 respectively. The average projected well density in San Juan County (one well per 233 acres) is the lowest density of any of the counties in the Albuquerque District. The density for Rio Arriba County is second lowest, at one well for every 263 acres.

The impacts of oil and gas leasing and development are both beneficial and adverse. Beneficial impacts include identification of sites and their avoidance or data recovery. An increase in the knowledge of past human use in portions of the district has occurred in recent years, a positive result of development.

However, the extensive development of energy reserves has resulted in many sites not visible from the surface being damaged by construction. In addition, increased vandalism resulting from greater public knowledge of site locations and improved access to remote portions of the district has been recognized as a detrimental aspect of development.



Over the years in which inventories have been conducted in the Farmington Resource Area, an average of one cultural site was identified for each well facility, and one site in three (33 percent) require some type of mitigation. It is estimated that the cost of mitigation (for data recovery) is \$15,000 per site.

Applying inventory and data recovery information to the projected number of wells for the Albuquerque District, a total of 1,518 wells would require mitigation over the next 20 years. At the cost of approximately \$15,000 per site, approximately \$22.8 million would be required to mitigate cultural sites under this alternative.

Impacts to sites or areas considered important to American Indians are difficult to ascertain, but contacts with the Navajo, Hopi, Jemez, and Ute tribes provide enough information to indicate impacts to American Indian use occur. Concerns not fully understood by the BLM about American Indian use of the portions of the Farmington Resource Area under intense development are expected to be illuminated by the results of an ethnographic study in progress.

Procedures have been instituted to comply with the National Historic Preservation Act. As cultural sites are identified, impacts are mitigated by use of avoidance, data recovery, or combinations of physical and administrative measures (fencing or road closure). Mitigation of impacts (data recovery) to sites identified as important by American Indians is considered before issuance of permits under the authority of the Archeological Resources Protection Act of 1979.

Farmington Resource Area

Because of the level of development in the Farmington Resource Area, the ability to avoid cultural sites by moving oil and gas facilities is limited. Site locations for new wells, roads, and pipelines are limited by topography, existing facilities, and legal requirements for well siting. As the result, an increased number of cultural sites are being identified and impacted by development. Figures compiled by the Farmington Resource Area (refer to Table 4-3) show a dramatic increase in the volume of applications and the number of cultural sites identified during pre-project field inventories.

An average of one archeological site is being found for each well developed (with associated access routes and pipeline rights-of-way) on average, two out of three of these archeological sites can be avoided, but the remainder are impacted in some way by oil and gas development. Based on the projected development of 4,527 new wells over the 20-year life of this plan amendment, approximately 1,500 archeological sites would suffer direct impacts that would require some form of mitigation.

The Farmington Resource Area has developed a regional archeological research design to allow

more efficient and productive data recovery from archeological sites that are likely to be damaged or destroyed by oil and gas development. In this design, full-scale data recovery is focused on the most important archeological sites, while investigation at other sites may end with limited testing.

Full-scale data recovery is required at only a half to a third of the sites. Assuming that mitigation costs average \$15,000 per site, an estimated \$7,500,000 to \$11,250,000 in 1990 dollars would be required over the 20 year life of this plan amendment to adequately mitigate the potential adverse effects of oil and gas development.

The overall cost of mitigating cultural sites could be reduced by sampling populations of sites, if large enough units for inventory are processed as single actions, and research is conducted based on a regional research design.

Except for two areas covered by this RMP Amendment/EIS, special cultural management areas were closed to leasing by the Farmington Resource Area RMP in 1988. However, much of the acreage in these areas was leased at the time. A controlled Surface Use Constraint is

applied to two cultural areas (9,350 acres). Until the present leases expire in these areas, standard mitigation measures to protect and control surface-disturbing actions will remain in effect.

Once cultural sites are damaged, the resource quality of the remaining site information is reduced. Portions of sites directly impacted by construction and not discovered constitute a total loss. Data recovery through excavation, while used to mitigate the adverse effects of development, is in itself a destructive force. Generally accepted as a best effort to save valuable information, excavation cannot be redone once it is conducted. Increased vandalism resulting from general public knowledge of sites and the ease of access would increase the potential for impacts to identified and unidentified cultural resources (Nickens, et.al. 1981; GAO 1987).

Only increased effort to review incoming reports for proposed actions, as well as greater compliance with pre- and post-construction stipulations can enable the current level of resource protection to continue. Additional efforts to educate the public about cultural resource values may offset vandalism.

**TABLE 4-3. FARMINGTON RESOURCE AREA
CULTURAL SITES LOCATED DURING PROJECT INVENTORIES**

Number of Actions/Sites	1988	1989	1990 ^{1/}
Number of actions ^{2/}	981	2,214	3,470
Sites identified	315	1,127	1,386
Sites avoided	276	905	938
Sites requiring mitigation	22	222	448
Acres inventoried	5,170	21,896	28,293

Notes: ^{1/} Numbers projected through end of fiscal year 1990.

^{2/} This number includes all actions. However, oil and gas wells, pipelines, and related oil and gas development comprises approximately 95 percent of this total.

Rio Puerco Resource Area

Because of the limited amount of oil and gas development in this resource area, most cultural sites can be avoided by moving wells and other facilities. Additionally, the relocation of new wells, roads, and pipelines is not likely to be impaired by topography and existing facilities. The total cost for mitigating 15 sites (33 percent of 47 wells) is estimated at \$225,000.

Impacts to cultural sites (subsurface) encountered during construction activities is dependent on the number and type of sites. Specific standard mitigation measures would be applied before and during development and production. Data recovery through excavation would mitigate some of the adverse effects of development. While generally accepted as a best effort to save valuable information, execution cannot be redone once it has been conducted.

Taos Resource Area

Because of the limited amount of oil and gas development in this resource area, most cultural sites can be avoided by moving wells and other facilities. Additionally, the relocation of new wells, roads, and pipelines would not be impaired by topography and existing facilities. The total cost for mitigating 10 sites (33 percent of 30 wells) is estimated at \$150,000.

Impacts to cultural sites (subsurface) encountered during construction activities is dependent on the number and type of sites. Specific standard mitigation measures would be applied before and during development and production. Data recovery through excavation would mitigate some of the adverse effects of development. While generally accepted as a best effort to save valuable information, excavation cannot be redone once it has been conducted.

PALEONTOLOGY

Albuquerque District

The assessment of impacts from an individual well drilled in an area with paleontological resources is difficult because, although fossil-bearing exposures are for the most part continuous locally and sometimes regionally, the fossils found in them generally are not. Certain

depositional and paleoenvironmental conditions determine where fossils are located within specific geologic formations. Through time, certain erosional factors determine where and when these fossils are exposed at the surface.

The development of oil and gas wells sometimes involves surface disturbances in locations where fossils are being exposed by erosion. Without appropriate management actions designed to mitigate the impact of oil and gas development, potentially important paleontological resources can be damaged or destroyed.

The management direction for the No Action Alternative is derived from existing decisions and guidance developed in the Farmington, Rio Puerco, and Taos RMPs. Under these RMPs, paleontological resources would be adequately protected and derive the greatest benefit. Continuation of current management practices (described in the Continuing Management Guidance section of Chapter 2) would be adequate to prevent significant impacts to the paleontological resources in the district. Potential impacts would be mitigated on a case-by-case basis.



Farmington Resource Area

Many wells are drilled in exposed badland areas potentially containing scientifically important vertebrate fossils. The estimated total surface disturbance (based on RFD assumptions) is 6.3 acres per well, the lowest amount of disturbance per well in the District. However, because the greatest number of wells are projected to be drilled in this resource area, the greatest amount of surface disturbance would occur and the greatest potential for impacts to paleontological resources exists.

The Kutz Canyon Paleontological Area and Angel Peak Recreation Area SMAs are located in the high-intensity development region. Approximately 99 percent of both areas are covered by existing leases. Approximately 293 and 113 wells exist in the Kutz Canyon and Angel Peak SMAs, respectively.

Based on the size of the SMAs and the projected well density for wells drilled in San Juan County (233 acres), approximately 108 and 41 wells would be drilled in these SMAs in the next 20 years. This would result in 5 (34 acres) and 2 wells (12.6 acres) being drilled each year. Paleontological clearances are required before any surface-disturbing activity occurs.

The Betonnie Tsosie SMA, Torrejon Fossil Fauna ACEC, and Fossil Forest Research Natural Area (RNA) are located in the low-intensity development region. Legislation has closed the Fossil Forest RNA to future leasing. Approximately 12 (75.6 acres) and .6 wells (1 acre) would be drilled in the Betonnie Tsosie and Torrejon Fossil SMAs in the next 20 years.

Rio Puerco Resource Area

The Torrejon Fossil Fauna ACEC and Juana Lopez portion of the Elk Springs ACEC are located in the high-intensity development region. According to RFD projections, a well would be drilled every 11,150 acres. Based on the total acreage of these SMAs (3,021 acres), these SMAs would be avoided by future oil and gas development.

The Ball Ranch ACEC and Ojito ACEC are located in the low-intensity development region. A well is projected to be drilled every 77,514 acres. These SMAs would be avoided by future oil and gas development.

Taos Resource Area

In this resource area, surface disturbance is projected to be 27.6 acres per well. The Sombrillo ACEC and Fun Valley SMA are located in the low-intensity development region. Nineteen wells are projected to be developed in the low-intensity development region (1,550,280 acres) in the next 20 years. Therefore, development would not occur in the Sombrillo and Fun Valley

SMAs. Paleontological clearances would be required before any surface-disturbing activities occur.

FORESTRY

Albuquerque District

Oil and gas leasing and development in the Albuquerque District could have both beneficial and adverse impacts on forest woodland resources and management. Approximately 28,000 acres of forest and 731,000 acres of woodland in the district are not restricted in some way from oil and gas leasing and development. The forests and woodlands are located generally in the high-intensity oil and gas development regions.

Oil and gas leasing and development (including roads, well pads, and pipelines) would remove some forest resources and reduce the number of acres for multiple use management. The additional roads into woodland areas would encourage continued unauthorized fuelwood cutting. However, these impacts to forests and woodlands are not expected to result in management decisions that would withdraw acres from oil and gas leasing and developments.

The beneficial impact of oil and gas leasing and development would be the construction of new access roads into previously inaccessible areas of forest and woodland tracts that require management practices, reducing costs to the BLM. Once these areas are reached, silvicultural management techniques could be initiated to replace the decadent trees with young, vigorous, and more desirable tree seedlings.

A short-term, beneficial impact would be an increase in the wood product harvest volumes that would become available to the general public. Assuming that all forest and woodland products removed for the construction of access roads and well pads would be available for public use under the BLM's wood permit system, the change in forest woodland resources would not result in significant adverse impacts to the forest woodland economics of the area. In fact, if local wood cutters and loggers are given the chance to

participate in the clearing work, the local forest industry would receive a beneficial economic impact.

Reclamation of abandoned roads and well pads would help mitigate the long-term effect of the semi-permanent nature of the oil and gas field operations. Also, reclamation of well pads and right-of-way corridors from construction to operational widths would help increase acres in production of woodlands and forests. On favorable sites, it would require at least 20 years for Christmas trees to reach commercial size and 100 to 200 years in the pinon-juniper woodlands for trees to attain harvestable sizes. Forest land composed of ponderosa pine and Douglas fir would require at least 75 years to produce merchantable timber products. This is not considered significant for long-term productivity.

Initial exploration and actual construction of access roads and well pads would result in a loss of vegetation and wood products from the forest and woodland acres involved, which are sparsely represented on public lands. For every woodland acre disturbed, about six cords of firewood (\$10 per cord, stumpage value) is lost or removed. In the commercial forest, an average acre usually supports 3,500 board feet with a stumpage value of \$50.00 per thousand board feet. This represents about \$175 for every acre of timber removed.

A provision should be included in the STCs to require compensation for any forest and/or woodland resources destroyed or removed in the course of road, well pad, and pipeline construction. These monies would be applied toward successful regeneration in these areas. Because of the limited acreages involved and the normal climatic factors of the sites, this is an important measure for restoring areas to predevelopment conditions.

Long-term removal of the forest and woodland acres from timber and woodland production is significant because a large percentage of the forest and woodland in the district grows on unfavorable terrain. It is estimated that about 5 to 8 acres per access road and well pad would be lost from wood production when development occurs in forest and woodland. This could lead to overcutting on the remaining accessible wood-

land acres, which could result in a vegetative shift from pinon-juniper woodland to the shrub and grassland type. This would reduce the wood-producing acres even further.

The presence of more access roads would increase the demand for wood products due to the apparent availability of unharvested woodland acres. This would encourage overcutting in the long-term, with damage to the sites (and stands) occurring.

More miles of new road constructed in woodlands and forests would result in more chances and opportunities for trespass woodcutting to occur. This type of activity on public lands would eventually lead to trespass woodcutting on adjacent private lands. This would cause more slash and litter to be left at woodcutting sites, constituting increased fire hazard.

Under the No Action Alternative, oil and gas development is expected to disturb 29,968 acres during the 20-year life of this plan amendment. Approximately 13.5 percent of this acreage would be forest or woodland. The forest and woodland disturbance is expected to result in the loss of 3,800 thousand board feet (Mbf) of lumber and 255,550 cords of fuel wood with a current stumpage value of \$3,235,000 (refer to Table 4-4). Production losses would be long-term because of the length of the forest and woodland regeneration cycle.

Farmington Resource Area

The impacts would be of the same type as those discussed for the Albuquerque District. The extent of impacts to forestry products in this resource area are presented in Table 4-4.

Rio Puerco Resource Area

The impacts would be of the same type as those discussed for the Albuquerque District. The extent of impacts to forestry products in this resource area are presented in Table 4-4.

Taos Resource Area

The impacts would be of the same type as those discussed for the Albuquerque District. The extent of impacts to forestry products in this resource area are presented in Table 4-4.

CUMULATIVE IMPACTS

This cumulative impact analysis identifies the impacts of oil and gas leasing and development within the Albuquerque District to the extent data is available. Included in this assessment are the cumulative impacts of 22,000 existing federal, state, and private wells (producing and temporarily abandoned). It is estimated that these wells and the facilities associated with them have disturbed as many as 65,600 acres.

Also included in this assessment are the impacts of future development. The RFD projects that 9,452 wells will be developed during the next 20 years. These wells and associated facilities are expected to disturb an additional 60,965 acres. Approximately 50 percent of these wells (4,604) are expected to be drilled on BLM-administered oil and gas. The other wells are expected to be drilled on other federal, state and privately administered oil and gas. Of this amount, approximately half of this acreage would be reclaimed after wells are put into production. Additionally, wells will be permanently abandoned at approximately the same rate as wells are drilled.



Approximately 98 percent of future development is expected to occur in areas within the San Juan Basin that have already been developed. Therefore, it is likely that the acreage reclaimed after well abandonment and rehabilitation will equal the new acreage disturbed, so little or no net disturbed acreage change will occur. Thus, the total area disturbed by federal, state and private development would continue to be about 65,600 acres.

The beneficial impacts associated with the projected development would be that jobs, personal income, and government revenues associated with federal oil and gas development would continue near current levels. It is unlikely that a measureable net change would occur.

VRM classes were not assigned when most of the existing development took place. Areas of private, state, and other ownership also have no VRM classes assigned. Visual resource impacts are measured in terms of acres lost from a specific VRM class. Approximately 7,072 acres of VRM Class I acres and 17,432 acres of VRM Class II areas would be affected by projected federal oil and gas development and would result in long-term surface impacts due to well pads and roads.

The acreage available for undeveloped types of recreation would be reduced by some amount greater than the 65,600 acres of existing disturbance. The amount of this additional acreage would depend on the users' attitudes toward the disturbance of their recreation experience. Undeveloped campsites affected would be a relatively small part of the disturbed acres.

Wilderness Study Areas (WSAs) cover 151,790 acres within the district; part of this acreage was leased before WSA designation. Because the BLM is committed to protecting the WSAs wilderness values until Congress acts on formal designation, it is unlikely these values would be impacted. If Congress releases any of this acreage from further wilderness consideration, and it is not protected by another type of special management designation (e.g., SMA or ACEC status), it would be subject to oil and gas development under STCs. Disturbance could occur on up to 31,600 acres (21 percent) of the WSA acreage.

Critical big game winter range (122,000 acres) was identified in the high-intensity development region. The estimated impacts of projected BLM oil and gas development (possible loss of 247 deer, 195 elk, and 59 antelope) could be doubled if development on non-BLM administered oil and gas was considered. Half the wells are projected to be developed adjoining BLM critical habitat on surface ad-

ministered by owners and agencies other than the BLM.

An estimated 148 acre feet of sediment per year is produced from oil and gas activities on BLM administered oil and gas. Surface disturbance on 1498 acres each year would add between 0.5 to 0.8 acre feet of sediment and 23 to 39 tons of salts to the aquatic environment.

The impacts on cultural resources would be both positive and negative. The positive impacts would result from site identification and recovery. Negative impacts would include site damage from development, vandalism to known locations, and improved access. The number of sites identified or recovered as the result of existing oil and gas development is not known. However, recent studies indicate that, on average, one site would be discovered for each well and associated facilities that are developed, and one-third of these sites would re-

quire recovery. As many as 9,452 sites may be located, with recovery taking place on as many as 1,530 of these sites. (The BLM cannot require site recovery on non-BLM-administered surface.)

Continuation of current management practices would prevent significant impacts to paleontological resources from BLM administered oil and gas development. Data is not available on impacts from existing development, nor on potential impacts from projected non-BLM development.

Forestry impacts related to existing oil and gas development and to non-BLM development are unknown. However, some loss of both timber and fuelwood would occur. Impacts expected from projected BLM development would include the loss of 3,880 Mbf of timber and 255,550 cords of fuelwood with a stumpage value of \$3,235,000. (see Table 4-4).

TABLE 4-4. ALBUQUERQUE DISTRICT FOREST AND WOODLAND IMPACTS BY ALTERNATIVE

Alternative/Item	Albuquerque District	Farmington Resource Area	Rio Puerco Resource Area	Taos Resource Area
No Action Alternative				
Lumber (Mbf) ¹	5,200	4,949	108	143
Fuelwood (cords)	23,382	22,253	484	645
Stumpage value (\$)	260,000	247,442	5,382	7,176
Production Alternative				
Lumber (Mbf)	5,460	5,200	111	149
Fuelwood (cords)	24,426	23,263	496	667
Stumpage value (\$)	271,600	258,672	5,513	7,415
Preferred Alternative				
Lumber (Mbf)	5,145	4,893	108	144
Fuelwood (cords)	23,076	21,945	485	646
Stumpage value (\$)	256,500	243,932	5,386	7,182

Note: ¹ Mbf=thousand board feet.

ALTERNATIVE B: PRODUCTION ALTERNATIVE

OIL AND GAS

Albuquerque District

The discussions of carbon dioxide production and locations of oil and gas wells under the No Action Alternative also apply to the Production Alternative. Under the Production Alternative, RFD projections indicate that 4,733 oil and gas wells would be drilled in the Farmington Resource Area, 48 in Rio Puerco, and 31 in Taos in the next 20 years. Both the Rio Puerco and Taos Resource Areas are considered to be "frontier" areas for oil and gas development. Although exploration activities continue to occur in these resource areas, significant oil and gas reservoirs have not been discovered.

Under this alternative, 241 wells will be developed per year for the life of the plan (refer to Table 4-2). Based on the historic data used to develop the RFD, it is estimated that 13.7 percent of these wells would (33 wells) be dry. The other 208 wells are expected to produce approximately 76,700 barrels of oil (bbl) and 5,365,000 thousand cubic feet (Mcf) of gas per year. Based on 1989 oil and gas prices, this production would have a value of approximately \$9,974,700. Royalties paid on oil and gas production would amount to an estimated \$1,235,700. Based on 1989 county revenues (per well), it is estimated that 208 wells would generate annual county revenues of approximately \$933,100, a 1.03 percent increase over the 1989 revenue figures.

Development over 20 years would result in an increase of 183 jobs (direct employment) in the oil and gas sector. Assuming a 2.2 employment multiplier, an additional 220 jobs (indirect employment) would be created. The 403 jobs created would be a 9 percent increase over the 1989 oil and gas employment figure (a .14 percent increase over the total employment in the district in 1989).

Based on the average wage paid in the oil and gas sector in 1989, the 183 direct employment jobs would result in a personal income totalling

\$5,755,500. This is a 9 percent increase in wage income in the oil and gas sector. The total 403-job increase is expected to generate an additional \$9,972,900 of income in the district (a .18 percent increase in the total covered wage income for the district in 1989). Based on the changes in oil and gas production, revenues, employment, and income, negligible changes would occur to the economy at the production levels projected for this alternative.

Farmington Resource Area

Except for the amount, the impacts to oil and gas development would be the same type as those identified for the district. Impacts associated with the development and production of oil and gas resources under this alternative are quantified for the Farmington Resource Area in Table 4-2.

Rio Puerco Resource Area

Except for the amount, the impacts to oil and gas development would be the same type as those identified for the district. Impacts associated with the development and production of oil and gas resources under this alternative are quantified for the Rio Puerco Resource Area in Table 4-2.

Taos Resource Area

Except for the amount, the impacts to oil and gas development would be the same type as those identified for the district. Impacts associated with the development and production of oil and gas resources under this alternative are quantified for the Taos Resource Area in Table 4-2.

VISUAL RESOURCES

Albuquerque District

The type of visual impacts caused by oil and gas leasing and development under this alternative would be the same as those discussed for the No Action Alternative. Under the Production Alternative, the total disturbance for 4,812 wells in the next 20 years would be 31,308 acres. Most of the disturbance and associated impacts to

visual resources and scenic quality would occur in the Farmington Resource Area as limited development is projected to occur in the Rio Puerco and Taos Resource Areas.

Under the Production Alternative, oil and gas acreage would be open to leasing under STCs. Standard operating procedures would be employed under this alternative without particular regard for visual resources. The STCs lack the minimum controls necessary for the achievement of VRM objectives and the protection of visual resources.

However, because the quality of scenic resources found on lands open to leasing and development does not usually require special protection measures, significant failure to achieve VRM objectives is not likely to occur. Additionally, a portion of this acreage has been identified as having low or no potential for oil and gas occurrence. Little or no impact is expected to occur to the scenic quality in areas with limited potential for oil and gas development. Development is projected to occur in the high-intensity oil and gas development region of each resource area. On acreage removed from future leasing by laws, Executive Orders, or similar actions full achievement of VRM objectives would be possible.

Farmington Resource Area

Under this alternative, more acreage would be open with STCs than under the No Action Alternative. The STCs lack the controls necessary for the achievement of VRM objectives and the preservation of visual resources, especially in VRM Class I and II areas.

VRM Class I Areas

Under this alternative the unleased portion of three Class I SMAs (Carracas Mesa, Negro Canyon, and Thomas Canyon) in the high-intensity development region would be open to leasing under STCs. The VRM objective to maintain a natural appearing landscape would not be achieved on the unleased portion (2,346 acres) of the Carracas Mesa SMA nor on 1,290 unleased acres of the Negro Canyon SMA. The assigned VRM Class I management objectives would also not be met on the unleased (public

land) portion of the Thomas Canyon SMA (1,402 acres) if this acreage is leased and developed under STCs. The impacts on the Bisti and De-na-zin Wilderness Areas would be the same under this alternative as those described for the No Action Alternative.

VRM Class II Areas

Under the Production Alternative, 219 acres of unleased lands in the Simon Canyon SMA and 2,270 acres of unleased lands in the Chacra Mesa SMA that are closed to leasing would be open under STCs. A total of 7,692 acres within these two SMAs contain leases held by production when the areas were designated. Class II management objectives are expected to be exceeded in these two SMAs due to the amount of contrast resulting from landform and vegetative disturbance, as well as the introduction of oil and gas structures into the natural landscape.

Approximately 94 percent of the Angel Peak SMA is leased and contains about 113 wells. The 500-acre Angel Peak ACEC (within the SMA) and 142 acres of the SMA would also be open to leasing under this alternative. Because of the topography of Angel Peak, VRM Class II management objectives are unlikely to change and could be met only on the 500-acre ACEC. The current well density in the rough badlands terrain of the SMA causes contrasting changes in the characteristic landscape; these changes exceed the management objectives for this visual class, and additional wells would cause similar changes with the same results. VRM Class II objectives would not be met on 21,690 acres of land that were leased before the four areas were designated as SMAs.

The Ah-shi-sle-pah WSA is assigned VRM Class II. If the area was designated wilderness, it would be reclassified as a VRM Class I area. If the area was not designated wilderness, it would be open to leasing under STCs.

Rio Puerco Resource Area

The assigned VRM Class I and II management objectives would be met on 213,600 acres within four SMAs (the Cebolla Wilderness, West Malpais Wilderness, Chain of Craters WSA, and El Malpais NCA). These objectives would be

met as the result of the legislation that closed the areas to leasing. Approximately 48 percent (102,400 acres) of these areas is Class I, with the remaining 52 percent (111,200 acres) designated as Class II. The quality of the visual resources would be protected.

Although 39,803 acres of the SMAs, WSAs, and ACECs located in the low-intensity development region are open to leasing, achievement of the VRM Class II objectives would likely occur. In the low-intensity development region, the density of wells is expected to be low after mitigation measures are instituted to avoid or reduce localized visual impacts.

If the nine WSAs in this resource area (112,227 acres) were designated as wilderness, they would be reclassified as VRM Class I areas and permanently withdrawn from leasing. If they were not designated wilderness, they would be open to leasing under STCs. Class II management objectives would not be met on these areas under STCs, especially on the 70,475 acres in five WSAs located in the high-intensity development region.



Taos Resource Area

Visual resource values have not been determined for the high-intensity development region of this resource area. The localized visual impacts in the high-intensity development region would be considered on a case-by-case basis in the permitting process for APDs. With the projected 10 wells and 276 acres of disturbance distributed over 95,600 acres, in the high-intensity development region, the effects on sensitive visual resources would not be noticeable.

Within the region of low-intensity development, the maintenance of visual quality is a concern in some management areas. VRM classes have been assigned to these areas. Under this alternative, VRM Class II lands would be open to leasing and/or development under STCs. Approximately 33,000 acres under VRM Class II (WSAs) and 18,000 acres under VRM Class I (Wild and Scenic Rivers) are protected by the legislative closure of these areas to leasing.

Within the 1,378,000 oil and gas acres, of the low-intensity development region, 21 wells (1 well per 65,619 acres) are projected to be drilled

in the next 20 years. As the result of the relatively low density and this distribution of disturbance, the impacts to visual resources would be localized and negligible.

RECREATION

Albuquerque District

The general description of impacts to recreation caused by oil and gas operations in the district applies to the Production Alternative as well as the No Action Alternative. However, the recreational settings, opportunities, and values in SMAs, identified in the RMPs would be altered under the Production Alternative. The cumulative effect would be a greater decline in the area available to users who prefer undeveloped settings and a greater increase in the area available to users who prefer more developed types of settings.

Farmington Resource Area

Under this alternative, nine SMAs (eight in the high-intensity development region and one in the low-intensity development region) would be affected by new oil and gas development. A total of 89,661 acres is included in these SMAs. Leasing within the eight SMAs in the high-intensity development region occurred before these areas were designated. The amount leased within these SMAs ranges from 15 to 100 percent. The remaining 5,081 unleased acres in these SMAs would be open to leasing under STCs. Development under STCs would result in greater surface disturbances, which would

adversely impact the recreational setting and experiences as described for the No Action Alternative, but on more acres.

Rio Puerco Resource Area

Implementation of this alternative would affect six SMAs (76,553 acres) in the high-intensity development region and eight SMAs (254,675 acres) in the low-intensity development region. In the high-intensity development region, four SMAs (6,078 acres) would be open to leasing under STCs. The remaining five SMAs (70,475 acres in WSAs) in the high-intensity development region would be closed to leasing.

Under this alternative, the amount of acreage open to leasing and/or development under STCs would increase. However, with one well drilled on every 56,762 acres, impacts to the recreational setting and opportunities are expected to be minimal. Development is expected to occur in areas of low visitor use, dispersed use, and outside SMAs.

Taos Resource Area

Within the high-intensity development region, most of the federal oil and gas acres underlie private surface. Ten wells are projected to be drilled in the high-intensity development region in the next 20 years, most likely on private land. Because recreation use on public lands in this area is minimal and dispersed, adverse impacts from oil and gas activities are not anticipated.

Recreation management areas are located in the low-intensity development region, concentrated in Rio Arriba and Taos Counties. The RFD projection is for two wells in these counties during the 20-year life of this plan amendment.

Management areas such as the Rio Grande and Rio Chama Wild and Scenic Rivers are legislatively closed to leasing. The Wild Rivers Recreation Area, Santa Cruz Lake, Guadalupe Mountain ACEC, and Racecourse ACEC would be open to leasing and development under STCs. However, the recreation setting and opportunities are not likely to be adversely affected by oil and gas development in this resource area. Even though oil and gas activities would likely occur in areas of dispersed recreation oppor-

tunities, the extent of recreational impacts would be minimal with the drilling of 21 wells in the next 20 years.

WILDERNESS STUDY AREAS

Albuquerque District

During the period of wilderness review for the thirteen Wilderness Study Areas (WSAs) in the Albuquerque District, these WSAs their total of 151,790 acres are closed to new oil and gas leasing and development. No impacts would occur to these areas while they are under study.

Should Congress decide to release WSAs from further study and designation, adverse impacts to the wilderness values may occur on a portion of these lands. Depending on the amount and type of activity that occurs with oil and gas leasing, and development the areas' wilderness values of solitude, naturalness, and primitive or unconfined recreation opportunities could be impaired or lost.

Farmington Resource Area

The Farmington Resource Area contains one 6,563-acre WSA in the low-intensity development region. The Ah-shi-sle-pah WSA has been closed to oil and gas leasing since 1982. Although the WSA is closed to leasing, leases were issued on 67 percent (4,400 acres) of the WSA before 1982. Unless they are suspended or held by production, the post-1976 leases are expected to expire by 1994.

If this WSA was designated as wilderness, its 6,563 acres would be permanently withdrawn from mineral leasing. Any leases with valid existing rights would be managed under the principle of nondegradation of wilderness values.

If Ah-shi-sle-pah is not designated wilderness, the unleased portion of the WSA would be leased under STCs. Oil and gas development, if it occurs, would result in the loss of wilderness values, including naturalness and opportunities for solitude, wherever wells are drilled and put into production.

Rio Puerco Resource Area

Of the nine WSAs (approximately 112,227 acres) in this resource area, five (approximately 74,560 acres) occur in the high-intensity development region and four WSAs (approximately 41,752 acres) in the low-intensity development region. Although these WSAs have been closed to leasing since 1982, leases were issued on a portion of them before that date. In the high-intensity development region, approximately 65 percent of the 74,560 acres were leased. Unless they are suspended or held by production, the post-1976 leases are expected to expire by 1994.

If these WSAs were designated wilderness, they would be permanently withdrawn from leasing. Any pre-1976 leases or leases with valid existing rights would be managed under the principle of nondegradation of wilderness values.

Should Congress not designate these areas (partially or wholly) as wilderness, unleased portions would be open to leasing under STCs. The development of five wells (65 acres of surface disturbance) on 52,000 acres in the high-intensity development region in Sandoval County would result in a localized loss of wilderness values (naturalness and opportunities for solitude). With one well (13 acres) projected to be drilled on 41,752 acres of the WSAs, wilderness values are expected to be negligibly impacted in the low-intensity development region.

Taos Resource Area

Three WSAs (approximately 33,000 acres) are located in the low-intensity development region of this resource area. These WSAs have been closed to oil and gas leasing since 1982, but leases were issued on a portion of them before 1982. Unless they are suspended or held by production, the post-1976 leases are expected to expire by 1994.

If these WSAs were designated wilderness, they would be permanently withdrawn from leasing. Any pre-1976 leases or leases with valid existing rights would be managed under the principle of nondegradation of wilderness values.

Should Congress not designate these areas (partially or wholly) as wilderness, unleased portions

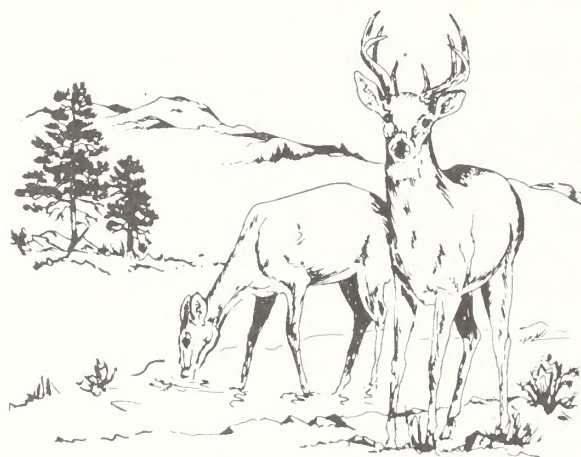
would be open to leasing and development under STCs. Any development in these areas would result in a localized loss of wilderness values (naturalness and opportunities for solitude).

WILDLIFE

Albuquerque District

The acreage of critical winter habitat for deer, elk, and antelope, as well as the estimated populations of these animals, are discussed in the No Action Alternative. The types of impacts would be similar; a reduction in critical winter habitat acreage could result in lower big game population numbers. Under the Production Alternative, the population would be reduced by as many as 308 deer, 202 elk, and 61 antelope.

Under this alternative, STCs would continue to be applied to most non-sensitive wildlife areas. The limitations of the STCs for wildlife habitat management are discussed under the No Action Alternative.



Farmington Resource Area

Areas of Special Concern

Three portions of the Farmington Resource Area require special attention, including bald eagle use areas, raptor use areas, and river tracts. These areas are in the high-intensity development region of the resource area. Development of oil and gas resources in bald eagle use areas is evaluated on a case-by-case basis according to

the consultation requirements of Section 7 of the Endangered Species Act.

Raptor use areas are located throughout the central portion of the resource area, which is open to leasing under STCs. Most of the raptor use areas are located in the resource area's low-intensity development region. As explained in the No Action Alternative, it is assumed that well development would not occur near nesting sites.

The 39 tracts in the River Tracts SMA would also be open to leasing and/or development under STCs. The BLM would require the lessee to provide berms, channels, dikes, and holding pits to prevent fluids and contaminated runoff from polluting riparian habitat.

Outside Areas of Special Concern

The acres of disturbance, rate of disturbance, and type of wildlife impacts under this alternative would be the same as those identified for the No Action Alternative. Population numbers are estimated at 2,400 deer; 1,000 elk; and 100 antelope in the high-intensity development region. A reduction in critical winter habitat acreage could result in a lower big game population numbers. Under the Production Alternative, the populations would be reduced by as many as 298 deer, 124 elk, and 12 antelope. Areas outside critical elk and antelope wildlife habitat would remain open to leasing and development under STCs.

Rio Puerco Resource Area

The amount of disturbance and type of impacts under the Production Alternative would be the same as those described for the No Action Alternative. Population numbers are estimated at 140 deer and 200 elk in the high-intensity development region of this resource area. Under this alternative, the populations would be reduced by as many as 4 deer and 5 elk.

Taos Resource Area

The amount of disturbance and type of impacts under the Production Alternative would be the same as those described for the No Action Alternative. Population numbers are estimated at 150

deer; 1,500 elk; and 1,000 antelope in the low-intensity development region. A reduction in critical winter habitat acreage could result in lower big game population numbers. Under this alternative, the populations would be reduced by as many as 7 deer, 73 elk, and 40 antelope.

THREATENED AND ENDANGERED (T&E) AND OTHER SPECIAL STATUS PLANT AND ANIMAL SPECIES

As discussed in Alternative A: (No Action), all BLM actions will be evaluated for potential effects on T&E and other Special Status Species (Federal Candidate and State Listed).

Because the BLM is committed to complying with the ESA, other applicable laws, regulations, policies, and manual requirements, the development of oil and gas under any alternative will not be allowed to occur where such development would effect T&E or other Special Status Species or their habitats.

SOILS AND HYDROLOGY

Albuquerque District

Oil and gas development is not expected to adversely impact soils or surface and ground water in the Taos and Rio Puerco Resource Areas. Applying management constraints such as Standard Lease Terms and Conditions, special lease stipulations, and site specific conditions of approval, would prevent degradation to soils, and surface and ground water.

Projected oil and gas development in the Farmington Resource Area would add to the existing network of lease roads, pipelines (both gas and water disposal), and well pads, in the Resource Area. Exploration and production activities would remove vegetation and increase soil disturbances that cause erosion and increase sediment delivery to surface waters. Oil spills and produced water discharges could contaminate soils, surface water, and near surface fresh water aquifers.

Ground water contamination during drilling operations could occur if circulation of the drilling materials is lost or water-bearing formations are improperly cemented and cause inter-aquifer mixing. Older wells, which were improperly cased and cemented, could leak and impact mineralized or ground water bearing formations.

The above potential impacts, in the Farmington Resource Area, are minimized or eliminated by the application of standard mitigation requirements and additional protective measures developed to address drilling and operational problems encountered in the San Juan Basin.

The following appendices contain mitigation measures, operational requirements, and soil/water conservation practices, currently being implemented in the Farmington Resource Area:

Appendix B-1, Uniform Format For Oil And Gas Lease Stipulations and Form 3100-11, Offer To Lease And Lease For Oil And Gas.

Appendix B-3, Conditions of Approval (COAs), Common To All Alternatives.

Appendix B-6, Soil and Water Conservation Practices.

Appendix D, Fruitland Formation Produced Water Disposal.

Appendix L, Requirements to Operate On Federal And Indian Leases: Casing and Cementing Requirements.

Appendix D-2, Oil And Gas Spill Prevention Plan Requirements And Reclamation Procedures For Produced Water Spills From Fruitland Coal Wells.

Soil and Surface Water

The drilling of 48 wells in the Rio Puerco Resource Area and 31 wells in the Taos Resource Area would result in negligible soil and water impacts. However, the drilling of 4,733 wells in the Farmington Resource Area would result in long-term disturbances to soil and water. About 50% of the area disturbed in well development is not required for production

and is rehabilitated. Mitigation measures for the protection of soil and water resources are implemented and continued for the life of the well. When a well is abandoned the site is rehabilitation. A model was used to estimate the potential for sediment yield in acre feet/square mile/year from a bare soil surface. While there is no data as to the actual amount of reduction in sediment yield from mitigation measures (soil and water conservation practices) an estimate of 50 to 70 per cent efficiency was assumed. Also 3 per cent of the sediment yield is assumed to be salts.

The Controlled Surface Use and No Surface Occupancy constraints limit or prohibit surface disturbing actions within SMAs. Under the No Surface Occupancy Constraint, a limited amount of development would occur adjacent to SMAs in areas open to leasing and/or development with mitigation practices applied. Even with the application of these constraints, long-term surface disturbances (well pads and roads) would remain for 20 to 30 years. However, for wells drilled under the Controlled Surface Use or No Surface Occupancy Constraints, such impacts would occur outside SMAs. In Farmington Resource Area an estimated 20 wells per year would be drilled on or adjacent to SMAs. This amounts to 9% of the total number of new wells with a projected sediment yield of 0.09 to 0.15 acre feet per year. The salt contribution would range from 4 to nearly 7 tons per year.

The drilling of an additional 4,812 wells (including 20 in SMAs) would result in 31,308 acres of new surface disturbance at the rate of 5 percent per year (1565 acres) for the next 20 years. Only 50 to 55 % of the disturbed area is needed for production after a well is completed. The unneeded area is rehabilitated and would reduce sediment yields. The potential sediment yield on the remaining acres, would be about 0.54 to 0.90 acre feet per year. The salt contribution would range from 25 to 41 tons per year. Increased sedimentation could degrade water quality and affect the whole chain of aquatic life, from plants to invertebrates to fish. sediment also destroys spawning habitat, eggs and fry, as well as invertebrates which are the foundation of the aquatic food pyramid. Water temperatures could increase and dissolved

oxygen concentrations would be reduced, both of which could cause direct mortalities to fish and other aquatic life. Salts and trace elements could have a significant and long-lasting effect by making the water unsuitable for livestock, wildlife, agriculture, industrial, and municipal drinking water.

Ground Water

The following actions associated with oil and gas development that could lead to ground water impacts occur in the Albuquerque District and are common to all alternatives.

Because of the negligible number of wells projected for the Taos and Rio Puerco Resource Areas, no impacts to ground water are anticipated. Applying standard mitigation measures, i.e., lease stipulations and conditions of approval, would protect all useable ground water aquifers.

Within the Farmington Resource Area, because of existing development and the projected number of additional wells to be drilled during the next 20 years, activities associated with oil and gas development could have adverse impacts to ground water.

Produced water and waste fluids associated with oil and gas operations could potentially impact aquifers. Drilling fluids and/or produced water could percolate from unlined pits into shallow aquifers. Brine drilling mud and produced water contain high concentrations of salts (sodium and chloride); produced water may also contain heavy metals and aromatic hydrocarbons.

Further ground water impacts could occur from leaking well-casings, either from older wells with corroded casing or from new wells which are improperly cased or cemented.

Recent increased coal-bed methane development in the Farmington Resource Area has prompted concern in the proper disposal of large quantities of produced water. The preferred method of disposal for large quantities of produced water is by underground injection. Generally, produced water disposed into authorized disposal wells will not cause ad-

verse impacts to shallow useable aquifers. (See Appendix D)

Farmington Resource Area

Soil and Surface Water

*The drilling of 4,733 wells would result in 29,818 acres of new disturbance at the rate of 5 percent per year (1491 acres) for the next 20 years. This would produce an estimated 0.48 to 0.8*acre feet per year sediment yield from new areas of production. The additional salt contribution would be 22 to 36 tons per year.*

Ground Water

The United States Geological Survey has identified nine aquifers in the San Juan Basin which are a source of water for public-supply, commercial, private-domestic, and livestock use in areas where drilling depths and pumping levels are economically feasible and where water quality is suitable (USGS Regional Aquifer-System Analysis Program). Possible pathways for the contamination of the above aquifers from oil and gas development include: (1) reserve pit and/or produced water leakage and percolation into shallow aquifers, and (2) contamination of aquifers as a result of well-casing failure. The following mitigation measures, developed to protect ground water contamination, are currently being implemented in the Albuquerque District, with additional protective measures identified for the Farmington Resource Area.

Notice to Lessee - 2B (NTL-2B) specifies informational and procedural requirements for submittal of an application for the disposal of produced water, and the design, construction and maintenance requirements for disposal pits. Selected requirements for injection wells, lined and unlined pits, and other disposal methods include:

(a) Injection wells: An operator shall obtain an Underground Injection Control (UIC) permit pursuant to 43 CFR Parts 144 and 146 from the EPA or the State/Tribe where the State/Tribe has achieved primacy as listed in 43 CFR Part 147. The injection well shall be designed and drilled or conditioned in accordance with the requirements and standards

described in Onshore Order No.2 and pertinent NTLs, as well as the UIC permit.

(b) Lined Pit: An operator shall submit schematics showing pit dimensions, cross section, leak detection device, and location. Water quality information must include: (1) Daily quantity of water to be disposed of and a water analysis that includes concentrations of chlorides, sulfates, pH, TDS, and toxic constituents that the authorized officer reasonably believes to be present, (2) method and schedule for periodic disposal of precipitated solids, and a copy of the appropriate disposal permit, and (3) type, thickness, and life span of material to be used for lining the pit and method of installation.

(c) Unlined Pits: An operator shall submit schematics showing dimensions, cross sections, and location. Water quality information shall include: (1) daily quantity of water to be disposed of and a water analysis that includes TDS, pH, oil and grease content, the concentrations of chlorides and sulfates and other parameters or constituents toxic to animal or plant life as determined by the authorized officer, (2) estimated depth and areal extent of the shallowest aquifer with TDS of 10,000 ppm or less.

(d) Other Methods: For off-lease disposal of produced water, the operator must submit an application for removal of the water together with a copy of the approval for the disposal facility.

Protection of near surface aquifers during drilling operations is addressed in Onshore Order No. 2- Drilling Operations. In addition to the above order, the BLM, in cooperation with New

Mexico Oil Conservation Division (NMOCD), has developed special casing and cementing requirements specifically addressing the protection or isolation of all useable water zones (water quality with TDS of 10,000 ppm or less) and hydrocarbon bearing zones in the San Juan Basin. See Appendix L, NTL-FRA 90-1, Casing and Cementing Requirements, for casing and cementing details.

Casing integrity of older wells is monitored by NMOCD. NMOCD has a monitoring program that has been in place for approximately 10 years. This program conducts Bradenhead tests

for all wells in the San Juan Basin. Each year approximately one third of all wells in the basin are tested. In addition to the NMOCD program, BLM Fluid Minerals Inspection and Enforcement staff regularly inspect Federal and Indian well facilities for environmental, site security, and safety compliance(See Appendix B-7, Proposed FY92 Farmington Oil and Gas Inspection and Enforcement Strategy). Well facilities found to be in noncompliance are identified for remedial action.

Rio Puerco Resource Area

Soil and Surface Water

The drilling of 48 wells would result in 634 acres of new disturbance, at the rate of 5 percent per year(31 acres) for the next 20 years. The sediment yield is estimated to be 0.02 to 0.03 acre feet per year. The salt contributions would be negligible, from 0.9 tons per year to 1.6 tons per year.

Ground Water

Because of the negligible number of wells projected for the Rio Puerco Resource Area, no impacts to ground water are anticipated. Applying standard mitigation measures, i.e., lease stipulations and conditions of approval, would protect all useable ground water aquifers.

Taos Resource Area

Soil and Surface Water

The drilling of 31 wells would result in 856 acres of new disturbance, at the rate of 5 percent per year(43 acres) for the next 20 years. The sediment yield is estimated to be 0.03 to 0.4 acre feet with salt contributions ranging from 1.2 to 2.0 tons per year.

Ground Water

Because of the negligible number of wells projected for the Taos Resource Area, no impacts to ground water are anticipated. Applying standard mitigation measures, i.e., lease stipulations and conditions of approval, would protect all useable ground water aquifers.

CULTURAL RESOURCES

Albuquerque District

Continued oil and gas development will result in increased impacts to cultural resources, particularly in the high-intensity development region in the Farmington Resource Area. The RFD projection for disturbance in the Albuquerque District as the result of oil and gas development is 31,308 acres. Of this amount, approximately 95 percent (29,818 acres) is projected to occur in the Farmington Resource Area. Projected disturbed acres for the Rio Puerco and Taos Resource areas are 634 and 856 respectively. The average projected *acres per well* in San Juan County (233 acres) is the lowest *density* interval of any of the counties in the Albuquerque District. The second lowest is Rio Arriba County at one well projected for every 263 acres.

Under the Production Alternative, the impacts of oil and gas leasing and development would be of the same type described for the No Action Alternative. Mitigation and compliance procedures would also be the same.

Farmington Resource Area

The current level of oil and gas development in the Farmington Resource Area limits the ability to avoid cultural sites by moving oil and gas facilities. Site locations for new wells, roads, and pipelines are impaired by topography, existing facilities, and legal requirements for well siting. As the result, an increased number of cultural sites are being identified and impacted by development. Figures compiled by the Farmington Resource Area (refer to Table 4-3) show a dramatic increase in the volume of applications and the number of cultural sites identified during pre-project field inventories.

Under the Production Alternative the mitigation and data recovery issues discussed for the No Action Alternative would also apply. The number of sites requiring some form of mitigation would be approximately 1,578 over the 20-year life of this plan amendment, based on the projected drilling of 4,733 wells. Assuming an average mitigation cost of \$15,000 per site, an estimated \$23,670,000 would be required to mitigate these sites.

Rio Puerco Resource Area

Because of the limited amount of oil and gas development in this resource area, most cultural sites can be avoided by moving wells and other facilities. Additionally, the relocation of new wells, roads, and pipelines is not likely to be impaired by topography and existing facilities. The total cost for mitigating 16 sites (33 percent of 48 wells) is estimated at \$237,600.

Taos Resource Area

Because of the limited amount of oil and gas development in this resource area, most cultural sites can be avoided by moving wells and other facilities. Additionally, the relocation of new wells, roads, and pipelines would not be impaired by topography and existing facilities. The total cost for mitigating 11 sites (33 percent of 31 wells) is estimated at \$165,000.

PALEONTOLOGY

Albuquerque District

Oil and gas development under the Production Alternative would impact fossils in the same manner as the No Action Alternative. Except in the Fossil Forest RNA, leasing and development would occur under STCs in all district's special paleontological areas. Continuation of current management practices (described in the Continuing Management Guidance section of Chapter 2) should be adequate to avoid significant impacts to the paleontological resources in the district.

Impacts would be mitigated on a case-by-case basis.

Farmington Resource Area

Impacts to fossils under the Production Alternative would be the same as those described for the No Action Alternative.

Rio Puerco Resource Area

As described for the No Action Alternative, oil and gas development impacts on fossils in the SMAs of this resource area would be avoided.

Taos Resource Area

Twenty wells are projected to be developed in the low-intensity development region (1,550,280 acres) in the next 20 years. Therefore, development would not occur in the Sombrillo and Fun Valley SMAs. Paleontological clearances are required before any surface-disturbing activities occur.

FORESTRY

Albuquerque District

Under the Production Alternative, oil and gas development is expected to disturb 31,308 acres during the 20-year life of this plan amendment. Approximately 13.5 percent of this acreage would be forest or woodland. The forest and woodland disturbance is expected to result in the loss of 4,050 thousand board feet (Mbf) of lumber and 267,000 cords of fuelwood with a current stumpage value of \$3,379,900. Production losses would be long-term because of the length of the forest and woodland regeneration cycle. The types of forestry impacts discussed for the No Action Alternative would also apply to the Production Alternative.

Farmington Resource Area

The impacts would be of the same type as those discussed above and under the No Action Alternative for the Albuquerque District. The extent of impacts to forestry products in this resource area are presented in Table 4-4.

Rio Puerco Resource Area

The impacts would be of the same type as those discussed above and under the No Action Alternative for the Albuquerque District. The extent of impacts to forestry products in this resource area are presented in Table 4-4.

Taos Resource Area

The impacts would be of the same type as those discussed above and under the No Action Alternative for the Albuquerque District. The extent of impacts to forestry products in this resource area are presented in Table 4-4.

CUMULATIVE IMPACTS

This cumulative impact analysis identifies the impacts of oil and gas leasing and development within the Albuquerque District to the extent data is available. Included in this assessment are the cumulative impacts of 22,000 existing wells (producing and temporarily abandoned). It is estimated that these wells and the facilities associated with them have disturbed as many as **65,600** acres.

Also included in this assessment are the impacts of future development. The RFD projects that 9,660 wells will be developed during the next 20 years. These wells and associated facilities are expected to disturb an additional 62,790 acres. *Approximately 50 percent of these wells (4,812) are expected to be drilled on BLM-administered oil and gas. Of this amount, approximately half of this acreage would be reclaimed after wells are put into production. Additionally, wells will be permanently abandoned at approximately the same rate as wells are drilled.*

Approximately 98 percent of future development is expected to occur in areas within the San Juan Basin that have already been developed. Therefore, it is likely that the acreage reclaimed after well abandonment and rehabilitation will equal the new acreage disturbed, so little or no net disturbed acreage change will occur. Thus, the total area disturbed would continue to be about **65,600** acres.

The beneficial impacts associated with the projected development would be that jobs, personal income, and government revenues associated with federal oil and gas development would continue near current levels. It is unlikely that a measureable net change would occur.

VRM classes were not assigned when most of the existing development took place. Areas of private, state, and other ownership also have no VRM classes assigned. Visual resource impacts are measured in terms of acres lost from a specific VRM class. Approximately 13,230 acres of VRM Class I acres and 20,421 acres of VRM Class II areas would be affected by projected federal oil and gas development and would result in long-term surface impacts due to well pads and roads.

The acreage available for undeveloped types of recreation would be reduced by some amount greater than the 65,600 acres of existing disturbance. The amount of this additional acreage would depend on the users' attitudes toward the disturbance of their recreation experience. Undeveloped campsites affected would be a relatively small part of the disturbed acres.

Wilderness Study Areas (WSAs) cover 151,790 acres within the district; part of this acreage was leased before WSA designation. Because the BLM is committed to protecting the WSAs wilderness values until Congress acts on formal designation, it is unlikely these values would be impacted. If Congress releases any of this acreage from further wilderness consideration, and it is not protected by another type of special management designation (e.g., SMA or ACEC status), it would be subject to oil and gas development under STCs. Disturbance could occur on up to 31,600 acres (21 percent) of the WSA acreage.

Critical big game winter range (122,000 acres) was identified in the high-intensity development region. The estimated impacts of projected BLM oil and gas development (possible loss of 308 deer, 202 elk, and 61 antelope) could be doubled if development on non-BLM administered oil and gas was considered. Half the wells projected to be developed adjoining BLM critical habitat on surface administered by other than the BLM.

An estimated 148 acre feet of sediment per year is produced from oil and gas activities on BLM

administered oil and gas. Surface disturbance on 1565 acres each year would add between 0.5 to 0.9 acre feet of sediment and 24 to 41 tons of salts to the aquatic environment.

The impacts on cultural resources would be both positive and negative. The positive impacts would result from site identification and recovery. Negative impacts would include site damage from development, vandalism to known locations, and improved access. The number of sites identified or recovered as the result of existing oil and gas development is not known. However, recent studies indicate that, on average, one site would be discovered for each well and associated facilities that are developed, and one-third of these sites would require recovery. As many as 9,660 sites may be located, with recovery taking place on as many as 1,600 of these sites. (The BLM cannot require site recovery on non-BLM-administered surface.)

Continuation of current management practices would prevent significant impacts to paleontological resources from federal oil and gas development. Data is not available on impacts from existing development, nor on potential impacts from projected non-federal development.

Forestry impacts related to existing oil and gas development and to non-BLM development are unknown. However, some loss of both timber and fuelwood would occur. Impacts expected from projected federal development would include the loss of 4,050 Mbf of timber and 267,000 cords of fuelwood with a stumpage value of \$3,379,900.

ALTERNATIVE C: PROPOSED ALTERNATIVE

OIL AND GAS

Albuquerque District

The discussions of management constraints, costs for operators, carbon dioxide production, locations of oil and gas wells, and directional drilling under the No Action Alternative also apply to the *Proposed* Alternative. Under the *Proposed* Alternative, RFD projections indicate that 4,543 wells would be drilled in the Farmington Resource Area, 47 in Rio Puerco, and 30 in Taos in the next 20 years. Both the Rio Puerco and Taos Resource Areas are considered to be "frontier" areas for oil and gas development. Although exploration activities continue to occur in these resource areas, significant oil and gas reservoirs have not been discovered.

Under this alternative, 233 wells would be developed per year for the life of the plan (refer to Table 4-2). Based on the historic data used to develop the RFD, it is estimated that 13.6 percent of these (31 wells) would be dry. The other 196 wells are expected to produce approximately 71,780 barrels of oil and 5,067,300 thousand cubic feet (Mcf) of gas per year. Based on 1989 oil and gas prices, this production would have a value of approximately \$9,398,300. Royalties paid on oil and gas production would amount to an estimated \$1,164,000. Based on 1989 county revenues (per well), it is estimated that 196 wells would generate annual county revenues of approximately \$878,900, a .97 percent increase over the 1989 revenue figures.

Development over 20 years would result in an increase of 173 jobs (direct employment) in the oil and gas sector. Assuming a 2.2 employment multiplier, an additional 207 jobs (indirect employment) would be created. The 380 jobs created would be an 8 percent increase over the 1989 oil and gas employment figure (a .13 percent increase over the total employment in the district in 1989).

Based on the average wage paid in the oil and gas sector in 1989, the 173 direct employment jobs would result in a personal income totalling

\$5,464,500. This is an 8 percent increase in wage income in the oil and gas sector.

The 380-job increase is expected to generate an additional \$9,424,700 of income in the district (a .17 percent increase in the total covered wage income for the district in 1989). Based on the changes in oil and gas production, revenues, employment, and income, negligible changes would occur to the economy at the production levels projected for this alternative.

Farmington Resource Area

Except for the amount, the impacts to oil and gas development would be the same type as those identified for the district. Impacts associated with the development and production of oil and gas resources under this alternative are quantified for the Farmington Resource Area in Table 4-3.

Rio Puerco Resource Area

Except for the amount, the impacts to oil and gas development would be the same type as those identified for the district. Impacts associated with the development and production of oil and gas resources under this alternative are quantified for the Rio Puerco Resource Area in Table 4-3.

Taos Resource Area

Except for the amount, the impacts to oil and gas development would be the same type as those identified for the district. Impacts associated with the development and production of oil and gas resources under this alternative are quantified for the Taos Resource Area in Table 4-3.

VISUAL RESOURCES

Albuquerque District

The type of visual impacts caused by oil and gas leasing and development under this alternative would be the same as those discussed for the No Action Alternative. Under the *Proposed* Alternative, the total disturbance for 4,543 wells in the next 20 years would be 29,578 acres. Most of

the disturbance and associated impacts to visual resources and scenic quality would occur in the Farmington Resource Area as limited development is projected to occur the Rio Puerco and Taos Resource Areas.

Under this alternative, most of the oil and gas acreage available for leasing and development would be open with STCs. Standard operating procedures would be employed under this alternative without particular regard for visual resources. The STCs lack the minimum controls necessary for the achievement of VRM objectives and the protection of visual resources.

However, because the quality of scenic resources found on lands open to leasing and development does not usually require special protection measures, significant failure to achieve VRM objectives is not likely to occur. Additionally, a portion of this acreage has been identified as having low or no potential for oil and gas occurrence. Little or no impact is expected to occur to the scenic quality in areas with limited potential for oil and gas development. Development is projected to occur in the high-intensity oil and gas development region of each resource area.

Farmington Resource Area

Except in SMAs and ACECs oil and gas development would occur under the BLM's STCs. The STCs lack the controls necessary for the achievement of VRM objectives and the preservation of visual resources, especially in VRM Class I and II areas.

VRM Class I Areas

Approximately 66 percent (4,654 acres) of the 7,000-acre Carracas Mesa SMA located in the high-intensity development region is leased. With 24 well locations (currently), VRM Class I management objectives would not be met in this portion of the SMA. The remaining 34 percent is closed to leasing under the Farmington RMP. Opening this portion of the SMA with a Controlled Surface Use Constraint would result in VRM Class I objectives not being achieved on the unleased portion (2,346 acres) of the SMA. Application of this less restrictive management constraint would alter the SMA's visual charac-

ter by allowing the development of 20 wells with associated disturbances.

Approximately 19 percent (310 acres) of 1,600-acre Negro Canyon SMA is leased and contains two wells. This SMA is located in the high-intensity development region. With the potential of additional wells being drilled on the existing lease(s), the assigned VRM Class I management objectives would not be met on the remaining 81 percent (1,290 acres) of public land.

Approximately 46 percent (2,108 acres) of the 4,360-acre Thomas Canyon SMA is leased and contains five wells. This SMA is located in the high-intensity development region, and VRM Class I objectives would not be met on the leased portion. Leasing this portion of the SMA with a Controlled Surface Use Constraint would affect the location of future wells. Up to 9 wells could be drilled in this SMA in the next 20 years, with an estimated 6.3 acres of disturbance for each well. However, the assigned VRM Class I management objectives would be met on the remaining, unleased portion (1,402 acres) of public land, which would remain closed to leasing.

VRM Class II Areas

Class II management objectives have been assigned as the result of Farmington RMP decisions to 14,051 acres in two SMAs (Simon Canyon and Angel Peak). Both SMAs are located in the low-intensity development region. The 13,110 acres of leased lands within these two SMAs contain existing leases held by production when the areas were designated.

Of the total, 861 acres (6 percent) are unleased. Closing these unleased areas to leasing would result in the assigned VRM Class II management objectives being met only on these portions of the SMAs. Class II management objectives would be exceeded on the leased acreage due to the amount of contrast resulting from landform and vegetative disturbance, as well as the introduction of structures into the natural landscape.

On the Chacra Mesa SMA, which is 64 percent leased, VRM Class II management objectives for the 2,270 unleased acres would not be met. The projected 7 wells in the next 20 years would

result in contrast changes in the characteristic landscape that would exceed the management objectives for this visual class.

The Ah-shi-sle-pah WSA, which is located in the low-intensity development region, is assigned VRM Class II. Should the WSA be designated wilderness, it would be reclassified as VRM Class I.

In addition to the protection conferred by wilderness designation (on 23,646 acres) in this resource area, visual resources in the above SMAs (11,452 acres) would be protected under both VRM Class I and II designations if the unleased acreage is closed to leasing. Achievement of VRM Class I and II objectives would not be met on 28,762 acres of land that were leased before the areas were designated.

Rio Puerco Resource Area

Class II management objectives are assigned to 112,227 acres in nine WSAs. Of this total, 70,475 acres (63 percent) are located in five WSAs in the high-intensity development region. The remaining 41,752 acres (37 percent) are located in four WSAs in the low-intensity development region.

If these WSAs were designated as wilderness, they would be reclassified as VRM Class I areas and permanently withdrawn from leasing. The visual resources in these nine WSAs would be protected. If they were not designated wilderness, these WSAs would be returned to multiple land use management and would be managed under other special area designations.

Class II management objectives (to retain the existing natural character of the landscape while allowing a low level of change that does not attract attention) have been assigned to 86,607 acres in seven SMAs, including the Ignacio Chavez, Empedrado, La Lena, Cabezon, Canon Jarido, Jones Canyon, and Elk Springs. These SMAs are located in the high-intensity development region. An additional 151,003 VRM Class II acres occur in seven SMAs in the low-intensity development region (Ojito, Petaca Pinta, Chain of Craters, El Malpais NCA, Tent Rocks, Bluewater Canyon, and Manzano).

VRM Class II objectives would be met on 58,130 acres of the SMAs and WSAs located in the low-intensity development region. Although this acreage is not closed to leasing, the low density of wells projected to be drilled in the next 20 years would cause visual impacts to be localized and dispersed throughout the resource area.

VRM Class II objectives would also be met on 73,077 acres of SMAs and WSAs located in the high-intensity development region. This acreage would be leased and developed with a No Surface Occupancy Constraint or closed to leasing.

However, VRM Class II objectives would not be met on 13,530 acres of SMAs and WSAs located in the high-intensity development region. Leasing and development on these lands would be Open with Timing (Seasonal) Limitations or under Controlled Surface Use. Under these management constraints, exploration and development would occur, resulting in surface disturbances. VRM Class II management objectives would be exceeded, primarily because of the amount of contrast that would result from landform and vegetative disturbance and the introduction of structures into the natural landscape.

The assigned VRM Class I and II management objectives would be met on 195,300 acres within three SMAs (the Cebolla Wilderness, West Malpais Wilderness, and El Malpais NCA) as the result of their being closed to leasing through legislative action. Approximately 52 percent of the acreage in these SMAs (102,400) in wilderness areas is under a Class I designation. The remaining 48 percent (92,900 acres) is Class II land located in the El Malpais NCA. All this acreage is within the low-intensity development region. The legislative closure protects the scenic quality of these areas.

Taos Resource Area

Visual resource values have not been determined for the high-intensity development region of this resource area. The localized visual impacts in the high-intensity development region would be considered on a case-by-case basis in the permitting process for APDs. With the projected 10 wells and 276 acres of disturbance distributed

over 95,600 acres in the high-intensity development region, the effects on sensitive visual resources would not be noticeable.

Within the region of low-intensity development, where the maintenance of visual quality is a concern in some management areas, VRM classes have been assigned to these areas. Under this alternative, 15,000 acres of VRM Class II lands would be protected through the application of the No Surface Occupancy Constraint. An additional 8,000 acres would be protected through the continued discretionary closure of this acreage. Approximately 18,000 acres under VRM Class II and 33,000 acres under VRM Class I designations are protected by the non-discretionary closure of these areas to leasing.

RECREATION

Albuquerque District

Oil and gas operations in the district would cause impacts to the recreation resource as described for the No Action Alternative.

Farmington Resource Area

Under this alternative, eight SMAs in the high-intensity development region and one in the low-intensity development region would be affected with a total of 58,294 acres. Leasing and development in the eight SMAs occurred before their designation. The extent of leasing ranges between 15 and 100 percent.

Of the unleased acreage in these SMAs (5,081 acres), 3,766 acres would remain closed to leasing. Closure would benefit existing recreation values and resources. A total of 500 acres would be leased with a No Surface Occupancy Constraint. An additional 585 acres would be leased with a Controlled Surface Use Constraint. These constraints would benefit the recreational setting and opportunities in these SMAs.

The remaining 230 acres would be open to leasing under STCs, which would result in greater surface disturbances and negatively impact the recreational setting and experience.

Recreational opportunities would be displaced or reduced. Depending on the location and magnitude of development and disturbances, the quality of the recreation setting and experience would be decreased during the life of the project.

Impacts on the corridor for the Continental Divide National Scenic Trail would be the same under this alternative as those described under the No Action Alternative.

Rio Puerco Resource Area

Under the *Proposed* Alternative, the impacts of oil and gas leasing and development on the recreation resources in this resource area would be the same as those described for the No Action Alternative, except no oil and gas activity would occur under STCs. The overall recreational opportunities would not be affected by the level of development projected to occur in this resource area.

Taos Resource Area

The impacts of oil and gas leasing and development on recreation resource in this resource area under the *Proposed* Alternative would be the same as those described under the No Action Alternative. The existing recreation setting and opportunities would not likely be adversely affected by oil and gas development. Even though oil and gas activities would likely occur in areas of dispersed recreation activity opportunities, the extent of recreational impacts would be minimal with the drilling of 20 wells in the next 20 years.

WILDERNESS STUDY AREAS

Albuquerque District

BLM policy for the WSAs would be the same under the *Proposed* Alternative as under the No Action Alternative. Since 1982, the Department of the Interior has been prohibited from issuing leases in areas under wilderness review. The WSAs in the Albuquerque District (totalling 151,790 acres) are closed to new oil and gas leasing, so no impacts would occur to these areas while they are under study.

If Congress decides to release areas from further wilderness study and designation, adverse impacts to the wilderness values may occur on a portion of these lands. Depending on the amount and type of oil and gas leasing activities, the wilderness values of solitude, naturalness, and primitive or unconfined recreation opportunities in these areas could be impaired or lost.

Farmington Resource Area

If the 6,563-acre Ah-shi-sle-pah WSA is not designated wilderness by Congress, the unleased portion of the WSA would be open to leasing and development under STCs. Adverse impacts to wilderness values would occur. Development on the leased portion of the WSA would also result in the loss of wilderness values, naturalness, and opportunities for solitude.

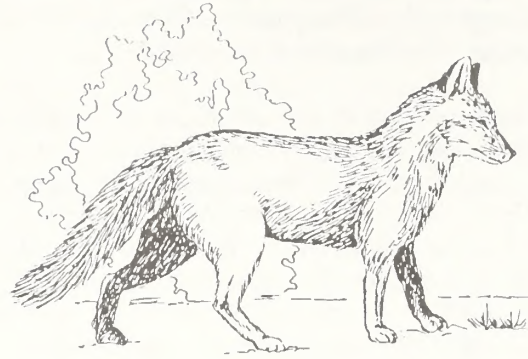
Rio Puerco Resource Area

While wilderness review continues, management of the nine WSAs in this resource area (totalling 112,227 acres) would be the same as under the No Action Alternative. If the areas were designated wilderness, they would be permanently withdrawn from leasing. If Congress releases any of this acreage from further wilderness considerations, and it is not protected by another type of special management designation (e.g., SMA or ACEC status), it would be subject to oil and gas development under STCs. Therefore, adverse impacts to wilderness values from leasing and/or development would occur.

Taos Resource Area

Three WSAs (approximately 33,000 acres), are located in the low-intensity development region of this resource area. Their management under WSA or designated wilderness status for this alternative would be the same as under the No Action Alternative.

If Congress releases any of this acreage from further wilderness considerations, and it is not protected by another type of special management designation (e.g., SMA or ACEC status), it would be subject to oil and gas development under STCs. Therefore, adverse impacts to wilderness values from leasing and development may occur.



WILDLIFE

Albuquerque District

The impacts and some of the management constraints for this alternative would be of the same type as those described for the No Action Alternative. Under the *Proposed* Alternative, STCs would continue to be applied for most areas.

Population numbers for deer, elk, and antelope could not be obtained for all BLM designated critical winter habitat in the district. Professional judgement and some game counts were used to develop the estimates for big game populations dependent on forage on public lands. Based on this information, an estimated 2,690 deer, 2,700 elk, and 1,200 antelope use public lands in the district. A reduction in critical winter habitat could result in lower big game numbers. Under the *Proposed* Alternative, the populations would be reduced by as many as 293 deer, 193 elk, and 59 antelope.

Farmington Resource Area

Areas of Special Concern

Raptor use areas are located in the low-intensity development region throughout the central portion of the resource area, which is open to leasing under STCs. Development of oil and gas resources in raptor use areas is evaluated on a case-by-case basis according to the candidate species policies and Section 7 consultation requirements. With 543 wells projected to be drilled in the low-intensity development region (1,254,020 acres) in the next 20 years, it is assumed that well development would not occur near nesting sites. As an added precaution, these

areas would be closed under this alternative to human activity during the nesting season (March 1 through June 30).

Outside Areas of Special Concern

A timing (seasonal) limitation would be applied to approximately 105,000 acres of critical deer and elk winter habitat. This constraint would allow the continued development of oil and gas resources and optimize the BLM's ability to manage the habitat for these species.

Population numbers for deer, elk, and antelope could not be obtained for all BLM designated critical winter habitat in the district. Professional judgement and some game counts were used to develop the estimates for big game population numbers dependent on forage on public lands. Based on this information, an estimated 2,400 deer; 1,000 elk; and 100 antelope use public lands in the high-intensity development region. A reduction in critical winter habitat could result in lower big game numbers. Under the *Proposed* Alternative, the populations would be reduced by as many as 282 deer, 118 elk, and 12 antelope.

Rio Puerco Resource Area

Areas of Special Concern

Population numbers for deer, elk, and antelope could not be obtained for all BLM designated critical winter habitat in the district. Professional judgement and some game counts were used to develop the estimates for big game population numbers dependent on forage on public lands. Based on this information, an estimated 140 deer and 200 elk use public lands in the high-intensity development region. No antelope population is known to occur at this time. A reduction in critical winter habitat could result in lower big game numbers. Under this alternative, the populations would be reduced by as many as 4 deer and 5 elk.

Taos Resource Area

Population numbers for deer, elk, and antelope could not be obtained for all BLM designated critical winter habitat in the district. Professional judgement and some game counts were

used to develop the estimates for big game population numbers dependent on forage on public lands. Based on this information, an estimated 150 deer; 1,500 elk; and 1,000 antelope use public lands in the low-intensity development region. A reduction in critical winter habitat could result in lower big game numbers. Under this alternative, the populations would be reduced by as many as 7 deer, 71 elk, and 47 antelope.



THREATENED AND ENDANGERED (T&E) AND OTHER SPECIAL STATUS PLANT AND ANIMAL SPECIES

As discussed in Alternative A: (No Action), all BLM actions will be evaluated for potential effects on T&E and other Special Status Species (Federal Candidate and State Listed).

Because the BLM is committed to complying with the ESA, other applicable laws, regulations, policies, and manual requirements, the development of oil and gas under any alternative will not be allowed to occur where such development would effect T&E or other Special Status Species or their habitats.

SOILS & HYDROLOGY

Albuquerque District

Oil and gas development is not expected to adversely impact soils or surface and ground water in the Taos and Rio Puerco Resource Areas. Applying management constraints such as Standard Lease Terms and Conditions, special lease stipulations, and site specific conditions of approval, would prevent degradation to soils, and surface and ground water.

Projected oil and gas development in the Farmington Resource Area would add to the existing network of lease roads, pipelines (both gas and water disposal), and well pads, in the Resource Area. Exploration and production activities would remove vegetation and increase soil disturbances that cause erosion and increase sediment delivery to surface waters. Oil spills and produced water discharges could contaminate soils, surface water, and near surface fresh water aquifers.

Ground water contamination during drilling operations could occur if circulation of the drilling materials is lost or water-bearing formations are improperly cemented and cause inter-aquifer mixing. Older wells, which were improperly cased and cemented, could leak and impact mineralized or ground water bearing formations.

The above potential impacts, in the Farmington Resource Area, are minimized or eliminated by the application of standard mitigation requirements and additional protective measures developed to address drilling and operational problems encountered in the San Juan Basin.

The following appendices contain mitigation measures, operational requirements, and soil/water conservation practices, currently being implemented in the Farmington Resource Area:

Appendix B-1, Uniform Format For Oil And Gas Lease Stipulations and Form 3100-11, Offer To Lease And Lease For Oil And Gas.

Appendix B-3, Conditions of Approval (COAs), Common To All Alternatives.

Appendix B-6, Soil and Water Conservation Practices.

Appendix D, Fruitland Formation Produced Water Disposal.

Appendix L, Requirements to Operate On Federal And Indian Leases: Casing and Cementing Requirements.

Appendix D-2, Oil And Gas Spill Prevention Plan Requirements And Reclamation Proce-

dures For Produced Water Spills From Fruitland Coal Wells.

Soil and Surface Water

The drilling of 48 wells in the Rio Puerco Resource Area and 31 wells in the Taos Resource Area would result in negligible soil and water impacts. However, the drilling of 4,733 wells in the Farmington Resource Area would result in long-term disturbances to soil and water. About 50% of the area disturbed in well development is not required for production and is rehabilitated. Mitigation measures for the protection of soil and water resources are implemented and continued for the life of the well. When a well is abandoned the site is rehabilitation. A model was used to estimate the potential for sediment yield in acre feet/square mile/year from a bare soil surface. While there is no data as to the actual amount of reduction in sediment yield from mitigation measures (soil and water conservation practices) an estimate of 50 to 70 per cent efficiency was assumed. Also 3 per cent of the sediment yield is assumed to be salts.

The Controlled Surface Use and No Surface Occupancy constraints limit or prohibit surface disturbing actions within SMAs. Under the No Surface Occupancy Constraint, a limited amount of development would occur adjacent to SMAs in areas open to leasing and/or development with mitigation practices applied. Even with the application of these constraints, long-term surface disturbances (well pads and roads) would remain for 20 to 30 years. However, for wells drilled under the Controlled Surface Use or No Surface Occupancy Constraints, such impacts would occur outside SMAs. In Farmington Resource Area an estimated 20 wells per year would be drilled on or adjacent to SMAs. This amounts to 9% of the total number of new wells with a projected sediment yield of 0.09 to 0.15 acre feet per year. The salt contribution would range from 4 to nearly 7 tons per year.

The drilling of an additional 4,542 wells (including 20 in SMAs) would result in 29578 acres of new surface disturbance at the rate of 5 percent per year (1479 acres) for the next 20 years. Only 50 to 55 % of the disturbed area is needed for

production after a well is completed. The unneeded area is rehabilitated and would reduce sediment yields. The potential sediment yield on the remaining acres, would be about 0.5 to 0.8 acre feet per year. The salt contribution would range from 23 to 37 tons per year. Increased sedimentation could degrade water quality and affect the whole chain of aquatic life, from plants to invertebrates to fish. sediment also destroys spawning habitat, eggs and fry, as well as invertebrates which are the foundation of the aquatic food pyramid. Water temperatures could increase and dissolved oxygen concentrations would be reduced, both of which could cause direct mortalities to fish and other aquatic life. Salts and trace elements could have a significant and long-lasting effect by making the water unsuitable for livestock, wildlife, agriculture, industrial, and municipal drinking water.

Ground Water

The following actions associated with oil and gas development that could lead to ground water impacts occur in the Albuquerque District and are common to all alternatives.

Because of the negligible number of wells projected for the Taos and Rio Puerco Resource Areas, no impacts to ground water are anticipated. Applying standard mitigation measures, i.e., lease stipulations and conditions of approval, would protect all useable ground water aquifers.

Within the Farmington Resource Area, because of existing development and the projected number of additional wells to be drilled during the next 20 years, activities associated with oil and gas development could have adverse impacts to ground water.

Produced water and waste fluids associated with oil and gas operations could potentially impact aquifers. Drilling fluids and/or produced water could percolate from unlined pits into shallow aquifers. Brine drilling mud and produced water contain high concentrations of salts (sodium and chloride); produced water may also contain heavy metals and aromatic hydrocarbons.

Further ground water impacts could occur from leaking well-casings, either from older wells with corroded casing or from new wells which are improperly cased or cemented.

Recent increased coal-bed methane development in the Farmington Resource Area has prompted concern in the proper disposal of large quantities of produced water. The preferred method of disposal for large quantities of produced water is by underground injection. Generally, produced water disposed into authorized disposal wells will not cause adverse impacts to shallow useable aquifers. (See Appendix D)

Farmington Resource Area

Soil and Surface Water

The drilling of 4,465 wells would result in 28,130 acres of new disturbance at the rate of 5 percent per year (1406 acres) for the next 20 years. This would produce an estimated 0.5 to 0.8 acre feet per year sediment yield from new areas of production. The additional salt contribution would be 22 to 36 tons per year.

Ground Water

The United States Geological Survey has identified nine aquifers in the San Juan Basin which are a source of water for public-supply, commercial, private-domestic, and livestock use in areas where drilling depths and pumping levels are economically feasible and where water quality is suitable (USGS Regional Aquifer-System Analysis Program). Possible pathways for the contamination of the above aquifers from oil and gas development include: (1) reserve pit and/or produced water leakage and percolation into shallow aquifers, and (2) contamination of aquifers as a result of well-casing failure. The following mitigation measures, developed to protect ground water contamination, are currently being implemented in the Albuquerque District, with additional protective measures identified for the Farmington Resource Area.

Notice to Lessee - 2B (NTL-2B) specifies informational and procedural requirements for submittal of an application for the disposal of

produced water, and the design, construction and maintenance requirements for disposal pits. Selected requirements for injection wells, lined and unlined pits, and other disposal methods include:

(a) Injection wells: An operator shall obtain an Underground Injection Control (UIC) permit pursuant to 43 CFR Parts 144 and 146 from the EPA or the State/Tribe where the State/Tribe has achieved primacy as listed in 43 CFR Part 147. The injection well shall be designed and drilled or conditioned in accordance with the requirements and standards described in Onshore Order No.2 and pertinent NTLs, as well as the UIC permit.

(b) Lined Pit: An operator shall submit schematics showing pit dimensions, cross section, leak detection device, and location. Water quality information must include: (1) Daily quantity of water to be disposed of and a water analysis that includes concentrations of chlorides, sulfates, pH, TDS, and toxic constituents that the authorized officer reasonably believes to be present, (2) method and schedule for periodic disposal of precipitated solids, and a copy of the appropriate disposal permit, and (3) type, thickness, and life span of material to be used for lining the pit and method of installation.

(c) Unlined Pits: An operator shall submit schematics showing dimensions, cross sections, and location. Water quality information shall include: (1) daily quantity of water to be disposed of and a water analysis that includes TDS, pH, oil and grease content, the concentrations of chlorides and sulfates and other parameters or constituents toxic to animal or plant life as determined by the authorized officer, (2) estimated depth and areal extent of the shallowest aquifer with TDS of 10,000 ppm or less.

(d) Other Methods: For off-lease disposal of produced water, the operator must submit an application for removal of the water together with a copy of the approval for the disposal facility.

Protection of near surface aquifers during drilling operations is addressed in Onshore Order

No. 2- Drilling Operations. In addition to the above order, the BLM, in cooperation with New

Mexico Oil Conservation Division (NMOCD), has developed special casing and cementing requirements specifically addressing the protection or isolation of all useable water zones (water quality with TDS of 10,000 ppm or less) and hydrocarbon bearing zones in the San Juan Basin. See Appendix L, NTL-FRA 90-1, Casing and Cementing Requirements, for casing and cementing details.

Casing integrity of older wells is monitored by NMOCD. NMOCD has a monitoring program that has been in place for approximately 10 years. This program conducts Bradenhead tests for all wells in the San Juan Basin. Each year approximately one third of all wells in the basin are tested. In addition to the NMOCD program, BLM Fluid Minerals Inspection and Enforcement staff regularly inspect Federal and Indian well facilities for environmental, site security, and safety compliance(See Appendix B-7, Proposed FY92 Farmington Oil and Gas Inspection and Enforcement Strategy). Well facilities found to be in noncompliance are identified for remedial action.

Rio Puerco Resource Area

Soil and Surface Water

The drilling of 47 wells would result in 620 acres of new disturbance, at the rate of 5 percent per year(31 acres) for the next 20 years. The sediment yield is estimated to be 0.01 to 0.015 acre feet per year. The salt contributions would be negligible, from 0.4 tons per year to 0.7 tons per year.

Ground Water

Because of the negligible number of wells projected for the Rio Puerco Resource Area, no impacts to ground water are anticipated. Applying standard mitigation measures, i.e., lease stipulations and conditions of approval, would protect all useable ground water aquifers.

Taos Resource Area

Soil And Surface Water

The drilling of 30 wells would result in 828 acres of new disturbance, at the rate of 5 per-

cent per year(41 acres) for the next 20 years. The sediment yield is estimated to be 0.01 to 0.2 acre feet with salt contributions ranging from 0.7 to 1.1 tons per year.

Ground Water

Because of the negligible number of wells projected for the Taos Resource Area, no impacts to ground water are anticipated. Applying standard mitigation measures, i.e., lease stipulations and conditions of approval, would protect all useable ground water aquifers.

CULTURAL RESOURCES

Albuquerque District

Continued oil and gas development would result in increased impacts to cultural resources, particularly in the high-intensity development region in the Farmington Resource Area. The RFD projection for disturbance in the Albuquerque District as the result of oil and gas development is 29,578 acres. Of this amount, approximately 95 percent (28,130 acres) is projected to occur in the Farmington Resource Area. Projected disturbed acres for the Rio Puerco and Taos Resource Areas are 620 and 828, respectively. The average projected space between wells in San Juan County (233 acres) is the lowest spacing interval of any of the counties in the Albuquerque District. The spacing inter-

val for Rio Arriba County is second lowest, at a projected well density of 1 well for every 263 acres.

Under the *Proposed* Alternative, the impacts of oil and gas leasing and development would be of the same type as those described for the No Action Alternative. Mitigation and compliance procedures would also be the same.

Farmington Resource Area

The current level of development in the Farmington Resource Area limits the ability to avoid cultural sites by moving oil and gas facilities. Site locations for new wells, roads, and pipelines are limited by topography, existing facilities, and legal requirements for well siting. As the result, an increased number of cultural sites are being identified and impacted by development. Figures compiled by the Farmington Resource Area (refer to Table 4-3) show a dramatic increase in the volume of applications and the number of cultural sites identified during pre-project field inventories.

Under the *Proposed* Alternative, the mitigation and data recovery issues discussed for the No Action Alternative would also apply. The number of sites requiring some form of mitigation would be 1,488 over the 20-year life of this plan amendment based on the projected drilling of



4,465 wells. Assuming an average mitigation cost of \$15,000 per site, an estimated \$22.3 million would be required to mitigate these sites.

Rio Puerco Resource Area

Because of the limited amount of oil and gas development in this resource area, most cultural sites can be avoided by moving wells and other facilities. Additionally, the relocation of new wells, roads, and pipelines is not likely to be impaired by topography and existing facilities. The total cost for mitigating 15 sites (33 percent of 47 wells) is estimated at \$225,000.

Taos Resource Area

Because of the limited amount of oil and gas development in this resource area, most cultural sites can be avoided by moving wells and other facilities. Additionally, the relocation of new wells, roads, and pipelines would not be impaired by topography and existing facilities. The total cost for mitigating 10 sites (33 percent of 30 wells) is estimated at \$150,000.

PALEONTOLOGY

Albuquerque District

Continuation of current management practices (described in the "Continuing Management Guidance" section of Chapter 2) would be adequate to avoid significant impacts to the paleontological resources in the district. Impacts would be mitigated on a case-by-case basis.

Farmington Resource Area

Impacts to the paleontological resources in this resource area would be the same under the *Proposed* Alternative as those described for the No Action Alternative.

Rio Puerco Resource Area

Impacts to the paleontological resources in the Torrejon Fossil Fauna ACEC, the Juana Lopez portion of the Elk Springs ACEC, and the Ball Ranch ACEC would be the same under this alternative as under the No Action Alternative. On the Ojito ACEC (13,657 acres) in the low-inten-

sity development region, a single well might be drilled. Paleontological clearances would be required before any surface-disturbing activities occur.

Taos Resource Area

Impacts to the paleontological resources in this resource area would be the same under the *Proposed* Alternative as those described for the No Action Alternative.

FORESTRY

Albuquerque District

The general impacts of oil and gas leasing and development would be the same under this alternative as those described under the No Action Alternative. Under the *Proposed* Alternative, oil and gas development is expected to disturb 29,578 acres during the 20-year life of this plan amendment. Approximately 13.5 percent of this acreage would be forest or woodland. The forest and woodland disturbance is expected to result in the loss of 3,830 thousand board feet (mbf) of lumber and 252,200 cords of fuelwood with a current stumpage value of \$3,192,600. Production losses would be long-term because of the length of the forest and woodland regeneration cycle.

Farmington Resource Area

The impacts would be of the same type as those discussed for the Albuquerque District. The extent of impacts to forestry products in this resource area are presented in Table 4-4.

Rio Puerco Resource Area

The impacts would be of the same type as those discussed for the Albuquerque District. The extent of impacts to forestry products in this resource area are presented in Table 4-4.

Taos Resource Area

The impacts would be of the same type as those discussed for the Albuquerque District. The extent of impacts to forestry products in this resource area are presented in Table 4-4.

CUMULATIVE IMPACTS

This cumulative impact analysis identifies the impacts of oil and gas leasing and development within the Albuquerque District to the extent data is available. Under the *Proposed* Alternative, the types of impacts would be the same as those that would occur under the *No Action* Alternative, although the quantity of impacts would be slightly less. Impacts from existing development would not be measurably different.

The impacts related to oil and gas development would be the result the drilling of 31,390 wells (22,000 existing; 9,390 projected) with associated facilities. Total area disturbed would continue to be about 65,600 acres. *Approximately 50 percent of these wells (4,542) are expected to be drilled on BLM-administered oil and gas.*

Visual resource impacts would include the loss of 7,072 acres under VRM Class I management and 17,432 acres under VRM Class II management. The impacts to Wilderness Study Areas would be the same under all alternatives (refer to the *No Action* Alternative).

Wildlife impacts would include the disturbance of critical winter habitat that could result in the loss of 293 deer, 193 elk, and 59 antelope.

An estimate 148 acre feet of sediment per year is produced from oil and gas activities on Public Lands. Surface disturbance on 1478 acres each year would add between 0.5 to 0.8 acre feet of sediment and 23 to 37 tons of salts to the aquatic environment.

Oil and gas development would result in the discovery of as many as 9,390 cultural sites, with recovery taking place on as many as 1,514 of them.

Continuation of current management practices would prevent significant impacts to paleontological resources from federal oil and gas development.

Forestry impacts related to existing oil and gas development (including non-BLM development) have not been estimated. However, some loss of both timber and fuelwood would occur. Impacts from projected federal development would in-

clude the loss of 5,150 Mbf of timber and 23,080 cords of fuelwood with a stumpage value of \$256,500.

MITIGATING MEASURES

Other than the management constraints applied, no specific mitigation measures have been identified in this RMP Amendment/EIS that would reduce the impacts of implementing any of the three alternatives. Mitigation is deemed necessary when the BLM begins implementing specific projects identified in the RMP Amendment/EIS. At that time, an environmental assessment identifying the environmental impacts of each project will be discussed and specific mitigation measures will be incorporated into the assessment to lessen those impacts. Therefore, mitigation measures will be incorporated on a site-specific basis as this RMP Amendment/EIS is implemented.

UNAVOIDABLE ADVERSE IMPACTS

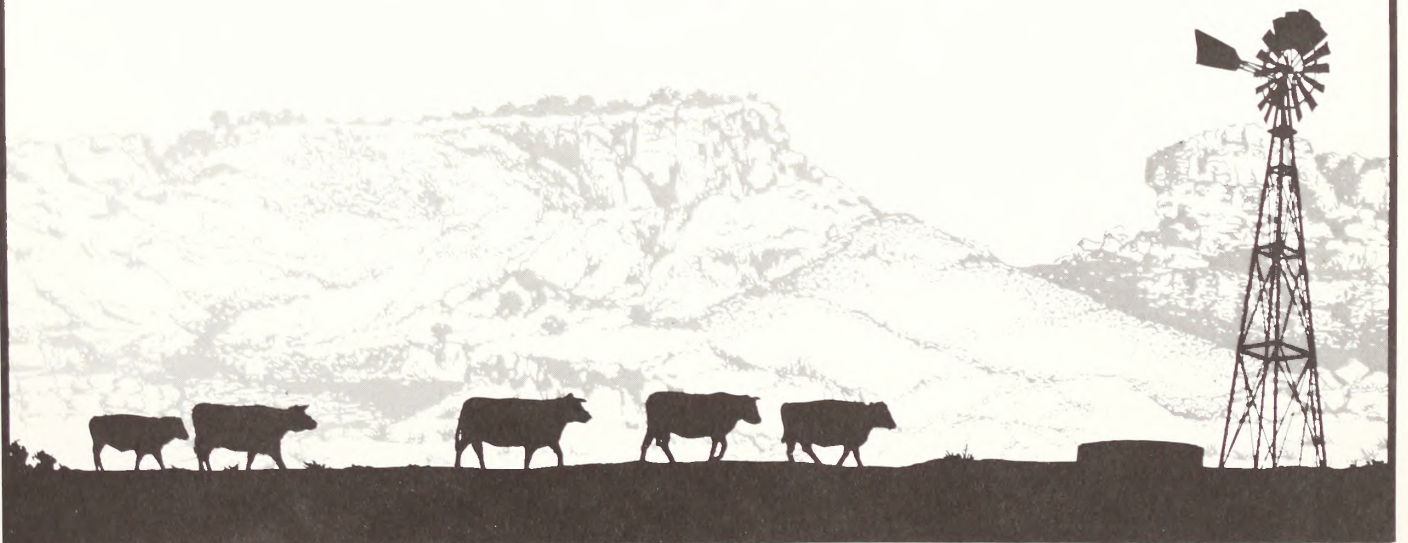
Management constraints have been applied in this RMPA/EIS to protect resources in certain areas of the Albuquerque District. However, no site-specific mitigation measures have been identified to lessen the adverse impacts of implementing the alternatives. When the BLM begins implementing the plan, site-specific mitigation will be developed to mitigate the impacts identified during the environmental assessment process. At this time, all adverse impacts identified in this RMP/EIS are considered unavoidable.

SHORT-TERM USE VERSUS LONG-TERM PRODUCTIVITY

The basic objective of this RMPA/EIS is to provide for efficient and environmentally sound long-term management of the public land and resources in the Albuquerque District. The benefits of achieving the long-term objectives of this plan amendment outweigh the short-term loss of some resource values that would occur as the plan amendment is implemented.

Consultation and Coordination

Chapter 5



CHAPTER 5

CONSULTATION AND COORDINATION

INTRODUCTION

The Albuquerque District Proposed Resource Management Plan Amendment/Final Environmental Impact Statement (RMPA/EIS) was prepared by an interdisciplinary team of resource specialists from the Albuquerque District Office with representatives from the staffs of each of the Resource Areas (see Table 5-2).

The initial sections of this chapter are devoted to consultation and coordination activities carried out during the preparation of the Draft Resource Management Plan. Included are copies of letters directed to "Dear Interested Public:" used in the scoping process. Comments received in writing on the draft and at public hearing held on August 6, 7, and 8, 1991, in Albuquerque, Taos, and Farmington, respectively, are included later in this chapter. Responses to these comments are also included.

During consultation and coordination for this document, both formal and informal efforts have been made to involve the public and local, state, and federal agencies. This involvement occurred through meetings, field trips, telephone calls, and letters. All applicable public participation has been documented and analyzed and is on file.

The planning process for this document was officially initiated through a public notice in the Federal Register on September 20, 1989. This notice invited the general public as well as federal, state, and local government agencies to identify issues and submit comments regarding the proposed planning effort to the BLM.

On December 27, 1989, letters were mailed announcing the intent to develop an amendment to three Resource Management Plans (RMPs) and Environmental Impact Statements (EISs), detailing the time and place for public meetings. The letter requested public participation. Meeting notices were also published in local newspapers and announced on the radio. The public scoping meetings were held in Farmington on November 14, in Albuquerque in November 16, in Santa Fe on November 20, and in Cuba on November 21,

1989. At these meetings the BLM received comments directly pertaining to the issues identified with oil and gas development. A letter was sent to the public on February 16, 1990, summarizing the comments and responding to the concerns identified. This letter is on file at the BLM Albuquerque District Office.

The U.S. Fish and Wildlife Service and the New Mexico Departments of Game and Fish and Natural Resources have been consulted concerning listed threatened or endangered wildlife and plant species. Documentation of these consultations is on file at the Albuquerque District Office. This RMP Amendment/EIS is consistent with legislation protecting state listed species. Coordination and consultation with the state will be continued during the life of the plan.

PLAN CONSISTENCY

The BLM's planning regulations require that RMPs be "consistent with officially approved or adopted resource related plans, and the policies and procedures contained therein, of other federal agencies, state and local governments, and Indian tribes, so long as the guidance and resource management plans are also consistent with the purposes, policies and programs of federal laws and regulations applicable to public lands..." (43 CFR 1610.3-20). To ensure such consistency, plans were solicited from federal, state, and local agencies and groups as well as tribal governments. No inconsistencies have been identified between this document and these other plans.

PUBLIC PARTICIPATION

Each resource area prepares an RMP Update each year. The purpose of this Update is to inform the public of the progress made in implementing the RMP. The Update also describes activity plans to be prepared during the following year so interested members of the public can request copies and comment. These updates will enable the public to be involved in the specific land management actions resulting from implementation of this RMP Amendment/EIS.

TABLE 5-1. LISTING OF DOCUMENT RECIPIENTS

FEDERAL GOVERNMENT

Department of Agriculture
 U.S. Forest Service
 Soil Conservation Service
Department of the Army
 Corps of Engineers
Department of the Interior
 Bureau of Indian Affairs
 Eastern Navajo Agency
 Navajo Area Office
 Bureau of Mines
 Bureau of Reclamation
 National Park Service
 U.S. Fish & Wildlife Service
Environmental Protection Agency

STATE GOVERNMENT

Bureau of Mines and Mineral Resources
Commissioner of Public Lands
Department of Game & Fish
Department of Natural Resources
Energy & Minerals Department
Health & Environment Department
 Environmental Improvement Division
Historic Preservation Bureau
 State Historic Preservation Officer
State Engineer

**CITY & COUNTY COMMISSIONS
& PLANNING COMMISSIONS**

Bernalillo County
Cibola County
Colfax County
Harding County
Los Alamos County
McKinley County
Mora County
Rio Arriba County
Sandoval County
San Juan County
San Miguel County
Santa Fe County
Taos County
Torrance County
Union County
Valencia County

SPECIAL INTEREST GROUPS

Albuquerque Wildlife Federation
American Motorcycle Association
Central Audubon Society
Colorado River Salinity Control Commission
DNA Legal Services
Independent Petroleum Association of New Mexico
Natural Resources Defense Council
New Mexico BLM Wilderness Coalition
New Mexico Cattle Growers' Association
New Mexico Oil and Gas Association
New Mexico Wildlife Federation
Rocky Mountain Oil and Gas Association
Sierra Club
The Nature Conservancy

TRIBAL GOVERNMENTS

Acoma Pueblo
Cochiti Pueblo
Isleta Pueblo
Jemez Pueblo
Jicarilla Apache Tribe
Laguna Pueblo
Nambe Pueblo
Navajo Tribe
 Baca Chapter
 Becenti Chapter
 Counselor Chapter
 Littlewater Chapter
 Nageezi Chapter
 Pueblo Pintado Chapter
 Thoreau Chapter
 White Rock Chapter
Picuris Pueblo
Pojoaque Pueblo
San Felipe Pueblo
San Ildefonso Pueblo
San Juan Pueblo
Sandia Pueblo
Santa Ana Pueblo
Santa Clara Pueblo
Santo Domingo Pueblo
Taos Pueblo
Tesuque Pueblo
Zia Pueblo
Zuni Pueblo

TABLE 5-2. LIST OF PREPARERS

Name	RMP Responsibility	Education	Experience
Manton Botsford	Cultural Resources	BS - Archeology	BLM - 12 years - Archeologist
John Bristol	Recreation, Wilderness, Visual Resources	BS - Landscape Architecture	BLM - 7 years - Outdoor Rec. Planner 5 years - Landscape Architect USFS - 6 years - Landscape Architect
Jane Clancy	Oil and Gas Potential, Reasonably Foreseeable Development (RFD)	BS - Geology	Petroleum & Ground Water Geologist - 14 years
Jack Dossett	Forestry Resources	BS - Forest Management	BLM - 22 years Private Lumber Co. - 5 years
Kent Hamilton	Team Leader Socio-Economics	BS - Agricultural Economics BIA - 15 years-Economist	BLM - 2 years - Community Planner 11 years - Economist
Elizabeth Hummer	Technical Coordinator Soil, Water and Air	BS - Commercial Art BS - Wildlife Biology	BLM - 15 years - Planning & Environmental Coordinator, Natural Resource Specialist
Randall P. Legler, Jr.	Wildlife	BS, MS - Wildlife	BLM - 16 years USFWS - 2.5 years
Joe Mirabal	Technical Coordinator Minerals	BS - Geology BA - Secondary Education	BLM - 6 years Private Industry - 7 years
Mike O'Neill	Paleontological Resources MA - Phys. Anthropology	BA - Phys. Anthropology	BLM - 8 years-Paleontologist
Sarah W. Spurrier	Writer/Editor	BA - Psychology; MBA	BLM - 10 years - Writer/Editor
Yolanda Vega	Lands Management	Beginning Lands Resource	BLM - 12 years - Realty Specialist
Gary Wood	Grazing Management	BS - Range Science	BLM - 11 years - Range Conservationist SCS - 7 years - Range Conservationist

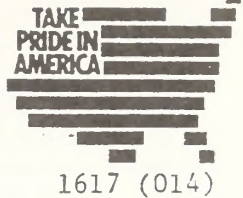
SUPPORT STAFF

Michael Candelaria - Geographic Information System
 Karen Davis - Word Processing
 Myrna Finke - Graphics and Desktop Publishing
 Annie Gaddis - Word Processing
 Emilio Montoya - Cartography
 Kathy Ollom - Word Processing
 Elizabeth Peck - Geographic Information System
 Millie Rose - Word Processing
 Anna Salas - Word Processing



United States Department of the Interior

BUREAU OF LAND MANAGEMENT
ALBUQUERQUE DISTRICT OFFICE
435 MONTANO N.E.
ALBUQUERQUE, NEW MEXICO 87107



OCT 30 1990

Dear Interested Public:

The Bureau of Land Management (Albuquerque District) is preparing an amendment to three Resource Management Plans (RMPs) and Environmental Impact Statements (EISs) for the Farmington, Taos, and Rio Puerco Resource Areas. The primary purpose for this amendment is to improve the process by which the BLM considers applications for new oil and gas leases. We will be incorporating the latest BLM program guidance for fluid minerals (BLM Manual Section 1624.2, issued after the preparation of the District's three RMPs). In addition to the oil and gas changes, the planning effort will evaluate eight identified Special Management Areas (SMAs) for their potential as Areas of Critical Environmental Concern (ACEC).

This action is a necessary part of the Bureau's planning process. Resource Management Plans are amended as new information becomes available or as conditions change.

The Farmington Resource Area is currently adapting to changing conditions. Recent tax incentive programs have caused increasing activity in the development of methane gas from the Fruitland coal deposits. The development of coal-methane gas requires larger well pads, new transmission pipeline systems and disposal of large amounts of waste water. The current development is taking place east of Navajo Reservoir in important wildlife habitat and rugged topography. Some of the development techniques being used are experimental. Improving the means by which we make future oil and gas leasing and lease stipulation (requirement) decisions will help the BLM react to changing conditions such as the coal-methane development.

This letter is beginning the planning process by requesting your comments on the scope of the Albuquerque RMP Amendments.

OIL AND GAS AMENDMENTS

The Proposed Planning Action for Fluid Minerals will be developed through the use of a "Reasonable/Foreseeable Development" scenario and identification of cumulative impacts. The planning action will help us determine which public lands and minerals should be made available for oil and gas development through leasing, and what lease stipulations (requirements) may be necessary to protect other resource values. The intent of this planning amendment is not to open up new areas to development or to seriously impact industry's ability to pursue areas of potential. The intent is to improve the process by which leasing and lease stipulation decisions are made by the Albuquerque District.

The RMP amendment will impact approximately 3,110,500 acres of public land and 6,762,800 acres of subsurface mineral values administered by the Bureau of Land Management's Albuquerque District. The RMP amendment will analyze the fluid mineral leasing issues not covered under previous plans (i.e. Farmington RMP--1987; Taos RMP--1987; and Rio Puerco RMP--1985). Those plans continue to be valid and will be extensively referenced in preparing the proposed amendment.

The oil and gas issues anticipated include:

1. How to determine which public lands and minerals should be made available for oil and gas development.
2. How to determine if existing lease stipulations are proper and sufficient to protect other resource values.
3. Consulting with other surface managing agencies to obtain resource information and developing stipulations for resources or values which cannot be protected by standard lease terms.
4. The impact of lease stipulations on oil and gas development.
5. What effect fluid mineral leasing activities have on designated ACECs and SMAs, given reasonable, foreseeable development scenarios.

AREAS OF CRITICAL ENVIRONMENTAL CONCERN *

In this planning amendment, eight existing Special Management Areas identified in the Rio Puerco and Taos RMPs, will be analyzed to determine if they meet ACEC criteria. They include Historic Homestead, Canyon Jarido, Jones Canyon, Headcut, Azabache Station, Big Bead Mesa, Guadalupe, and La Cienega. These have been thoroughly described in the Rio Puerco and Taos RMP Appendices.

Your comments through this public scoping process will be used to determine which of the eight identified SMAs should be considered for ACEC designation in the amendment process. The planning team will also accept your comments about other areas which you may deem appropriate for ACEC consideration. These additional areas cannot be considered in this planning amendment due to the need to move quickly on the oil and gas issues. The information you provide could be used to emphasize or modify current management until these areas are addressed in the next plan amendment process.

HOW TO GET INVOLVED

The BLM Albuquerque District will conduct open-house scoping meetings during the month of November in Farmington, Albuquerque, Santa Fe and Cuba (see schedule below). Interested persons, organizations, and agencies are encouraged to attend and assist us in this process by providing written or verbal comments on the issues and concerns to be addressed in the RMP Amendment.

Meeting Schedule

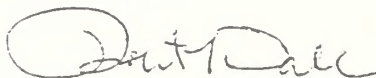
<u>Location</u>	<u>Date</u>	<u>Time</u>
Farmington BLM Office (1235 La Plata Highway)	November 14, 1989	2 - 4 pm and 7 - 9 pm
Albuquerque District Office (435 Montano NE)	November 16, 1989	2 - 4 pm and 7 - 9 pm
Santa Fe BLM Office (1474 Rodeo Road)	November 20, 1989	2 - 4 pm and 7 - 9 pm
Cuba Field Office (Old Highway 44 - next to U.S. Forest Service)	November 21, 1989	4 - 7 pm

Additional public participation opportunities will be provided through formal public hearings on the draft Environmental Impact Statement (EIS) and requests for written comments.

If you would like to be kept informed about the Albuquerque District RMP Amendment process, please remove the next page, fill in the requested information, and refold, staple, and mail with the BLM Farmington, New Mexico address showing.

For further information contact: Joel E. Farrell, Farmington Resource Area Office, (505) 327-5344 or Mike O'Neill, Albuquerque District Office, (505) 761-4547.

Sincerely,



Robert T. Dale
District Manager

1 Enclosure

* Possible designation of Special Management Areas (SMAs) in the Rio Puerco Resource Area as Areas of Critical Environmental Concern (ACECs) was considered initially in this plan amendment. Because the status and designation of all SMAs in the Rio Puerco Resource Area will be evaluated in 1991, under the BLM's 5-7 year evaluation of RMP implementation, these areas were dropped from further consideration in this RMP Amendment/EIS. Based on the 5-year evaluation, a plan amendment may be prepared to make changes in existing designations and management prescriptions and/or to place new areas under special management designations.



United States Department of the Interior



BUREAU OF LAND MANAGEMENT
ALBUQUERQUE DISTRICT OFFICE
435 MONTANO N.E.
ALBUQUERQUE, NEW MEXICO 87107

DEC 27 1989

Dear Interested Party:

The Albuquerque District is now in the process of preparing an amendment to three Resource Management Plan/Environmental Impact Statements (RMP/EIS) for all Federal minerals (except USFS) within the District. The RMP/EIS will specifically address the cumulative effects of Federal oil and gas leasing within the District (Farmington, Taos and Rio Puerco Resource Areas).

A notice of intent to prepare an RMP Amendment, invitation for public involvement, notice of public meetings and request for mineral and resource information, was published in the Federal Register on September 20, 1989.

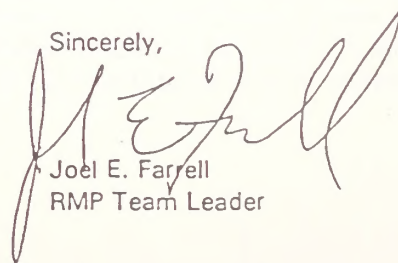
The planning area for the RMP Amendment will include all BLM managed Federal surface and mineral estate within the District. Federal mineral estate encompasses over 7.1 million acres of both split estate minerals (Federal minerals under private or state surface) and minerals under other Federal surface management agencies lands which includes primarily BIA administered allotted and 2198 lands, BOR and COE projects. Not included are Federal minerals under the U.S. Forest Service.

The RMP/EIS will specifically address the cumulative effects of Federal oil and gas leasing within the District. We are requesting resource information which you have for private surface areas within the planning area. This information will be incorporated into the RMP amendment to make oil and gas leasing determinations for Federal lands as to areas which are closed to leasing, areas open with special stipulations or open with standard stipulations. We would appreciate getting this information by 3/1/90 so that it can be incorporated into the draft plan.

If you have any questions concerning this request contact Mr. Joel Farrell (505) 327-5344 or Mike O'Neill (505) 761-4547.

Thank you for your cooperation in this endeavor.

Sincerely,



Joel E. Farrell
RMP Team Leader



United States Department of the Interior



BUREAU OF LAND MANAGEMENT
ALBUQUERQUE DISTRICT OFFICE
435 MONTANO N.E.
ALBUQUERQUE, NEW MEXICO 87107

DEC 27 1989

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The planning area for the RMP Amendment will include all BLM managed Federal surface and mineral estate within the District. Federal mineral estate encompasses over 7.1 million acres of both split estate minerals (Federal minerals under private or state surface) and minerals under other Federal surface management agencies lands which includes primarily BIA administered allotted and 2198 lands, BOR and COE projects. Not included are Federal minerals under the U.S. Forest Service.


The RMP/EIS will specifically address the cumulative effects of Federal oil and gas leasing within the District. We are requesting resource information which you have on hand. This information will be incorporated into the RMP amendment to make determinations for Federal lands as to areas which are closed to leasing areas open with special stipulations or open with standard stipulations.

In addition, oil and gas leasing and drilling restrictions that you are currently utilizing will be incorporated as stipulations into the RMP. We will utilize the leasing stipulations provided by your office to make fluid leasing determinations/decisions for Federal minerals on lands under your administration where Federal minerals are currently considered for leasing in the Albuquerque District. We would appreciate getting this information by 3/1/90 so that it can be incorporated into the draft plan.

If you have any questions concerning this request contact Mr. Joel Farrell (505) 327-5344 or Mike O'Neill (505) 761-4547.

Thank you for your cooperation in this endeavor.

Sincerely,



Joe E. Farrell
RMP Team Leader



Telephone: 505/835-5420
Facsimile: 505/835-5410

New Mexico Bureau of Mines & Mineral Resources
Socorro, NM 87801

A DIVISION OF
NEW MEXICO INSTITUTE OF MINING & TECHNOLOGY

October 4, 1990

Ms. Elizabeth Hummer
BLM
1235 La Plata Hwy
Farmington, NM 87401

Dear Ms. Hummer:

The Appendix draft you sent looks very good. However, the following comments may be helpful.

1. As some water work in the region was carried out before coal-bed methane was extracted, you might want to cite our Hydrologic Report 6, in case others aren't aware of it. This would be easy to do when describing the rocks involved. Although we didn't present much for the Fruitland, Figs. 78-82 on Sheet 6 give a lot of information for the Entrada.
2. The correct name for rock units depends on how they were originally named; that is, the second part of the name (always capitalized) can be the major rock type or simply the stratigraphic rank. Thus it is the Entrada Sandstone but the Fruitland Formation. We can of course speak informally of the Fruitland coals or the disposal formation (no caps).
3. It might also be good to specify the shale units you expect to confine water to the Entrada: the Summerville Fm or lower part of the Morrison Fm above and the Chinle Fm below (Fig. 10 in HR 6).

Hope these are useful. Incorporate them as you wish.

Sincerely,

William J. Stone, Ph.D.
Senior Hydrogeologist

WJS/tll

COMMENTORS AND COMMENTS

LETTER #1 - USDI Bureau of Mines, Intermountain Field
Operations Center

COMMENTS: NONE

LETTER #2 - USDI Fish and Wildlife Service, Ecological Services

COMMENTS: L2-A Limited Acreage Differences Between
Alternatives
L2-B Threatened & Endangered Impact Analysis
L2-C Polycyclic Aromatic Hydrocarbons
L2-D Forestry Preservation and Improvement
L2-E Well Spacing
L2-F Impact Analysis in High-intensity Development
Areas
L2-G Rehabilitation
L2-H Threatened & Endangered Requirements for the
Production Alternative
L2-I Conservation Alternative
L2-J Cumulative Impacts of ORVs and Roads
L2-K Forestry and Road Impacts
L2-L Habitat Fragmentation
L2-M Soil and Water
L2-N Cover Pits
L2-O Range of Alternatives
L2-P Cumulative Impacts

LETTER #3 - Schmierer, T.J.

COMMENTS: L3-A Royalties
L3-B Oil and Gas Stipulations

LETTER #4 - Merrion Oil and Gas Corporation

COMMENTS: L4-A Areas Closed to Leasing

LETTER #5 - USDA Forest Service, Santa Fe National Forest

COMMENTS: NONE

LETTER #6 - New Mexico Environment Department

COMMENTS: L6-A Range of Alternatives
L6-B Water Quality in San Juan Basin
L6-C Water Quality Related to Dirt Roads
L6-D Impacts to Navajo Reservoir and San Juan
River
L6-E Water Quality Impacts
L6-F High-intensity Development in Simon Canyon
L6-G Water Stipulations

LETTER #7 - D.J. Simmons Co.

COMMENTS: L7-A Areas Closed to Leasing

LETTER #8 - Natural Resources Defense Council

COMMENTS: L8-A Range of Alternatives

L8-B Air Quality Impacts
L8-C Riparian Analysis
L8-D Cumulative Impacts

LETTER #9 - The Nature Conservancy
COMMENTS: L9-A Range of Alternatives
L9-B Entire Threatened and Endangered Spectrum

LETTER #10 - Smith, Walter S.
COMMENTS: NONE

LETTER #11 - Phillips Petroleum Company
COMMENTS: L11-A Lease Operations

LETTER #12 - National Wildlife Federation Rocky Mountain Natural
Resources Clinic
COMMENTS: L12-A No Leasing Alternative
L12-B Limited Acreage Differences Between
Alternatives
L12-C Air Quality Impacts
L12-D Wildlife Resources and Impacts
L12-E Mexican Spotted Owl
L12-F Water Quality Impacts
L12-G Cumulative Impacts
L12-H Cultural Analysis
L12-I Paleontological Analysis
L12-J Timber Analysis
L12-K Visual Impacts
L12-L Vegetative Impacts
L12-M Methane Migration

LETTER #13 - Dugan Production Corp.
COMMENTS: NONE

LETTER #14 - The Rio Grande Chapter of the Sierra Club
COMMENTS: L14-A Leasing of Wilderness Study Areas
L14-B Special Management Area Protection and
Designation

LETTER #15 - USDI National Park Service
COMMENTS: L15-A National Park Service Information
L15-B Air Quality Study
L15-C Air Impacts to Class 1 Areas
L15-D Stipulations
L15-E Stipulations
L15-F Stipulation

LETTER #16 - Amoco, Southern Rockies Business Unit
COMMENTS: L16-A Leasing in SMAs With Lease Stipulations
L16-B Stipulation

LETTER #17 - US Environmental Protection Agency, Region 6

COMMENTS: L17-A Consultation and Coordination
L17-B Water Disposal
L17-C Cementing of Wells
L17-D Disposal of Oil and Gas Activity Waste
L17-E Well Spacing
L17-F Resource Area Hydrology
L17-G Ground Water Impacts
L17-H Conditions of Approval for Geophysical
Exploration
L17-I COA for Well Construction

LETTER #18 - New Mexico Office of Cultural Affairs, Historic
Preservation Division

COMMENTS: L18-A Alternatives
L18-B Cultural Resources Preservation
L18-C Dinetah
L18-D Long-term Effect

LETTER #19 - New Mexico Department of Game and Fish

COMMENTS: L19-A Oil and Gas Leasing in Areas Requiring
Protective Management
L19-B Oil and Gas Development in Special
Management Areas
L19-C Road Policy
L19-D Seasonal Closures

TRANSCRIPT #1 - Albuquerque

COMMENTS: NONE

TRANSCRIPT #2 - Taos

COMMENTS: NONE

TRANSCRIPT #3 - FARMINGTON

COMMENTS: T3-A SMAs and ACECs
T3-B Change in Leasing Categories for SMAs and
ACECs by Alternative
T3-C Withdrawal of Carracas Mesa SMA from Leasing
T3-D Carracas Mesa SMA Closed to Leasing
T3-E Thomas Canyon SMA Closed to Leasing

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June 11, 1991

1

Memorandum

To: Robert Dale, District Manager, Bureau of Land Management,
435 Montano NE, Albuquerque, NM 87107

From: Chief, Intermountain Field Operations Center

Subject: Review of Draft Albuquerque District Resource Management
Plan Amendment/Environmental Impact Statement

As requested, personnel of the Bureau of Mines reviewed the subject draft document to determine whether mineral resources and mineral-related facilities are adequately considered. The draft document addresses only oil and gas leasing and development and does not address nonfuel mineral issues. Those issues, however, were discussed adequately in previous versions of the Resource Management Plan. The Bureau of Mines commented on the earlier plan May 13, 1987, and June 15, 1983. Because the subject document deals only with issues outside the Bureau of Mines primary area of responsibility--nonfuel mineral resources, we have no comment concerning the document or its content.

William Cochran
William Cochran

ig/rf



UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

Ecological Services
Suite D, 3530 Pan American Highway, NE
Albuquerque, New Mexico 87107

June 20, 1991

2

Memorandum

To: District Manager, Bureau of Land Management, Albuquerque District,
Albuquerque, New Mexico

From: Field Supervisor, Fish and Wildlife Service, New Mexico Ecological
Services Office, Albuquerque, New Mexico

Subject: Bureau of Land Management, Albuquerque District, Draft Resource
Management Plan Amendment/Environmental Impact Statement (EC #91/64)

We have reviewed the subject document and have serious concerns regarding its adequacy in presenting a sufficient range of reasonable alternatives for analysis and in complying with the Endangered Species Act of 1973, as amended.

The three alternatives considered (No Action, Production, and Preferred) offer so little difference among them that assessment of impacts appears a moot issue. The number of wells drilled ranges from 4,542 to 4,604 to 4,812. The difference between the Preferred alternative, which has as its primary emphasis "the protection and preservation of cultural, visual, recreation, wildlife, and paleontological resources values," and the No Action alternative perpetuating existing policies, is 62 wells, a decrease of only 1.3 percent. Between the Production alternative, with its primary focus on the leasing and development of oil and gas resources, and the No Action alternative is a difference of 208 wells, an increase of 4.5 percent. The difference between the two action alternatives is 270 wells, an increase of 5.9 percent over the wildlife emphasis alternative.

This similarity between and among alternatives is more than evident in the analysis of impacts on big game species discussed in the document. Deer losses range from 293 (No Action) to 308 (Production alternative). Differences in losses between these alternatives range from 4 to 15 animals. Such differences are virtually insignificant and, based on the lack of data available on these populations, could easily be accounted for in sampling error. Differences in losses of elk (ranging from 2 to 15) and antelope (0 to 2) are equally insignificant and represent no difference between alternatives based on the analysis provided.

L2-A (Limited Acreage Differences Between Alternatives). BLM has consulted with environmental groups and oil and gas representatives to revise environmental analysis standards for oil and gas leasing decisions made in the Resource Management Plans (RMPs). As a result, BLM issued new manual guidance titled Supplemental Program Guidance for Fluid Minerals (1987). When this guidance was issued, work on Albuquerque District RMPs had been completed or was near completion for the three resource areas in the district. To achieve compliance with the new guidance for the Albuquerque District, it was decided to amend the three RMPs with this document. The three RMP/EISS amended by this document are Farmington, Rio Puerco, and Taos. In the Albuquerque District there is in excess of 5.6 million acres of federal oil and gas estate.

L2-A Cont.

To help reduce the United States dependence on imported oil, it is federal policy to make lands available for oil and gas leasing and development. The supplemental program guidance (SPG) directs that the least restrictive stipulation, that effectively accomplishes the resource objectives or uses for a given alternative, be used (BLM Handbook H-1624). In addition to this policy and direction, the selection of alternatives was influenced by the current level of and potential for oil and gas development. The Rio Puerco and Taos Resource Areas have had little oil and gas leasing and development. These areas are not likely to have significant development during the life of this plan. Therefore, leasing and development whether totally allowed or restricted does not provide a wide range of differences in alternatives. The existing situation in these resource areas does, however, provide BLM an opportunity to protect other resources by influencing the areas of oil and gas development with management decisions, which was done in the previous RMPs.

The Farmington Resource Area, on the other hand, has a highly developed oil and gas basin. Over 88 percent of the federal oil and gas acreage is leased and has been under long-term development and production. Many of the leases are "held by production" i.e., having at least one producing well on the lease. Most of this acreage was leased prior to development of the existing RMP, which designated special management areas (SMAs), areas of critical environmental concern (ACECs), and research natural areas (RNAs). Because leases existed before special management areas were designated, there are many areas where new leases, with lease stipulations, will not be issued during the life of this plan. It should be noted that in an effort to achieve the management goals for special management areas, BLM does apply Conditions of Approval (COAs) on Applications for Permits to Drill (APDs).

Based on these points, the final result is that BLM has a relatively small number of acres in the Rio Puerco and Taos Resource Areas where control of leasing and development by oil and gas stipulations is needed. Although it is desirable to exercise some added control to oil and gas development in the Farmington Resource Area, there has been long-term leasing and development in this resource area. There is little oil and gas acreage left in the resource area that could be leased with leasing stipulations.

These factors were the basis for developing and analyzing the alternatives considered in this document. Alternatives, with narrow acreage and impact differences are a result of the (1) areas where development is and will continue to occur, (2) extent of leased acreage, and (3) areas identified for special management. Other alternatives have been considered. They would not have been implementable with the amount of leased acreage and/or were within the range of acreage considered in the three alternatives.

Treatment of impacts to threatened and endangered species is a summary dismissal that development will not be allowed to interfere with recovery plans and habitat management objectives, "therefore, oil and gas impacts on threatened and endangered species are not analyzed in this document." Such a dismissal is not considered an adequate assessment of potential impacts resulting from any of the alternatives, even as similar as they are.

L2-B (T&E Impact Analysis). The Albuquerque District's Threatened and Endangered Species program is presented in Appendix I. BLM's Biologists have reviewed the laws, regulations, and policies and believe that the BLM's program will prevent impacts to T&E, candidate and special interest species under all alternatives.

L2-C There is no mention of the known occurrence of polycyclic aromatic hydrocarbons (naphthalene, phenanthrene, and benzo(a)pyrene) in the San Juan Basin, the potential of the proposed development under any alternative to introduce these hydrocarbons to water sources such as the San Juan River, and the potential for impacts of these hydrocarbons on aquatic resources, particularly the endangered Colorado squawfish or the Category 2 candidate razorback sucker. The squawfish in the San Juan River was noted in the species list provided to you by this office on May 21, 1990. The presence of contaminants and their possible link to the petrochemical industry was verbally discussed with Farmington Resource Area personnel during the January 15, 1991, Interagency Work Group on Oil and Gas Development for the San Juan River Basin. A copy of the data sheet presented at that meeting is attached.

L2-C (Polycyclic Aromatic Hydrocarbons PAHs). The hydrology section of Chapter 3 (Affected Environment) has been changed to discuss the occurrence of PAHs in the San Juan River.

Based on the lack of definitive data concerning impacts to water quality, the presence of polycyclic aromatic hydrocarbons in the San Juan River, and the potential impacts on endangered species, we believe that the need for consultation under Section 7 of the Endangered Species Act is immediate.

Of somewhat lesser importance are the following inadequacies noted in the document:

1. The discussion of forest resources states that the policy is directed at preserving and improving the remaining forested areas in the Albuquerque District. Yet, none of the three alternatives provides the means by which such preservation and improvement might be achieved. Each results in reduced amounts of forest and woodland habitats.

L2-D (Forestry Preservation and Improvement). Production will result in a loss of forest and woodland base management areas. Access provided by this development will present opportunities for more intensive management of forest and woodland areas. This will improve the overall forest stand. Monies received for the removal of wood products will be used for reforestation or stand improvement.

2. The impact analysis provided in the document assumes a 320-acre spacing of wells. Yet, it also states that the Bureau of Land Management policy for Federal well spacing is to accept the well spacing units established by the New Mexico Oil Conservation Division (OCD) and that spacing of 160 acres is under consideration by the state agency. I think OCD ruled on 320! There is no analysis of impacts potentially caused by the closer spacing of wells, particularly with regard to habitat fragmentation and increased disturbance. It is also unclear if the number of wells drilled, as summed in the long-term impacts

L2-E (Well Spacing). Well spacing and well density are two different concepts. Well density is used for impact analysis purposes in this document. It is the projected number of wells that could be drilled on the federal mineral estate in each county. To more accurately determine well density and identify potential impacts, oil and gas activity was further delineated into high- and low-intensity development areas. This

L2-E Cont.

is particularly important in projecting the number of wells that might be drilled in the smaller geographical areas such as SMAs, ACECs, or other areas of special concern. The high-intensity development area boundary is based on historic data in which 90% of past development has occurred. The low-intensity development area is the remaining area in which 10% of past development has occurred.

As an example, the well density in the high-intensity development area in San Juan and Rio Arriba Counties (See Map 5) is 233 acres/well in San Juan County and 263 acres/well in Rio Arriba County (Table 2-1). Well density in the low-intensity development area for these counties is 1,016 acres/well in San Juan County and 2,062 acres/well in Rio Arriba County. The wide ranging well density figures clearly shows a higher concentration of oil and gas development and potential impacts in the high-intensity development area. Impacts to SMAs, ACECs, and other areas of special concern, in Farmington's high-intensity development area, were identified and analyzed using an average well density figure of 240 acres/well.

Well spacing units are used to efficiently drain and protect the long-term producing capacity of oil and gas reservoirs. They are established by the New Mexico Oil Conservation Division and are generally accepted by the BLM. The required well spacing units establish the amount of space allowed between wells. Spacing requirements are established for each formation, therefore, well spacing differs from formation to formation. Well spacing can vary from 40-acres for conventional oil wells to 160- or 320-acres for gas wells. Throughout the San Juan Basin, hydrocarbon production is primarily gas, consequently the typical well spacing unit is 160-acres. Fruitland Coal Gas wells have a 320-acre well spacing unit (established July 16, 1991, NMOCD Order No. R-8768A).

discussions, reflects the closer spacing. If so, the increased potential to severely decrease water quality through release of contaminants, thereby affecting endangered species, should also be included in the discussion.

L2-E
Cont.

3. Within the Farmington Resource Area, the document identifies a "high-intensity development region." This area supports the highest concentration of existing wells and will likely support the majority of wells to be developed. Similar, albeit smaller, high-intensity development regions exist in the Rio Puerco and Taos Resource Areas. The cumulative, and quite possibly synergistic, effects of development in these regions are masked by the continual comparison of these regions to the total land area of the resource areas. Without adequate assessment of impacts within the delineated areas of occurrence, these regions become sacrifice zones subject to significant and adverse impacts, but minimized by their relatively small representation within the larger resource area. The continued use and comparison of the large acreages within the resource areas negates the impact concentrated on the actual acres drilled in the designated high-intensity regions.

L2-F

4. Each alternative discusses the rehabilitation of well pads and rights-of-way, yet no data is presented on the success of rehabilitation efforts on which the assumption of remediation of long-term surface disturbance has been based. There is also no discussion of monitoring plans for determining the success of rehabilitation requirements.

L2-G

5. We question the basis of impact analysis for the Production alternative that lease stipulations would not be attached to future leases. Certainly, stipulations for compliance with the Endangered Species Act and the Migratory Bird Treaty Act would be required. Even for the Production alternative, realistic projections of environmental requirements are necessary.

L2-H

6. In the discussion of the resource conservation alternative, which was eliminated from consideration, approximately 11,000 acres in the special management areas would receive more protection than under the Preferred alternative. However, it is dismissed because of the small percentage these areas comprise of the total oil and gas acres. The significance of these areas, as denoted by their designations, should outweigh their relative size.

L2-I

L2-F (Impact Analyses in High-Intensity Development Areas). The high-intensity development areas were defined for impact analysis purposes. This is where development has historically and is currently taking place in the resource areas. Based on the amount of development in these areas, most of the future development is also projected to occur in these areas. Therefore, most of the impact analysis in this document is concerned with development in the high-intensity development areas. Statements as to the amount of oil and gas development (and impacts) occurring within the resource areas were used to draw comparisons on the extent of (1) oil and gas development within a resource area and (2) surface acres affected by oil and gas development. This is particularly important for both the Rio Puerco and Taos Resource Areas where little development has and is projected to occur in these resource areas. Determinations have been made through the analysis for leasing stipulations that will protect special resource values and using (1) the high-intensity acreage figures, (2) number of wells from table 2-1, and (3) the disturbance per well figures from table 4-1 it can be calculated that the disturbed acres will be less than one percent of the high-intensity development acreage in both the Rio Puerco and Taos Resource Areas. Therefore, much of the impact analyses in this document is concerned with the impacts of in-field drilling in the San Juan Basin.

L2-G (Rehabilitation). Abandonment and reseeding requirements, in the form of Conditions of Approval, are attached to all Applications for Permit to Drill and Rights-of-Way. Upon notification that a well site is to be abandoned, the lessee/operator is required to perform site specific surface restoration procedures. BLMs Environmental Protection Staff monitor the success of surface rehabilitation procedures. Upon satisfactory completion of surface restoration stipulations, which includes the successful re-establishment of vegetation, BLM staff recommends release of the lessees' performance bond by the bond holder. Specific data on the success of the rehab efforts is not available.

L2-H (T&E Requirements for the Production Alternative). See comment response to comment L2-B and Appendix I. Under the production alternative all new leases would be issued with BLMs standard terms and conditions for oil and gas leasing. The standard terms and conditions contain provisions for protecting T&E species. Appendix B-1 show the standard terms and conditions.

L2-I (Conservation Alternative). Your comment is valid. However, it should be noted that based on BLM policy the proposed alternative will provide the protection needed by other resource values to avoid impacts.

As indicated in the document, the existing policy maintains use by off-road and off-highway vehicles to the "greatest extent possible." The cumulative effects of off-road vehicles and the road systems should be presented. The impacts of the road system providing access to forested areas and the potential impacts of overcutting on the remaining accessible woodland acres, mentioned only briefly, should be provided in detail. Construction of new roads and the almost daily use of both new and existing roads should be discussed with regard to fragmentation of wildlife habitats.

L2-J

L2-K

L2-L

7. Under the Preferred alternative, the document states that with long-term oil and gas development, the extent of further degradation to the soil and water of the San Juan Basin cannot be determined. However, under the existing conditions (as described in the No Action alternative), disturbance associated with existing development has resulted in sedimentation, salt loading of the Colorado River system, and non-point source pollution of major waters and watersheds. The amount of these disturbances occurring the San Juan Basin is above acceptable levels. It is further stated that studies and data collection are needed to determine the extent to which Federal oil and gas development contribute to these problems. However, there is no commitment to monitor, much less remedy, these impacts to all life forms dependent upon the San Juan.

L2-M

We failed to find in the appendices the requirements to be placed on any permits or licenses to cover all oil pits for the protection of migratory birds.

L2-N

In summary, we earnestly recommend that a reanalysis of possible alternatives be conducted and that the analysis be provided on a range of alternatives sufficiently different so that choices regarding planning and management may be documented. In none of the three alternatives under consideration is production significantly reduced or resource protection significantly increased from current conditions. The array of actions normally considered in land use planning has been truncated to only development of oil and gas resources. We further recommend that these alternatives be stringently assessed for cumulative impacts regarding water quality, habitat fragmentation, wildlife disturbance, threatened and endangered species, and development intensity. Of paramount importance is the expeditious initiation of consultation under Section 7 of the Endangered Species Act and basinwide analysis of potential introduction of contaminants to the San Juan River system from oil and gas development.

L2-O

L2-P

L2-J (Cumulative Impacts of ORVs and Roads). Because the extent of the impacts of indiscriminate ORV use are not known, the cumulative impacts of ORVs and roads are not available. Additionally, the total miles of existing roads are difficult to ascertain because of the many levels of government that have roads and/or maintain roads in counties. BLM has estimated the number of roads associated with oil and gas development at approximately 13,000 miles. This would result in long-term surface disturbances to approximately 36,000 acres. Two areas [Dunes (1,000 acres and Head Canyon (150 acres)] were established specifically for ORV recreational use in the Farmington RMP. The acreage from these two areas would then result in approximately 37,000 acres being disturbed for roads and designated ORV used.

L2-K (Forestry and Road Impacts). Access to all but the most adverse terrain is possible with the type and amount of four-wheel drive vehicles used by the public. With or without roads, some individuals will attempt to drive in any area in the resource areas. Increased law enforcement activity is needed to abate this situation.

L2-L (Habitat Fragmentation). The effects of habitat fragmentation have been considered. As is noted in Appendix J, little information is available to predict the potential of or significance of habitat fragmentation on wildlife. However, based on the information available about this subject and field observations by BLM biologists, changes in the environment should not be extensive enough, at any time, to result in a sudden and extensive loss of wildlife. As a result of development, maintenance, and operational aspects of oil and gas development, wildlife may be displaced from some areas during these operations. Reclamation of approximately half of new surface disturbances should occur the next growing season.

Reclaimed areas would allow wildlife species to return to their normal use patterns. The effects of habitat fragmentation to consumptive and nonconsumptive wildlife are presented in Appendix J.

L2-M (Soil and Water) Chapter 3 has been revised and provides more detail about existing water quality and sources of impairment. BLM is also committed to developing and implementing a monitoring plan with guidance from NEMED. Chapter 4 has also been revised to provide an estimate of potential impacts to water quality from sediment and salts.

L2-N (Cover Pits) The covering of reserve pits to keep wildlife, particularly waterfowl from using them will be a standard BLM condition of approval when the size of the reserve pit exceeds 16 feet.

L2-O (Range of Alternatives). See comment response to comment L2-A.

L2-P (Cumulative Impacts). Extensive oil and gas leasing and development occurred in the San Juan Basin prior to the passage of federal and state laws, regulations, policy, land use plans, and operational procedures to manage, protect, and preserve a variety of resource values and components. Lease development and the construction of other oil and gas related facilities occurred throughout the Basin, with few if any restrictions, for more than 20 years. Even with the passage of new laws and regulations, the development of existing leases is protected as a "valid, existing right". Additionally, the interest in (and value of) many resources did not exist during the 1950s, 1960s, and early 1970s. As a result, much of the San Juan Basin was leased and developed by the time laws and regulations were developed to protect non-energy resource values. Resource data (extent and condition) is not available for the non-energy resources that existed prior to oil and gas development in the Basin.

Data is not available to track the effect oil and gas development has had on non-energy resources over time. Problems in determining cumulative impacts occur as a result of when laws and other legal requirements (and standards) were established and where and when monitoring data is obtained. As an example, the need to improve and maintain air quality standards is not questioned. However, air quality standards are relatively new when compared with the amount and extent of all energy related development in the Basin. Air quality information is not available at the time oil and gas development began in the Basin nor is it available at the time standards were established. A review of

Based on the long history of development in the San Juan Basin, development has occurred on most leases. Many of the leases are "held by production". These leases, many issued prior to NEPA and FLPMA, will not come up for lease renewal as long as there is an economically producing well on the lease. The current situation in the Basin is that this is a developed field with further in-field development projected to occur with future development. The amount of acres put into long-term production uses (well pads and roads) will occur at about the same rate as older facilities are being abandoned and acres are being rehabilitated. Development in the San Juan Basin has, therefore, reached a stage where the amount of acreage in long-term production uses is likely to remain nearly constant. Cumulative impact analyses is, therefore, limited to (1) identifying and analyzing the long-term production impacts (well pads and roads) remaining from previous oil and gas development and (2) new impacts projected to occur with future development.

The impacts of oil and gas development relate primarily to the disturbance of land surfaces on lands with oil and gas leasing and development. In considering the cumulative impacts, as they relate to oil and gas development, BLM has considered the resources that might be adversely affected by this development. The cumulative impacts discussed in the cumulative impact sections in chapter 4 relate to the disturbance created by an estimated number of wells presently developed and projected for development during the life of this plan. The amount of acreage under long-term surface disturbance, at any time, is estimated to be around 65,600 acres.

L2-P Cont.

Beginning with visual resources, BLM has no data as to how areas might have been classified prior to the establishment of VRM classes, particularly **potential class I and class II areas**. BLM can only provide quantification as to the (1) the initial acreage (and areas) **placed** in each VRM class and (2) the effect of the proposed action to acreage (or areas) in the VRM classes. This has been done in the document (see the **summary tables and the cumulative impact sections in chapter 4**).

The recreation resource is one that is constantly changing because of the specific interests of the users. BLM has little visitor use data **for recreational use of public lands even for developed recreation areas**. Again, **with limited development in both the Rio Puerco (48 wells in 20 years) and Taos (31 wells in 20 years) Resource Areas**, most areas are not likely to be impacted by oil and gas development. The major visitor use areas within the Albuquerque District and Farmington Resource Area are not on public lands and are, therefore, not administered by the BLM. There are visitor use figures for these areas, which are used to (establish patterns of consistency or change of use?). However, none of these **areas and uses** are likely to be impacted by oil and gas leasing and development. **The BLM does not have data to quantify the amount of acreage available for or used for recreation purposes in undeveloped areas of the resource areas. Therefore, estimates can only be made as to the amount of acres that might not be available for undeveloped types of recreation purposes and uses. Although there would be a limited reduction in the amount of acreage used throughout the resource areas for undeveloped recreational use, people will usually move to other areas.**

BLM administers wilderness and wilderness study areas in the Albuquerque District. **With special provisions for the type and amount of development that can occur in wilderness areas, wilderness areas are protected from oil and gas development.** The wilderness study areas could be turned down by Congress for wilderness designation. If that were to occur, leasing and development in certain areas would reduce a acreage containing wilderness values. These acreages can not be determined until Congress issues it's decisions on WSAs.

Wildlife data does not indicate specific numbers in areas directly related to oil and gas or other resource uses. While most comments and reports indicate some past reduction in wildlife numbers, specific numbers and causes for these reductions are not known. BLM has made an estimate of the potential loss of animals from projected oil and gas development and has indicated that a like amount of loss could occur from the development of leases on other oil and gas ownerships in the future. Since the administration is split nearly 50 percent BLM administered and 50 percent other administration. BLMs estimates are shown in the summary table and cumulative impact sections in chapter 4. Special status species management are discussed in Appendix I.

Soils (See Cumulative Section in Chapter 4.)

Hydrology (See Cumulative Section in Chapter 4.)

L2-P Cont.

Cultural resources on BLM administered estate include archaeological, historic, and socio-cultural properties. BLM attempts to protect a representative sample of a full array of cultural resources found on BLM administered land. Past impacts to cultural resources result from sites not being visible from the surface, being disturbed by construction, and from vandalism resulting from greater public knowledge and access. A total of sites impacted in the past is not available. However, over the years inventories have been conducted in the Farmington Resource Area. An average of one cultural site has been identified for each well facility. Assuming this has been true through the history of oil and gas development and 22,000 wells in the San Juan Basin, it would indicate a potential for disturbance of approximately 22,000 sites. Under current management, two-thirds of these sites would be avoided and one-third would require mitigation. It is estimated that as many as one-third of the wells may have been drilled before BLM had the expertise and information to protect these sites. Therefore, there may have been direct impacts to these sites without work to recover the data. Currently and in the future, BLM is committed to avoiding sites on up to 4,812 wells that may be developed and to mitigate impacts that cannot be avoided by data recovery. Cultural resource impacts of mining, highway construction, agricultural development, ORV use, and other activities are not known.

Paleontological impacts are not known for past, present, or future development. However, current management practices would be adequate to prevent significant impacts to the paleontological resources in the Albuquerque District. Potential impacts from oil and gas leasing and development would be mitigated on a case-by-case basis. Future oil and gas development on nonfederal oil and gas acres could cause greater impacts than the federal development because the number of wells projected to be drilled is slightly higher and development on private lands is less restrictive.

The impact information available for BLM forest and woodland resources are presented in the summary table and cumulative impact sections in chapter 4. Additional information is not available. Although not presented here, additional consideration was also given to other resource components such as air.

Thank you for the opportunity to review this document. If we may be of any assistance in the initiation of consultation, please contact this office at your earliest convenience at (505) 883-7877 or FTS 474-7877.



Jennifer Fowler-Propst

Attachment

cc: (w/atc)h
Director, New Mexico Department of Game and Fish, Santa Fe, New Mexico
Regional Director, U.S. Bureau of Reclamation, Salt Lake City, Utah
Mr. Jim Platt, New Mexico Environment Department, Surface Water Quality
Bureau, Santa Fe, New Mexico
Director, U.S. Fish and Wildlife Service, Branch of Federal Activities (ERT),
Washington, D.C.
Regional Director, U.S. Fish and Wildlife Service, Albuquerque, New Mexico
Regional Director, U.S. Fish and Wildlife Service, Fish and Wildlife
Enhancement, Albuquerque, New Mexico
Oil Pit Coordinator, U.S. Fish and Wildlife Service, Division of Refuges,
Albuquerque, New Mexico

TITLE: SAN JUAN RIVER IRRIGATION DRAINAGE STUDY-90

TABULATED RESULTS OF PAH CONFOUNDS DETECTED IN FISH AND MIGRATORY BIRDS FROM THE SAN JUAN RIVER, NEW MEXICO

ORGANISM	MATRIX	SAMPLE TYPE	LOCATION	INITIALS/WEIGHT KG/G	INITIALS/WEIGHT KG/G	BEIJO (a) PYRENE KG/G
CH. CATFISH	FISH (BILE)	COMPOSITE (5)	HAVAJO RES. SAN JUAN ARM	120,000	22,000	280
CH. CATFISH	FISH (BILE)	COMPOSITE (3)	FRUITLAND to DOGRACK	110,000	29,000	430
CH. CATFISH	FISH (BILE)	COMPOSITE (5)	SHILOCK to CUDAI	77,000	17,000	240
CH. CATFISH	FISH (BILE)	COMPOSITE (2)	CUDAI to HANXOS	140,000	41,000	630
CARP	FISH (BILE)	COMPOSITE (5)	HAVAJO RES. PINE R. ARM	52,000	8,200	130
CARP	FISH (BILE)	COMPOSITE (3)	BLOOMFIELD to LEE ACRES	180,000	42,000	600
CARP	FISH (BILE)	COMPOSITE (5)	CUDAI to HANXOS	71,000	18,000	290
N. PIKE***	FISH (BILE)	INDIVIDUAL	HAVAJO RES. SAN JUAN ARM	8500	2,300	ND
B.L. BULLHEAD	FISH (BILE)	COMPOSITE (4)	HAVAJO RES. PINE R. ARM	100,000	21,000	460
MALLARD*	BIRD (BILE)	INDIVIDUAL	RAPI	160,000	25,000	140
COOT*	BIRD (BILE)	COMPOSITE (2)	GALLEDOS & AVOCET	140,000	37,000	330
MALLARD	BIRD (BILE)	INDIVIDUAL	WEST HANDEED	47,000	7,300	350
CINN. TEAL*	BIRD (BILE)	COMPOSITE (3)	EAST HANDEED	76,000	16,000	330
AVOCET	BIRD (BILE)	INDIVIDUAL	WEST RAPI	210,000	150,000	550
MALLARD	BIRD (BILE)	INDIVIDUAL	WEST FRUITLAND	73,000	13,000	380
CINN. TEAL*	BIRD (BILE)	COMPOSITE (3)	EAST FRUITLAND	15,000	3,300	320
COOT	BIRD (BILE)	COMPOSITE (3)	RELICT WETLAND	210,000	29,000	310

*CHROMIUMS SUGGEST POSSIBLE SAMPLE DEGRADATION

*** REPRESENTS BASELINE VALUES FOR PAH CONFOUNDS LEVELS IN FISH BASED UPON NAT'L MARINE FISHERIES SERVICE DATA

Robert Dale, District Manager
Bureau of Land Management
435 Montano, N. E.
Albuquerque, New Mexico 87107

Re: Draft "Albuquerque District Resource Management Plan
Amendment/Environmental Impact Statement" - June 1991

June 28, 1991

Dear Sir:

I have only a couple comments as my primary interest in the BLM is its attitude towards the amateur mineral collector (only the minerals which are integral components of rocks and not the oil and gas minerals).

- 1. OFFER TO LEASE AND LEASE FOR OIL AND GAS
Section 2 - Royalties

I recall that there has been some concern that the BLM has not, in the past, received all the royalties to which it was entitled. Is there something, stated elsewhere, as to what action the lessee must take to ensure that the BLM receives ALL the royalties to which it is entitled?

L3-A

- 2. CORPS OF ENGINEERS SPECIAL STIPULATIONS
item 6
- 3. BUREAU OF RECLAMATION SPECIAL OIL AND GAS STIPULATIONS
item 2

This includes the statement that nothing should happen within 2,000 feet of the any major structure.

This includes the statement that nothing should happen within 1,500 feet of a dam.

I am wondering why a lessee can get within 2,000 feet of a Corps of Engineer dam and 1,500 feet of a Bureau of Reclamation dam. It seems as though there should be no difference or something should be clarified.

Yours truly,

T. J. Schmierer

5010 Crownpoint Court, N. W.
Albuquerque, New Mexico 87120-112

L3-A (Royalties). The following regulations [Onshore Orders and Notice to Lessees (NTLs)] describe in detail the proper handling, measurement, site security, and royalty reporting requirements on federal and Indian oil and gas leases.

- * 43 CFR Part 3160 - Onshore Oil and Gas Operations.
- * 30 CFR Subchapter A - Royalty Management, Part 200.
- * Onshore Oil and Gas Order No. 3, Site Security.
- * Onshore Oil and Gas Order No. 4, Measurement of Oil.
- * Onshore Oil and Gas Order No. 5, Measurement of Gas.
- * Notice to Lessees and Operators of Onshore Federal and Indian Oil and Gas Leases (NTL-4A) - Royalty or Compensation for Oil and Gas Lost.

L3-B (Oil and Gas Stipulation). The Corps of Engineers and the Bureau of Reclamation reserve the right to apply site specific stipulations developed on a case-by-case basis. Therefore, each agency may impose different requirements such as the minimum distance between oil or gas activities and dams.

August 13, 1991

Merrion Oil & Gas Corporation
 610 Reilly Avenue • Post Office Box 840
 Farmington, New Mexico 87499

Phone 505-327-9801

4

Robert Dale, District Manager
 Bureau Of Land Management
 435 Montano NE
 Albuquerque, New Mexico 87107

Re: Banning Oil and Gas leasing
 Proposed RMP/Final EIS

Dear Mr. Dale:

This letter will accomplish two objectives. One, provide written comment for consideration concerning the amendment to BLM's 1988 Resource Management Plan (RMP). Two, allow banned federal oil and gas acreage in the Carracas Mesa Area (T 32 N, R 5 W) to be placed on competitive lease sale lists.

Map 5 of the Draft Amendment to the BLM's 1988 RMP sets out the following seven areas that are closed to oil and gas leasing:

	Management Area	Designation	Township/Range	Acres
1)	Carracas Mesa	SMA	T31, 32N, R5, 6W	7,000
2)	Reese Canyon	RNA	T32N, R7, 8W	apx. 2,200
3)	Simon Canyon	SMA	T30, 31N, R8W	3,811
4)	The Hogback	ACEC	T29, 30N, R15, 16W	9,480
5)	Thomas Canyon	SMA	T32N, R13W	4,630
6)	Chactra Mesa Com	SMA	T19N, R7, 8W	11,330
7)	Negro Canyon	SMA	T31, 32N R7, 8W	1,600
			TOTAL	<u>40,051</u>

L4-A

L4-A (Areas Closed to Leasing). Of the 40,051 acres listed for the seven special management areas, there are 33,131 acres of federal oil or gas estate. Of the 33,131 acres, 22,137 acres are leased. There is at least one well in each of the special management areas. There are a total of 128 wells in the seven special management areas. Based on the fact that these leases have at least one producing well, the leases would be held by production. This then results in 10,994 acres unavailable for leasing and not 40,051 acres.

Issuance of new leases, with a no surface occupancy stipulation, in SMAs closed (discretionarily) to new leasing was considered on page 2-18. As was noted above, much of the federal mineral estate is leased in these SMAs. Although leasing with a NSO stipulation is the most restrictive stipulation that can be applied to new leases, it is less restrictive than no leasing (BLM Handbook H-1624). Although wells would not be drilled on portions leased with a NSO stipulation, development of such leases may occur on adjacent, older leases in the SMAs. Additional development on existing leases, as a result of leases with NSO stipulation, would not be consistent with or provide the level of protection specified for areas under special management area designation and management. The 10,994 acres in these seven special management areas will remain in the closed to oil and gas leasing category in the proposed alternative.

Before a complete ban of oil and gas leasing is put into effect, the utilization of lease stipulations needs to be closely examined. BLM Director, Cy Jamison is quoted as saying in the Albuquerque Journal on May 5th that "the President has asked us (BLM) to take a balanced approach" in managing oil and gas activities and protection of the environment. Director Jamison endorsed the President's call for a balanced approach in his talk before oil and gas representatives from which said article was written.

Banning oil and gas leasing in an area such as Carracas Mesa, which does not even include an endangered species does not appear to be the balanced approach that the President was calling for.

August 13, 1991
Robert Dale, District Manager
Bureau Of Land Management
Page 2

The Carracas Mesa area is covered by Farmington BLM Leasing Stipulation #11 which was placed in effect 12 years ago. This stipulation is in the form of a "withdrawal order", and bans oil and gas leasing, "pending a final decision on a planning report."

From a letter received from Don Ellsworth of the Farmington Area Office dated June 18, 1991, it appears that the BLM's position is that the "planning report" is in fact completed with the adoption of the Resource Management Plan that occurred in July, 1988. We would appreciate a copy of this portion of the report or RMP, as we apparently missed out in our opportunity to present comments. It will also be helpful if you would provide us with copies of the notices of public hearings held in developing this document.

We believe that the Federal Land Policy & Management Act, 1976, requires considerable public input before such de facto withdrawals are made. In our research of this matter it is interesting to note that the Interagency Agreement for the Protection of Environmental Resources and Mineral Development, (Agreement), prepared by the BLM and others, clearly states that natural gas and oil as well as wildlife habitat, are "resource values to be protected." Your complete ban of leasing does not seem to reflect this policy.

This Agreement also identifies certain mitigation measures adopted for the Carracas Mesa Unit. Of particular interest is Measure #5, which prohibits oil or gas activity only between December 1 and March 31, to prevent disturbance to wildlife winter range, (although providing for some exceptions on a case-by-case basis), and Measure #7 which allows drilling activities between July 15 and November 30, and allows maintenance operations throughout the year.

As we read these measures, it seems that leases could be awarded with the stipulation that drilling only be allowed during the aforementioned four and a half month period. These types of lease stipulations seem to be in line with the "balanced approach" that our President was referring to. It also does not appear that the Farmington Area Office is aware of Cy Jamison's and the President's position concerning the balance between drilling and nature.

Finally, we wish to point out a recent decision by the Interior Board of Land Appeals, Uintah Mountain Club, 112 IBLA 287, January 5, 1990. This decision states that a BLM decision implementing a RMP will be affirmed only if the decision is based on consideration of all relative factors and is supported by the record. We are not convinced that this is the case concerning Carracas Mesa.

August 13, 1991
Robert Dale, District Manager
Bureau Of Land Management
Page 3

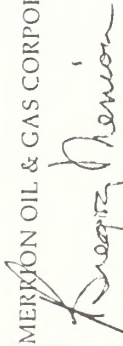
Please note that we are serious about trying to open this area to future leasing and intend to pursue this effort to the highest level necessary. We believe that the records show that mineral development and wildlife management are compatible in this area of New Mexico.

To completely close an area to further leasing of a valuable resource without closely investigating the utilization of lease stipulations is not proper or required.

Please respond with specifics. We would also welcome a meeting with the appropriate management level needed to reverse this situation. Please direct any questions to Mr. Patrick Hegarty at the number or address listed above.

Sincerely,

MERKON OIL & GAS CORPORATION


J. Gregory Merrion
President

xc: Don Ellsworth, Farmington Area Office



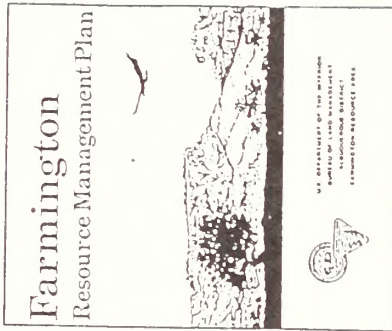
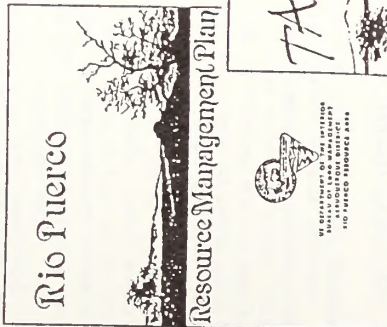
United States Department of the Interior
Bureau of Land Management
Albuquerque District Office
Albuquerque, New Mexico

June 1991



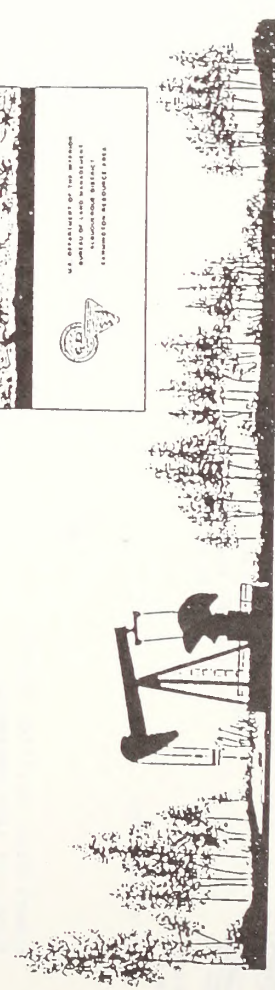
Draft

ALBUQUERQUE DISTRICT RESOURCE MANAGEMENT PLAN AMENDMENT/ENVIRONMENTAL IMPACT STATEMENT OIL & GAS LEASING AND DEVELOPMENT



Thank you for
the opportunity to
comment.

Santa Fe N.F.
Land Mgmt. Planning





State of New Mexico
ENVIRONMENT DEPARTMENT
Harold Runnels Building
1190 St. Francis Drive, P.O. Box 26110
Santa Fe, New Mexico 87502
(505) 827-2850

JUDITH M. ESPINOSA
SECRETARY

RON CURRY
DEPUTY SECRETARY

BRUCE KING
GOVERNOR

14 August 1991

6

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Robert Dale, District Manager
Bureau of Land Management
435 Montano NE
Albuquerque, New Mexico 87107

Dear Mr. Dale:

Staff of the Surface Water Quality Bureau of the NM Environment Department have completed our review of the Draft Albuquerque District Resource Management Plan Amendment/Environmental Impact Statement for Oil & Gas Leasing and Development. While you will receive a copy of this review through the normal State Clearinghouse process, the results of our analysis are being directly forwarded to you due to our concerns with the proposal. Our analysis indicates that:

- 1) The document scope does not meet NEPA requirements, and
- 2) Significant water quality concerns are not addressed.

Our review indicates that BLM has abrogated its designated management authorities for nonpoint source water pollution control. Specific requirements of the State's Nonpoint Source Management Program have been ignored in watersheds already suffering from lack of effective water quality management. Activities performed on BLM properties during existing oil and gas leasing and development have been shown to result in significant water quality impairment of the State's waters. The proposed activities would exacerbate an already poor situation.

Under authority of section 313 of the federal Water Pollution Control Act and Executive Order 12088, you are required to provide this office with:

- 1) An analysis of water quality effects of existing BLM management practices on the main stem of the San Juan River, its tributaries and wetlands,
- 2) An analysis of potential effects of each of the proposed alternatives on water quality,
- 3) A list of Best Management Practices which will be implemented to prevent water quality impairment, and
- 4) Adequate assurances that BMP's will be evaluated for their effectiveness and, if necessary, modified to insure attainment of water quality standards.

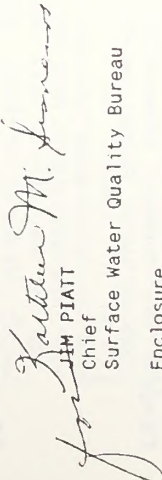
These reviews should be performed by individuals who are knowledgeable in hydrology and water quality.

Mr. Robert Dale
Page Two
14 August 1991

As you are aware, Executive Order 12088 requires "... the Executive agency shall promptly consult with the notifying agency and provide for its approval a plan to achieve and maintain compliance..." (section 1-601, emphasis added). Until such a plan has been developed and approved by this department the BLM should hold in abeyance any proposed actions developed under this draft Environmental Impact Statement.

The NM Environment Department requests that this analysis of the Draft Environmental Impact Statement be made a part of the record. Please address your reviews to Mr. David Coss of my staff at 827-2793.

Sincerely,


Kathleen M. Finney
Chief
Surface Water Quality Bureau

Enclosure

xc w/ enclosure: Members NM Water Quality Control Commission
Larry Woodard, State Director, Bureau of Land Management
Kirk Koch, Hydrologist, BLM
Susan Alexander, NPS Coordinator, Region VI, Environmental
Protection Agency

JP/clb

MEMORANDUM

TO: Gedi Cibas, Program Support Bureau

THROUGH: Jim Platt, Chief, Surface Water Quality Bureau

FROM: DC David Coss, SRS II, Surface Water Quality Bureau

RE: Draft Albuquerque District Resource Management Plan Amendment/Environmental Impact Statement, File # 0228

DATE: 11 August 1991

Staff have reviewed the above-referenced document prepared by the U.S. Bureau of Land Management (BLM). The purpose of this document was to present proposed changes to the BLM's Resource Management Plan (RMP) for oil and gas leasing and development in the Albuquerque District and to present an environmental impact statement on the RMP changes. The draft document fails short in three areas. The range of alternatives addressed is not broad enough to fulfill the intent of the National Environmental Quality Act (NEPA). The report is inadequate in addressing water quality concerns presented by oil and gas leasing and development in the Albuquerque District, especially the Farmington Resource Area. Such concerns have already resulted in water quality impairment in the area as documented in the New Mexico Water Quality Control Commission 1990 report to Congress entitled Water Quality and Water Pollution Control in New Mexico, 1990. Finally, as an amendment to an RMP, the document does not comply with the New Mexico Nonpoint Source Management Program. Consequently, BLM could be in violation of the federal consistency requirements of Section 319 of the Federal Water Pollution Control Act.

Our review focused on nonpoint source (NPS) water quality issues in the Farmington Resource Area within the Albuquerque District. Oil and gas leasing and development in the Taos and Rio Huerco Areas is minor compared to the Farmington Resource Area.

Range of Alternatives Considered Under NEPA

On the surface, it appears that there is no significant difference between the no action alternative, the production alternative and the preferred alternative. Therefore, the document does not meet NEPA requirements. For example, the number of wells drilled ranges from 4,342 to 4,312 to 4,604. Yet, while the letter to interested citizens on page 5-1 states that the intent of the RMP amendment is "not to open up new areas to development", the preferred alternative calls for 2,600 acres to be changed from discretionary closure status to high intensity development status in the Farmington Resource Area. Under the no action alternative 118,100 acres are closed to oil and gas activity. Under the preferred alternative, only 75,500 acres would be closed. Staff

L6-A (Range of Alternatives). See comment response to comment L2-A. BLM believes that the requirement to look at a reasonable range of alternatives has been met.

believes there could be a significant water quality impact from this change that should be addressed in detail by BLM.

Analysis of Water Quality Impacts

On page 1-11 and 1-12, BLM identified several issues to be addressed in the document. Issue 2 was to determine the effect of developing oil and gas leases in designated special management areas and other areas of concern. Issue 4 was to identify the cumulative impact of oil and gas development. Issue 5 was to identify if existing management constraints on oil and gas leasing and development are proper and sufficient to protect other resource values. The document did not address these issues as they pertain to water quality in the San Juan River Basin.

L6-B

BLM states that they have permitted 37,650 miles of roads in the Farmington Resource Area and that total existing surface disturbance is 202,675 acres. The water quality impacts associated with over 37,000 miles of dirt roads in the Farmington Resource Area are not assessed. BLM notes on page 4-17 that existing oil and gas development has resulted in sedimentation, salt loading of the Colorado River system, and non-point source pollution of major waters and watersheds but then states that "these problems appear to be the result of grazing and agricultural practices." The 1990 Section 305(b) report to Congress from the New Mexico Water Quality Control Commission reports the San Juan River and Navajo Reservoir are impacted by metals, siltation, turbidity, and salinity. Agriculture and resource extraction are listed as the probable sources of these impacts.

L6-C

L6-C (Water Quality of 13,000 miles of Dirt Roads). Upon review of the numbers presented for existing development in Chapter 1, errors were found in the numbers used and calculations performed for the estimated miles of road. Approximately 0.5 miles of road per well was used in place of 1.5 miles used in earlier calculations (see Table 4-1). This then computes to approximately 13,000 miles of road. Area disturbed for roads is an estimated 35,990 acres (see footnote 2 to the History and Background section in Chapter 1). The estimated 35,990 acres, for roads, were used in calculating sediment and salt yields. There are text changes to the SOIL AND HYDROLOGY sections in Chapters 3 and 4.

L6-D

In the document's analysis of environmental impacts, it is unacceptable for BLM to dismiss water quality issues. On page 4-17, they state, "Except for identifying the total number of wells and estimating the amount of additional acreage placed under long-term oil and gas development, the extent of further degradation to the soil and water of the San Juan Basin cannot be determined." This statement is repeated on page 4-19 in assessing the environmental impact of the preferred alternative. In discussing the impacts of the production alternative on page 4-32, BLM states "No quantification has been made of the units of soil lost to erosion and units of water quality degraded by salts and dissolved solids resulting from erosion." Hence, there is really no assessment of water quality impacts resulting from BLM's oil and gas leasing and development program in the document.

L6-E

L6-D (Impacts to Navajo Reservoir and San Juan River). The New Mexico Nonpoint Source Pollution Water Quality Assessment (September 1988 Update April 1989) was the source of the statement "These problems appear to be the result of grazing and agricultural practices". A copy of the 1990 report was not available for our review and use during the preparation of the DEIS. The 1990 report was used in preparation of the final plan amendment and other sources of problems have been identified.

L6-E (Water Quality Impacts). See comment response to comment L6-C.

Of particular concern to the Surface Water Bureau is the plan under the preferred alternative to change 3,521 acres of the Simon Canyon Recreation Area from discretionary closure status to high intensity development status. This area is relatively undisturbed at present and Simon Canyon is an ephemeral tributary of the San Juan River in a segment that is one of the State's most significant high quality coldwater fisheries. BLM states on page 2-20, "A discretionary closure of land to leasing and development is normally implemented only after less restrictive measures are considered and found

inadequate to provide appropriate protection for other resource values and uses that cannot share land use with oil and gas development." BLM must explain what "adequate" measures it proposes to protect water quality in the San Juan River if Simon Canyon is opened for "high intensity development."

L6-F

BLM states in the document that areas changed from discretionary closure status to high intensity development status will be protected by "controlled surface use" stipulations in the leases. They state that the preferred alternative is "implementing the least restrictive constraints that will provide adequate resource protection while allowing oil and gas leasing and development to occur." Given that there is no analysis of the effects on water quality of past, present and planned activities, BLM can not show that its RMP meets the objective of resource protection.

NPS PROGRAM ISSUES

Under the New Mexico Nonpoint Source Management Program, BLM, as a designated management agency, committed to include NPS water quality management objectives in all new Resource Management Plans and, where applicable, incorporate and implement water quality BMPs in all new or amended activity plans for all management activities. BLM must meet these commitments in order to comply with Federal consistency requirements of Section 319 of the Federal Water Pollution Control Act. The RMP amendments in the draft document preferred alternative do not fulfill BLM's obligations under the New Mexico Nonpoint Source Management Program and the Federal Clean Water Act.

On page 2-30, BLM states it is developing a NPS plan. On page 3-16 BLM states it is implementing a NPS pollution control program. To meet federal consistency requirements under section 319 of the federal Water Pollution Control Act, the NPS plan must be submitted to the Environment Department for approval. The draft document by itself does not fulfill consistency requirements. Nor are the requirements met by stating that it will be done in the future.

L6-G

A review of the lease language and special stipulations BLM proposes in Appendix B of the document shows insufficient attention has been paid to NPS control and abatement. The "controlled surface use" stipulations BLM would use to protect newly open areas such as Simon Canyon address recreation, scenic values and wildlife. They do not address water quality. Lease conditions imposed for pipelines and well pads do contain requirements to use best management practices for protection of surface waters. Management practices are required to maintain a buffer strip between pipelines and stream courses and to build berms between waste pits and water courses at well sites.

L6-G

No best management practices specifically for water quality protection in road construction were found in the lease conditions in Appendix B. Lease conditions seeking to ensure adequate drainage and road integrity may contribute to water quality

L6-F (High-Intensity Development in Simon Canyon). The high-intensity development area was defined for impact analysis purposes. This is where development has historically and is currently taking place in the resource area. Based on the amount of development in this area, most of the future development is also projected to occur in this area. The term "high-intensity development" has nothing to do with the rate at which development will occur. The extent of development is limited by well spacing units. Development of gas resources is limited to 160- or 320-acres per well. The rate or number of wells drilled at any time is based primarily on economics.

All but 250 acres of the Simon Canyon Recreation Area ACEC was moved from the discretionary closure category to leasing with a controlled surface use constraint stipulation. Although this change was made, new leases will probably not be issued in this ACEC. This assumption is based on the fact that there are oil or gas leases on 93 percent of the ACEC. These leases were issued before Simon Canyon was designated a recreation area and ACEC. There are producing wells on these leases. As a result, these leases will probably not expire and come up for renewal during the life of this plan (20 years). The 250 unleased acres will remain in the closed to leasing category in the proposed alternative.

Limitations on oil and gas development are presented in the Simon Canyon Recreation Area Management Plan (1984). "Future oil and gas development will not be allowed within Simon Canyon. Development of leases near the rim (on Pump Mesa) will be allowed when visual impacts, as viewed from the interior of the canyon, can be avoided or are not noticeable." ORV use of the area was also defined: "Simon Canyon is officially closed to ORV use, with vehicle access and travel in the rest of the area (above the 6,200 foot contour) limited to existing roads and trails". Another management action developed to protect the Simon Canyon streambed states: "Deny sediment modification or channel flow proposals that would adversely affect the stream flow into the San Juan River and the natural quality of the canyon bottom".

The management actions noted above have been and will continue to be enforced in the Simon Canyon Recreation Area ACEC. Oil and gas development will not occur in Simon Canyon. There will, therefore, not be surface disturbing actions in Simon Canyon or along the San Juan River.

L6-G (Water Stipulations). The BLM, as a multiple-use land management agency, considers and permits a wide variety of activities on public land. Almost all activities result in surface disturbances. In all cases, across all programs, surface restoration and reclamation measures and requirements are part of the authorized permits.

Specialists from all disciplines provide input, relative to their area of expertise, during the development of reclamation requirements for oil and gas development. In the case of Conditions of Approval (COAs), for Applications for Permit to Drill (APDs) and rights-of-way (ROWS), soil scientists and hydrologists provide input on the measures to be used to mitigate the impacts occurring from the construction of well

L6-G Cont.

pads, roads, and drilling pits. These mitigation measures and other requirements are used to mitigate impacts to water quality.

The following are examples of BLM soil and water practices found in COAs and ROWs, both for roads and pipelines. These examples are followed by a brief narrative, which describes how these mitigation requirements benefit soils and water quality.

Surface Reclamation Practices

Topsoiling an abandoned well pad or road.

Surface contouring of well pads and roads.

Watershed/Water Quality Benefits

Provides an acceptable growth medium for plants.

Provides better infiltration and less surface runoff of water, hence less erosion.

The macro- and microtopography of disturbed areas can be modified to increase depression storage, reduce slope length or eliminate unwanted ponding of water.

Mulching requirements.

Mulches can be used to:

(1) reduce evaporation which allows water to remain near the surface for a longer time. This enhances the opportunity for seedling survival during revegetation. (2) intercept raindrops which protects surfaces from puddling and splashing. This reduces the velocity of surface runoff, which correspondingly reduces surface erosion while increasing the infiltration time on newly restored surfaces.

Vegetation cover.

The amount and kind of vegetation cover, protecting rehabed well pads and roads is an important determinant of the infiltration, surface runoff, and erosion behavior of rehabed lands. This

L6-G Cont.

is also true for the hydraulic resistance of the surface to overland flow.

Road design standards in crowning, ditching, drainage, slope, and culvert placement, erosion in terms of detention time.

Sediment ponds, below large fills or points where road ditch discharge is dumped, prevents

Breaking up the drainage off of roads is accomplished by installing several drainage points. The volume of water coming off the road at any one point is not great enough to create headcutting or accelerated erosion.

Road cuts and fills.

Proper placement of road cuts and fills minimizes sediment loss caused by sheet and rill erosion flows.

COA reclamation requirements, that result in direct and indirect benefits to watershed and water quality, are listed below.

<u>Management Constraint</u>	<u>Item #</u>	<u>Page No.</u>	<u>Watershed/Water Quality Benefit</u>
COAs attached to APDs.	6	B-21	WS
	7	B-21	WS,WQ
	8	B-21	WQ
	9	B-21	WQ
	11	B-22	WQ
	12	B-22	WS,WQ
	13	B-22	WQ
	16	B-22	WS,WQ
	17	B-22	WS
	18	B-23	WS
	23-D	B-23	WQ
	23-E	B-24	WQ
	23-I	B-24	WQ
	23-K	B-24	WQ
	25-A	B-25	WS

L6-G Cont.

25-B	B-25	WS
25-C	B-25	WS
25-D	B-25	WS
25-E	B-25	WS,WQ

COAs attached to
Notices of Intent to
Conduct Geophysical
Exploration.

2	B-26	WS
3	B-26	WS
4	B-26	WS
5	B-26	WS
6	B-26	WQ
8	B-28	WS
9	B-28	WQ
10	B-28	WQ
13	B-28	WQ
14	B-28	WQ
15	B-28	WQ

COAs attached to
pipeline ROWs.

4b	B-30	WQ
4c	B-30	WQ
9	B-31	WS
16	B-32	WS
17	B-32	WS
18	B-32	WS, WQ
20	B-32	WS
21	B-33	WS, WQ
22	B-33	WS, WQ
23	B-33	WS, WQ
25	B-33	WS
26	B-33	WS
27	B-33	WS, WQ
29	B-33	WS
31	B-33	WS, WQ
32	B-34	WS
33	B-35	WS, WQ
38	B-35	WS, WQ
39	B-35	WS, WQ

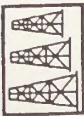
COAs attached to road
ROWs.

B	B-36	WS
C	B-36	WS, WQ
D	B-36	WS, WQ
F	B-37	WS
H	B-37	WS, WQ

degradation. Roads have been identified as a leading cause of NPS pollution in the State and are the single largest source of surface disturbance in ELM's oil and gas leasing and development program.

ELM states on page 1-12 that site-specific mitigation will be undertaken for individual projects under the RMP. This statement in no way satisfy's requirements to assess the NPS impacts of ELM's oil and gas leasing and development activities on water quality or ELM's federal consistency requirements to control and abate NPS pollution under Section 319.

Because of the concerns listed above, the Department should not support the proposed amendment of the RMP and implementation of the new oil and gas leasing and development activities.



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August 20, 1991

Mr. Robert Dale, District Manager
 Bureau of Land Management
 435 Montano NE
 Albuquerque, New Mexico 87107

Banning Oil and Gas leasing
 Proposed RMP/Final EIS

Dear Mr. Dale:

This letter is written comment for consideration concerning the Amendment to BLM's 1988 Resource Management Plan (RMP).

Map 5 of the Draft Amendment the BLM's 1988 RMP sets out the following seven areas that are closed to oil and gas leasing.

Management Area	Designation	Township/Range	Acres
1) Carracas Mesa	SMA	T31,32N,R5,6W	7000
2) Reese Canyon	RNA	T32N,R7,8W	apx. 2200
3) Simon Canyon	SMA	T30,31N,R8W	3811
4) The Hogback	ACEC	T29,30N,R15,16W	9480
5) Thomas Canyon	SMA	T32N,R13W	4630
6) Caraca Mesa ComSMA		T19N,R7,8W	11330
7) Negro Canyon	SMA	T31,32N,R7,8W	1600
TOTAL			40051

L7-A

L7-A (Areas Closed to Leasing). See comment response to comment L4-A.

We would like to add our voice to those many parties protesting the complete ban of oil and gas leasing in these areas. Joint use of these areas is in the publics best long term interest. Regulation and mitigation to offset any negative effects of oil and gas production are certainly something to be considered prior to a total ban. Let us all work together for the total common good.

Sincerely,

William Manchester
 William Manchester
 General Manager

jlm/wm



Natural Resources
Defense Council

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August 30, 1991

Robert Dale, District Manager
Albuquerque District
Bureau of Land Management
435 Montano NE
Albuquerque, NM 87107

Re: Resource Management Plan Amendment/Environmental
Impact Statement for Oil and Gas Leasing and
Development

Dear Mr. Dale:

We are writing on behalf of the Natural Resources
Defense Council (NRDC) regarding the draft Resource
Management Plan Amendment/Environmental Impact Statement
(RMP/EIS) for oil and gas leasing and development that has
been prepared by the Albuquerque District of the Bureau of
Land Management (BLM). According to the RMP/EIS, its
purpose is to update "management constraints on and
analyze() the environmental impacts of oil and gas leasing
and development" for the District.'

NRDC is a non-profit environmental membership
organization that has long been concerned about the manner
in which BLM administers publicly-owned resources,
including oil and gas resources, as well as the Bureau's
efforts to comply with the requirements of the National

¹RMP/EIS, at 1-1, June 1991.

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Environmental Policy Act (NEPA).² NRDC has more than 170,000 members nationwide, including residents of New Mexico.

The decision to amend the Farmington RMP and the preparation of this document were prompted in large part by a General Accounting Office (GAO) report highlighting inadequacies in BLM and Forest Service management plans and related environmental impact statements.³ In particular, GAO found that only seven of 82 land use plans and related EISS it renewed contained all the elements essential for evaluating the impacts of oil and gas development.⁴ In most cases, the documents examined contained no or an incomplete evaluation of the cumulative impacts of proposed development, with only 11 plans and EISS meeting GAO's criteria of adequacy.⁵ Our review of this EIS reveals that it too fails to fully evaluate cumulative impacts as well as to comply with other nondiscretionary requirements of NEPA and the Endangered Species Act (ESA).⁶

In brief, we submit that the draft suffers from four major deficiencies: First, the alternatives considered encompass far too narrow a range. BLM gave no consideration to options

²42 U.S.C. §4332.

³GAO, "Federal Land Management: Better Oil and Gas Information Needed to Support Land Use Decisions" (RCED-90-71) (1990), at 3.

⁴Id.

⁵Id., at 27 and app. II and III.

⁶16 U.S.C. § 1531, et seq.

involving the leasing of little or no land not already leased. Thus, the "alternatives" presented in the draft EIS are much more similar than dissimilar, and present no real choice. Moreover, none of the alternatives considered addressed any of numerous operational issues associated with development under existing leases -- all of which were issued in the absence of both an adequate land use plan or a comprehensive environmental analysis.

Second, the draft EIS fails to adequately evaluate the impact oil and gas production may have on threatened and endangered (T&E) species, violating the ESA as well as NEPA. Although the draft acknowledges that listed avian species could be affected by oil and gas drilling, it contains no analysis of the effects on those species. In addition, BLM admits that riparian habitat exists within the District, but made no attempt to inventory those areas for the presence of T&E species although they are known to inhabit such areas.

Third, not only effects on T&E species, but also other direct effects of the proposed leasing have been inadequately assessed. The EIS's discussion of the effects of leasing is limited to 20 years of development, despite its admission that those effects will last up to 30 years. Its analysis is limited to federal lands managed by BLM, even though it concedes that other lands will be affected. And, air quality impacts arising from the proposed development have been completely ignored in the EIS.

Last, but by no means least, as previously indicated, the draft's analysis of cumulative impacts is inadequate. It ignores a variety of activities on contiguous lands and, equally importantly, past activities on federal lands. For example, air quality effects resulting from past oil and gas development are completely omitted. Similarly, consideration of the effects of oil and gas development on non-BLM land in the region was entirely left out of the cumulative analysis. Until these and other inadequacies are fully rectified, BLM will continue to lack the requisite basis for leasing decisions in the Farmington District.

L8-A [I. THE EIS FAILS TO EVALUATE ALL REASONABLE ALTERNATIVES

L8-A (Range of Alternatives). See comment response to comment L2-A.

In this RMP/EIS, BLM acknowledges that NEPA requires it to "rigorously explore and objectively evaluate all reasonable alternatives" to the proposed action.⁷ Nonetheless, BLM has evaluated only three alternatives in the draft: 1) the No Action Alternative; 2) the Production Alternative; and 3) the Preferred Alternative.⁸ The difference in the number of projected wells among the alternatives is minimal, varying between 4,812 in the Production Alternative and 4,542 in the Preferred Alternative.⁹ Despite this objective lack of difference, BLM states "(t)hese

⁷RMP/EIS, at 2-1.

⁸Id.

⁹Id., at 2-4, table 2-2.

alternatives provide a reasonable range of options to guide oil and gas leasing and development in the Albuquerque District".¹⁰

In fact, this is a patently inadequate range of alternatives. BLM is not required to lease all land in this District other than that which is barred by statute from leasing. While it is clear that extensive oil and gas development will take place in the Albuquerque District because half of the federal oil and gas acres are already leased,¹¹ it would certainly be reasonable to consider not leasing some or all of the remaining acreage. To state that, because federal law allows federal oil and gas development, it is unreasonable to not permit development, as BLM does,¹² is illogical, unjustifiable and inconsistent with the dictates of NEPA.

Moreover, the EIS has failed to consider any alternative field development scenarios. Numerous decisions will have to be made with respect to existing leases in the District -- none of which were preceded by, or based on, adequate cumulative impact analyses or a land use plan that provided an adequate basis for leasing decisions. These as-yet-unmade decisions relate to production from new formations and involve such issues as spacing between wells and the location and number of roads and pipelines. There are a number of different ways each of these issues could

¹⁰Id., at 2-1.

¹¹Id., at 2-18.

¹²Id.

be resolved. For example, BLM could decide to require 640 or 240 acres between wells. The environmental impacts of these (and other) options are obviously relevant to choosing between them as well as to the number of new leases, if any, that should be issued and their location.

BLM has ignored an overriding truth about NEPA and EISs: that alternatives are "the heart" of the process.¹³ It should publish a new draft with a complete set of real alternatives, including options which involve leasing less land than contemplated by the current alternatives and which involve different conditions for actual development.

L8-B II. THE EIS CONTAINS AN INADEQUATE DISCUSSION OF THE DIRECT EFFECTS THE OIL AND GAS PRODUCTION WOULD HAVE ON THE ENVIRONMENT

Among other things, NEPA requires a comprehensive evaluation of all direct effects of all major federal actions significantly affecting the environment.¹⁴ The BLM Handbook, Planning For Fluid Mineral Resources¹⁵ (hereinafter Planning Handbook), prepared to ensure that plans or plan amendments for oil and gas decisions and associated environmental documents would comply with NEPA, defines direct impacts as those "ecological, aesthetic, historic, cultural, economic, social, or health

¹³40 C.F.R. § 1502.14.

¹⁴42 U.S.C. § 4332(c)(1). See also, 40 CFR § 1502.16(a).

¹⁵BLM Handbook H-1624-1 (May 7, 1990).

L8-B (Air Quality Impacts). Air quality is regulated for stationary sources including tank storage areas, pumping and compressor stations by the New Mexico Environmental Department. When approval of this type facility is requested, a modeling analysis is required to cover an area within 65 kilometers of the development site. If the modeling results indicate that ambient air quality standards can be met a permit is issued. If standards can not be met, modification of the proposal is required to bring the operation within air quality standards.

The major contaminants monitored for are nitrogen dioxide, carbon monoxide, sulphur dioxide and volatile organic compounds. Sample data from the Environmental Department's data base is shown in Appendix M. This is a cumulative impact levels at identified locations. The specific contaminants created by oil and gas wells have not been quantified. Therefore, the impacts for projected well development is only available to the extent that BLM has projected a level of development that should maintain the number of wells at a nearly constant level meaning that wells will be going out of production at a rate nearly equal to the number of new wells being developed. Air pollutants from wells should remain nearly constant and not increase significantly.

L8-B (Long-term Impact Analysis). Projecting impacts of BLM actions for 20 years extends the time beyond which these kinds of impact projections are reliable. Therefore, there is little value of extending the impact analysis beyond the 20 years.

L8-B (Impacts to Other Surface Ownership). BLM's analysis looks at the potential impact of developing a specific number of wells per alternative based on federal oil and gas development regardless of surface ownership and, therefore, it does consider impacts on land surface not administered by BLM.

effects" which occur at "the same time and place as the action."¹⁶ The Planning Handbook further requires that BLM personnel evaluate direct effects not only in terms of those areas managed by BLM, but also for surrounding areas not managed by BLM.¹⁷ BLM itself acknowledges in the draft EIS that the drilling of, and production from, the projected maximum of 4,812 wells in the Albuquerque District will have impacts not only on BLM-managed land, but also on land managed by various other federal agencies, Indian tribes, the state, and private individuals.¹⁸ However, BLM failed to include any discussion of several foreseeable direct effects of oil and gas development in this EIS.

First, the draft contains no discussion of the air quality effects that can be expected to result from the proposed development. Air quality impacts should be among the primary concerns of BLM when evaluating oil and gas development,¹⁹ but they have been ignored completely in the EIS.

Second, the draft EIS states that long-term impacts should be expected to occur for up to 30 years.²⁰ In spite of this statement, however, the impacts of the three alternatives are

¹⁶Planning Handbook, III-9.

¹⁷Id., at III-10, III-12.

¹⁸RMP/EIS, at 4-1.

¹⁹See, e.g., Planning Handbook, at 29, illustration 6.

²⁰RMP/EIS, at 4-1.

discussed for only 20 years.²¹ Third, notwithstanding its acknowledgement that non-BLM land will be affected by leasing and development, the EIS contains no discussion of what those effects will be. Instead, it looks only at impacts to lands managed by BLM.²²

In short, the draft fails to satisfy BLM's own guidance. We simply cannot understand how or why BLM has refused to examine impacts that it has acknowledged will occur in this specific area and that its own guidance requires be examined.

L8-C III. BLM HAS VIOLATED NEPA, AS WELL AS THE ESA, BY INADEQUATELY EVALUATING THE EFFECTS OF OIL AND GAS DEVELOPMENT ON PROTECTED SPECIES WITHIN THE PRODUCTION AREAS.

In addition to the omissions discussed above, the EIS also fails, in two separate contexts, to fully evaluate effects the oil and gas development might have on threatened or endangered species. In both of these contexts, BLM's failure violates not only NEPA, but also the ESA.

First, BLM has failed to evaluate the direct effects it has conceded may occur to certain T&E species known to exist in the production areas. Second, BLM failed to investigate whether habitat known to have a high likelihood of supporting protected species, actually contains such species. Lack of this critical information makes rational, environmentally responsible

²¹Id., at S-1.

²²Id.

L8-C (T&E Impact Analysis). See comment response to comment L2-B and Appendix I.

L8-C (Riparian Analysis). The BLM does not state on Page 4-14, 4-15 that riparian habitat could be adversely affected by the proposed drilling. We have identified on these pages stipulations such as no surface occupancy, berms, dikes, etc. that have been used for years and shown effective in preventing surface disturbance and off-site contamination from oil and gas activities. The policy for riparian areas is presented in the continuing management guidance section in chapter 2. It is included as part of the response to this comment. Resource information on riparian habitat is presented for the high-intensity development area in each resource area.

"Since 1977, riparian area management has received increasing national attention. Riparian areas are unique and among the most productive and important ecosystems managed by the BLM. Because riparian areas only constitute about 1 percent of the public lands, they are also one of the most limited wildlife habitats managed by BLM. In 1987 the BLM adopted a Riparian Area Management Policy (USDI, BLM 1987b).

The BLM's goals in riparian management are to maintain, restore, or improve riparian values to achieve a healthy and productive ecological condition for maximum long-term benefits. The BLM pursues these goals in the oil and gas program by following STCs and COAs (refer to Appendices B-2 and B-3)." (USDI, BLM 1991).

Farmington Resource Area

Riparian habitat in the high-intensity development area is associated with permanent water on public lands and is limited to 39 scattered tracts. Most of the land adjacent to the scattered BLM parcels is private land. These tracts contain 853 acres of riparian habitat and approximately 2,100 acres of associated upland habitat along the San Juan, Animas, and La Plata Rivers. These rivers are the only perennial streams on public lands. Small cottonwood stands occur in some major washes and around a few stock reservoirs, springs, and seeps. Greasewood and rabbitbrush stands and occasional patches of tamarisk occur along some washes. Some of these areas have been mapped as special habitat features. The steep rocky nature of the borders of Navajo Reservoir, combined with water level fluctuations, prevent the development of a permanent riparian vegetation border around the reservoir. Numerous springs and seeps are scattered throughout the northern half of the resource area. Nineteen (19) springs have been developed for wildlife. In general, wildlife use of these developments is not extensive.

Riparian habitat in the low-intensity development area is limited to small cottonwood stands occurring in some of the major washes and around a few stock reservoirs, springs, and seeps. Greasewood and rabbitbrush stands and occasional patches of

L8-C Cont.

tamarisk occur along some washes. With most of the land around BLMs river tracts being private, protection of riparian areas adjacent to BLMs river tracts is dependent on negotiations between the land owner and lessee.

Riparian SMA

River Tracts SMA

"There are 39 river tracts containing 2,953 acres of public lands scattered along the San Juan, Animas, and La Plata Rivers. Vegetation communities on these tracts vary from upland types containing no riparian vegetation to stands of woody riparian species such as cottonwood, Russian olive, and tamarisk. Some of the tracts also contain wetland communities. The riparian and wetland communities support a variety of wildlife species not commonly found elsewhere in the Resource Area.

The river tracts are also potential recreation and access sites for the public. Some of the tracts have legal access, others do not. ...Management incorporating both wildlife and recreation concerns is needed to serve the public and protect the resources on these areas.

...In general the SMA is designed to protect and rehabilitate the riparian and wetland habitats and, when compatible with wildlife, provide river access and recreation sites for the public." The second management prescription (1) closes the unleased portions of the SMA to oil and gas leasing, and (3) requires the application of special stipulations or siting requirements on APDs for existing leases.

Rio Puerco Resource Area

Riparian habitat in the high intensity development area is limited to a few drainages and small areas around stock ponds and springs. Generally, the vegetation in these riparian zones consists of salt cedar, alkali sacaton, and in some areas sparsely scattered cottonwoods. Because of the lack of vegetative diversity and distance from major migration corridors, riparian wildlife habitat in the Rio Puerco is of limited significance. Additionally, these areas boarder water sources and are affected and constrained in value by livestock use. Protection of riparian areas on private land is dependent on negotiations between the land owner and lessee.

Taos Resource Area

Riparian habitat that exists in the high-intensity development area is associated with split estate (private surface with federal minerals). BLM biologists have not conducted wildlife inventories in this area. Riparian areas are limited to drainages and small areas around stock ponds and springs. Protection of riparian areas on private land is dependent on negotiations between the land owner and lessee.

decisionmaking about lease constraints impossible.

A. The RMP/EIS fails to fully evaluate the effects oil and gas development will have on threatened and endangered species within the development areas.

According to the RMP/EIS, 27,611 acres within the Albuquerque District have been previously designated for specific protection because they contain species which are proposed for listing, candidates for listing, or are officially listed pursuant to the ESA.²³ In particular, these acres provide bald eagle and raptor use areas.²⁴ Moreover, we have reason to believe that three T&E plant species are found within the Farmington Resource Area, although no mention is made of them in the drafts. BLM further admits that 706 of the protected acres "could be disturbed by oil and gas development under one or more of the alternatives considered."²⁵ BLM fails to discuss these impacts any further, however, specifically mentioning T&E species only under "Environmental Concerns Considered but Dropped from Study."²⁶

As discussed above, NEPA requires discussion of all direct impacts. By omitting any discussion of the direct impacts that the proposed action and alternatives concededly could have on T&E species, BLM has patently failed to satisfy its legal

²³RMP/EIS, supra note 1, at 1-13.

²⁴Id., at 4-14.

²⁵Id., at 1-13.

²⁶Id., at 1-13.

obligations. Even assuming that none of the alternatives under consideration will jeopardize the continued existence of one or more of these species, BLM must still undertake a comprehensive evaluation of the effects the proposed drilling could have on them in order to comply with NEPA.

In addition to violating NEPA, BLM's failure to evaluate the effects of the proposed development on T&E species violates the terms of the ESA. Rather than analyze these effects, BLM states it will protect T&E species by barring oil and gas development where and when they are found in the future.²⁷ This claim is similar to that advanced by BLM and rejected in Conner v. Burford.²⁸

In Conner, BLM argued it could satisfy the terms of the ESA by placing stipulations on oil and gas leases which allowed for intervention at any point in subsequent oil and gas-related activities should a threat to a T&E species develop.²⁹ In rejecting this type of incremental approach, the court held that the ESA requires a biological opinion from the Fish and Wildlife Service (FWS) detailing exactly how the entire proposed "agency action" will affect T&E species, before the action is taken.³⁰

²⁷Id., at 1-14.

²⁸848 F.2d 1441 (9th Cir. 1988), cert. denied sub. nom. Sun Exploration and Production Co. v. Lujan 489 U.S. 1012, 109 S.Ct. 1121 (1989).

²⁹Conner, 848 F.2d at 1452.

³⁰Id., at 1452-1453, citing 16 U.S.C. §1536(b)(3)(A).

It specifically ruled that, in the case of oil and gas leasing, "agency action" includes "leasing and all post-leasing activities through production and abandonment."³¹

Now BLM is again proposing to comply with the ESA in a staged fashion, albeit in a slightly different fashion. As in Conner, this approach is inconsistent with the ESA's requirement for a comprehensive evaluation of the impacts a proposed action may have on listed species before an irretrievable commitment of resources is made or reasonable alternatives foreclosed.³² Having admitted a possible adverse impact on T&E species, BLM is required to engage in a formal consultation with the FWS in order to identify proper methods of protecting those species.³³ The subsequent biological assessment must also be made a part of the EIS.³⁴

B. BLM failed to evaluate riparian habitat, which has a high likelihood of containing threatened or endangered species, for the existence of such species.

Riparian zones are among the premier biological resources of the Southwest region.³⁵ Arizona and New Mexico have lost an estimated 90% of their riparian areas over the past 100 years,

³¹ Id.

³² 16 U.S.C. §1536(d).

³³ 16 U.S.C. § 1536(a)(4), 50 C.F.R. §402.14(a).

³⁴ 40 C.F.R. §1502.16(a).

³⁵ Johnson, Aubrey Stephen, The Thin Green Line, in In Defense of Wildlife: Preserving Communities and Corridors 35, 36 (Defenders of Wildlife, Gay McIntosh, ed. 1989) (hereinafter Johnson).

and the remnants contain the rarest ecological community in the United States, the Fremont cottonwood/Gooding willow forests.³⁶ These forests are home for over 100 state and federally listed threatened and endangered species in both Arizona and New Mexico.³⁷

BLM has acknowledged that critical riparian habitat is present in the District and could be adversely affected by the proposed drilling.³⁸ BLM asserts that managing the riparian zones under a No Surface Occupancy (NSO) constraint,³⁹ supplemented by lessee-constructed "berms, channels, dikes, and holding pits to prevent fluids and contaminated runoff from polluting," will adequately protect them.⁴⁰ However, the EIS presents nothing more than this bald statement, with no analysis or data to support it. Such conclusory and self-serving statements are not sufficient under NEPA. Moreover, many likely off-site impacts to the resources of riparian zones have been ignored, including impacts to T&E species within them.

³⁶Id., at 37.

³⁷Id.

³⁸RMP/EIS, at 4-14, 4-15.

³⁹BLM defines this as a constraint prohibiting occupancy or disturbance on all or part of the lease surface to protect special values or uses. Lessees may exploit the oil and gas resources under leases restricted by this constraint through the use of directional drilling from sites outside the NSO area. RMP/EIS, at G-3.

⁴⁰RMP/EIS, at 4-14, 4-15.

An NSO constraint on a lease does not mean there will be no impacts to adjoining riparian (or other) areas.⁴¹ For example, off-lease development activities could disturb soil that could then be blown or eroded into riparian waters. Such activities could cause the air quality in the riparian zone to be significantly degraded. Additionally, noise from nearby wells could seriously disturb wildlife within riparian areas. Moreover, one must know what species are present within riparian areas in order to determine how best to protect them. The habitat needs of some species may require protection from noise or human presence at certain times of the year, while others may require the establishment of buffer zones of a particular size. BLM cannot reasonably determine the proper steps to be taken to protect wildlife and other resources of riparian zones without a proper inventory of those resources.

It is also foreseeable that the riparian habitats within the District contain T&E species. There is evidence that several rare or endangered species exist there, including eight species of fish, two of amphibians, four of birds, and four of mammals.⁴²

⁴¹This is so even assuming the stipulation is actually imposed on a lease at its issuance -- a result which has not in fact always occurred in the past.

⁴²Johnson, at 42-43. The fish include the Arkansas River shiner, the Speckled dace, the Suckermouth minnow, the Southern redbelly dace, the Brook stickleback, the Bluntnose shiner, the Silvery minnow, and the Colorado River squawfish. The amphibians include the Jemez Mountain Salamander and the Western boreal toad. The birds include the Bald eagle, the Black hawk, the Red-headed woodpecker, and the Mississippi kite. The mammals include the

By leasing riparian areas with NSO constraints, BLM has admitted that they may be affected by on-site oil and gas development.⁴³ Therefore, it is possible that any T&E species that inhabit them may also be affected by development -- whether on- or off-site.

The draft EIS, however, presents no data as to what species are or may be present in riparian areas within the District. Without knowing which, if any, T&E species exist in the riparian zones, BLM cannot reasonably evaluate the impacts that oil and gas development will have on them. Nor can it develop mitigation measures that will in fact protect them from these impacts and ensure compliance with the goals of the ESA.

Due both to the high likelihood of T&E species being present in riparian areas, and the need to determine appropriate safeguards for those areas, all riparian habitat which may be affected by oil and gas development must be evaluated. This evaluation must be based on a full inventory of the contents within the riparian areas. And, as indicated above, if this evaluation reveals that T&E species are present and likely to be affected, BLM must initiate formal consultation with the FWS and include that agency's conclusions in the EIS.

Western mastiff bat, the Southern yellow bat, the mink, and the river otter.

⁴³RMP/EIS, at 4-14, 4-15.

L8-D IV. THE CUMULATIVE IMPACT ANALYSIS IS INADEQUATE.

L8-D (Cumulative Impacts). See comment response to comment L2-P.

The Planning Handbook defines cumulative impacts as "those which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions".⁴⁴ The Handbook specifically requires BLM personnel to address, in an EIS, the activities of other surface management agencies and persons outside of BLM whose actions may have impacts upon the area involved in the proposed action.⁴⁵ Notwithstanding the significance of this kind of analysis generally and its importance in this particular case,⁴⁶ the draft EIS fails to consider all relevant cumulative impacts.

In particular, the EIS contains no analysis of past, present and projected effects of development on T&E species and their habitats. In addition, the document ignores the air quality effects of previous oil and gas development on BLM and non-BLM land in the area.⁴⁷ It may well be that significant air quality problems exist already and, if so, it may be important to limit additional emissions from new development. Although BLM does

⁴⁴Planning Handbook, at III-9.

⁴⁵Id.

⁴⁶See, e.g., Secretarial Decision on Review in Michael Gold, at 10 (June 25, 1991).

⁴⁷This omission is in addition to the failure to analyze the direct air quality effects of proposed oil and gas development discussed above.

discuss the impact of the roads necessary for oil and gas development in terms of the land use, there is no mention of the impacts such roads will have on air quality, let alone on wildlife habitat, despite the known likelihood that those effects will be negative.

Moreover, there is no consideration of the cumulative effects of oil and gas development which is occurring on non-BLM land in the region; indeed references to development on state and private land are oblique at best.⁴⁸ Thus, for example, the EIS did not estimate all the impacts of existing oil and gas development on timber production. Instead, it looked only at an estimated loss of timber due to BLM oil and gas development under the proposed action.⁴⁹

Consideration of all effects on all lands, regardless of ownership or jurisdiction, is essential to an adequate cumulative analysis. While BLM can condition only federal activities, the conditions that it should impose on leases cannot be properly developed without full consideration of all development impacts.

BLM also refused to consider the effects from produced water associated with older wells.⁵⁰ That studies are "ongoing or are proposed" in the problem areas⁵¹ does not obviate the requirement

⁴⁸See, e.g., RMP/EIS, at 4-3.

⁴⁹Id., at 4-23, 4-33, 4-42.

⁵⁰Id., at 1-14.

⁵¹Id.

to include those effects in analyzing cumulative effects of development.

CONCLUSION

The Albuquerque District's draft RMP/EIS on oil and gas leasing and development is fatally flawed. Its too narrow range of alternatives reveals a pre-determined intention to develop the area for oil and gas. In addition, BLM's cumulative impact analysis is patently insufficient. Moreover, all direct impacts of development, particularly air quality effects and impacts to threatened and endangered species and their habitats, have yet to be analyzed.

In short, BLM has fallen far short of complying with NEPA or the ESA. The deficiencies we have identified cannot be remedied in a final EIS. Instead, a new draft EIS should be prepared and circulated for public comment.

Thank you in advance for considering these comments.

Sincerely,

Johanna H. Wald

Johanna H. Wald
Senior Attorney

Daniel L. Icenogle

Daniel L. Icenogle
Legal Intern



THE NATURE CONSERVANCY

New Mexico Field Office

107 Cienega Street • Santa Fe, New Mexico 87501 • (505) 988-3867

9

September 3, 1991

Mr. Robert Dale, District Manager
Bureau of Land Management
435 Montano NE
Albuquerque, NM 87107

Dear Mr. Dale,

Thank you for your request for comments on the draft Albuquerque District Resource Management Plan Amendment/EIS for oil and gas leasing and development. We do have serious problems with this draft.

We object that the only alternatives offered in the draft are for increased consumptive use of resources, especially in the Farmington Resource Area. If the original RMP's are to be considered for amendment, there should be a range of alternatives that include one for increased resource protection for wildlife, and biodiversity. There are a number of opportunities to strengthen resource conservation on SMA's especially on the Taos and Rio Puerco Resource areas, therefore we reject your argument for not including a Resource Conservation Alternative (p.2-18.) We believe the draft is defective in this omission, and therefore we urge that the No Action Alternative be selected.

L9-A (Range of Alternatives). The basic premise of the analysis in this document is that areas of special management concern have been identified and designated as SMAs, ACECs, and RNAs. Within these special management areas we will determine the leasing stipulations primarily for unleased portions of these areas that will protect special resource values. Standard terms and conditions will be applied to areas outside special management areas. It is acknowledged that it is desirable to do more to protect special resource values than what is required by existing, older leases in portions of special management areas. In these cases, BLM is consulting with the lessees and applying conditions of approval when approving Applications for Permits to Drill (APDs). These COAs will provide as much protection for special management resources as possible. BLM is providing for the protection of threatened and endangered species as required by law and is complying with policy to provide protection for candidate species. As a result, BLM is providing protection for wildlife and for biodiversity under the proposed alternative. See also response L2-A.

In discussing impacts on Threatened and Endangered plant and animal species (p.1-14), only species covered under the Federal Endangered Species Act are addressed, with the conclusion that Federal T&E species currently are being protected by law under the ESA and "Therefore, oil and gas impacts on T&E species are not analyzed in this document." The spectrum of T&E concerns is much broader than species legally protected under the Act and includes Federal Candidate species as well as State Endangered and Sensitive species. That this is BLM policy is acknowledged on p.2-29 in the draft. The entire T&E spectrum was addressed at the time that each of the three Resource Area RMP's were developed, and it should be for this amendment. The amendment needs to be rewritten with this analysis included.

L9-B (Entire T&E Spectrum). See comment response to comment L2-B and Appendices I and K.

In particular we are concerned that all alternatives would weaken biological resource protection actions within existing SMA's that were prescribed in the original RMP's. SMA's being considered for weakened protection actions include The Hogback ACEC, Reese Canyon RNA (both in the Farmington Resource Area); Ojito ACEC, Tent Rocks ACEC, Ball Ranch ACEC and San Luis Mesa ACEC (all in the Rio Puerco RA); and San Antonio ACEC and Black Mesa ACEC (the draft calls it an SMA but the approved Taos RMP designates Black Mesa as an ACEC). The Nature Conservancy was involved in the original identification and designation of most of these areas, and we urgently request that no weakened management prescriptions be adopted for any of the sites.

Again we ask that the document be redrafted or that the No Action Alternative be selected.

Sincerely,



William W. Dunmire
Public Lands Coordinator

WWD/bb

Dear Sir:

08/30/91

It's past due, I thought it would never happen. Someone finally told the Oil & Gas Industry NO, you can't drill in certain areas.

I know energy needs exist, but a what expense. There's not much land left in San Juan & Western Rio Arriba counties that doesn't have a dirt road, well site, or pipeline right of way in it.

The industry wants to put in a new pipeline to markets back east. What is this going to do start a new drilling boom? I see this as possible and the pressure on BLM to open up will increase. PLEASE DON'T give in. There are a lot of roads that should be gated off as well.

If the land recovered faster in the area then maybe the industry could drill at will. But it does NOT. I have yet to see a substantial growth of trees on the majority of well sites and pipeline right of ways in the area. Juniper & pinion just don't grow that fast.

I was born and raised in San Juan County, have family roots in and around the area going back to the 1850's. I remember the deer & antelope herds in the area.

I do contribute part of their decline to the mass road network in the area as well as habitat loss. The animals can't seek refuge by running back into the distance, everything is accessible by road.

This area is a poachers dream, unlimited access, and unlimited areas to drive to and avoid detection.

I spend a good amount of my time in the area scouting for game. There is a tract of land in Rio Arriba Co. owned by a rancher, he has closed off the main entrance into the canyon. However, he left the back part accessible. In the canyon stayed a herd of Elk approx. 15-20 head, during the Elk hunt it would grow to 30 head because it was not usually hunted. One year ago the O.R.G. Industry drilled a well on the back side, putting the location on the edge of ^{the} canyon overlooking it all. Where once trees provided cover and some brush for browse, now stands a barren well site with its road into it. Since, I've noticed less frequency of elk in the area, hunters that use to pass by it because they would have to walk into the area now drive right up to the rim of the canyon placing that much more pressure on the animals.

Where there use to be nothing but still black night, now is illuminated by lights from various compressor stations breaking up the black night and the silence.

This region had the potential of magnificent game herds as was proven, before, the Oil & Gas industry came in and made access to every nook & cranny of the land.

What areas BIM has closed off
PLEASE KEEP CLOSED. Any other
areas under consideration for closing, have
my support, and I believe we need more.

Sincerely,
Walt S. Smith



PHILLIPS PETROLEUM COMPANY

FARMINGTON, NEW MEXICO 87401
5525 HWY. 64 NEU 3004

11

September 4, 1991

Bureau of Land Management
435 Montano, SE
Albuquerque, New Mexico 87107

Attn: Robert Dale, District Manager

Re: Draft Albuquerque District
Resource Management Plan
Amendment/Environmental
Impact Statement
Oil and Gas Leasing and
Development

Gentlemen:

This letter provides comments to the captioned document.

Phillips Petroleum Company owns and/or operates unitized areas covering over 45,000 oil and gas lease acres in and around Carracas Mesa, Reese Canyon, Simon Canyon and Negro Canyon areas.

L11-A [It is not clear what affect this proposed amendment will have on lease operations in these areas.]

Table 2-4 (Farmington Resource Area) reflects a change from Management Alternatives "No Action Alternative" (Alt.A) to "Preferred Alternatives" (Alt.C) as follows: a decrease in acres with timing limitation constraints from 584,000 (Alt.A) to 126,500 acres (Alt.C) and an increase in acres with controlled surface use constraints from 0- (Alt.A) to 189,400 acres (Alt.C).

Map 5 and Table A-1 indicates a change in management category from 5 to 3 in the Simon Canyon Rec./ACEC (3521 acs), Carracas Mesa (4,620 acs) and Reese Canyon RNA (1914 acs). Management category 5 states "Closed to New Leasing. RMP decisions to close an area to future leasing will not affect development, uses or rights, on existing leases". Management category 3 states "Managed Under Controlled Surface Use Constraints".

Map 9 indicates the areas designating "Critical Range for Elk, Mule Deer, Antelope, and Raptor Nesting Habitat". This map appears to be identical to the current map published by the BLM for this purpose.

L11-A (Lease Operations). See Appendix A for a listing of the SMAs and ACECs in the open, closed, or leased with stipulation categories for the no action, production, and proposed alternatives for each resource area. The current RMP management decisions, for leasing in SMAs and ACECs, is presented in the no action alternative for each resource area. Proposed leasing or leasing with stipulation changes for SMAs and ACECs is presented in both the production and proposed alternatives for each resource area. Again, these are changes from the current management (leasing) situation presented in the no action alternative.

For the most part, a change in leasing or leasing with stipulations (and the associated impacts) is not presented for each SMA and ACEC in the Albuquerque District. Instead, the amount of acreage in each leasing category (and the associated impacts) is considered by alternative for each resource area. Impact analysis for specific SMAs and ACECs is included in the text, when potential impacts could adversely affect a special management area. See Appendix A for the SMAs and ACECs listed in the existing (no action alternative) and proposed (production and proposed alternatives) leasing categories.

There would be little effect on lease operations under the no action and proposed alternatives. BLM would continue to require COAs, standard operating procedures, etc. of the operators to protect resource values and promote multiple use management of public lands. Decisions on leasing or leasing with stipulations could affect the availability of some acreage for oil and gas development of the unleased oil and gas estate in special management areas.

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From review of the foregoing it appears that the BIM's amendment may be placing additional constraints on area operators without fully revealing the affected areas and respective constraints. Please clarify what additional constraints are being added and what specific acreage is being affected.

Thank you for this opportunity to comment on this plan. Please contact this office if you wish to discuss this matter.

Very truly yours,

PHILLIPS PETROLEUM COMPANY



R. G. Flesher
Area Manager
Farmington Area

wp/rmplanam.jay



NATIONAL WILDLIFE FEDERATION

Rocky Mountain Natural Resources Clinic
Box 401, Fleming Law Building, Boulder, CO 80309 303/492-6552
303/492-2118 (fax)

BY AIRBORNE EXPRESS

12

September 5, 1991

Robert Dale, District Manager
Bureau of Land Management
435 Montano NE
Albuquerque, NM 87107

Re: Comments on Draft Albuquerque District Resource Management Plan
Amendment/Environmental Impact Statement

Dear Mr. Dale:

On behalf of the National Wildlife Federation, we are pleased to submit the following comments on the Draft Albuquerque District Resource Management Plan Amendment/Environmental Impact Statement ("DEIS") for Oil and Gas Leasing on Bureau of Land Management lands in the Farmington, Taos and Rio Puerco Resource Areas in New Mexico.

In reviewing this DEIS, we discovered many inadequacies, failures to comply with applicable statutory and case law, and unfounded assertions. The effect of these deficiencies is to render this document, in its current form, both inadequate to discharge the District's NEPA responsibilities (and therefore, inadequate for tiering purposes in the future), and inadequate as a management document under FLPMA. For example:

- L12-A**

This DEIS fails to adequately consider the no leasing alternative, in violation of the National Environmental Policy Act ("NEPA") and *Bob Marshall Alliance v. Hodel*, 852 F.2d 1223 (9th Cir. 1988), *cert. denied sub nom. Kohlman v. Alliance*, 109 S.Ct. 1340 (1989).

L12-A (No Leasing Alternative). See comment response to comment L2-A.
- L12-B**

Since all of the alternatives considered present essentially the same development scenario — with almost no variation in the amount of acreage open to leasing (the alternatives vary from each other by about 2 percent of the total acreage in the District) — the DEIS does not provide the agency and the public with a meaningful basis for choice among options, once again in violation of NEPA.

L12-B (Limited Acreage Differences Between Alternatives). See comment response to comment L2-A.
- L12-C**

This DEIS admits that the oil and gas development anticipated under the Amendment may result in violations of the Clean Air Act, yet it dismisses air quality impacts of oil and gas development as insignificant.

L12-C (Air Quality Impacts). See comment response to comment L8-B.

- The Albuquerque District places undue reliance on Seasonal Stipulations (which do not apply to operation and maintenance phase of oil and gas activities); Conditions of Approval (which are not always attached to drilling permits); and Timing Stipulations (which are subject to waiver, modification and exception) in protection of wildlife habitat and other resources. Moreover, all these stipulations require and assume that enforcement will be effective, despite verifiable doubts as to BLM's ability to provide the necessary oversight. Indeed, a recent report by the Interior Department's Inspector General seriously challenges BLM's assumptions regarding effectiveness of mitigation and reclamation.

L12-D [] • For most of the district, the BLM is unaware of the extent of the wildlife resources present or the expected impacts on these resources.

L12-E [] • Inadequate discussion is given to the protection of suitable habitat for the Mexican Spotted Owl.

L12-F [] • This DEIS admits that the District does not know how much soil erosion or water quality degradation will result from any of the alternatives considered.

L12-G [] • The DEIS's evaluation of the cumulative impacts of oil and gas activities in combination with other activities on the same lands is inadequate.

L12-H [] • The minimal analysis of impacts on cultural resources shows that significant impacts are expected with no assurance that these impacts will be mitigated.

L12-I [] • There is inadequate analysis of paleontological resources.

L12-J [] • There is inadequate analysis of timber resources.

L12-K [] • The DEIS admits that there will be detrimental impacts to visual quality. Indeed, under all alternatives, a substantial proportion of the acreage will fail to meet VRM Class I and II objectives. (DEIS, Table S-1, at 4-8, 4-25, 4-34). This failure is a violation of FLPMA.

L12-L [] • The disturbance to vegetation and non-sensitive habitat is given only cursory examination.

L12-M [] • The problem of methane migration is only briefly and inadequately discussed.

L12-D (Wildlife Resources and Impacts). See comment response to comment L2-B, Appendices I and J.

L12-E (Mexican Spotted Owl). See comment response to comment L2-8 and Appendix I.

L12-F (Water Quality Impacts). See comment response to comment L6-C.

L12-G (Cumulative Impacts). See comment response to comment L2-P.

L12-H (Cultural Analysis). The National Wildlife Federation correctly points out that BLM cultural resources management policies are not intended to preserve every cultural resource property. In a multiple use context, some damage to individual properties is inevitable. The BLM procedures for inventory of areas which will be subjected to disturbance, avoidance of most cultural properties, and data recovery at others seek to minimize this damage and maintain it at acceptable levels. These management practices have been developed in consultation with the State Historic Preservation Officer and the Advisory Council on Historic Preservation, as required by the Historic Preservation Act. They are implemented in the context of continuing consultations with these two agencies.

The BLM is committed to continuing consultation and coordination with American Indian groups who have concerns about traditional cultural properties in the Albuquerque District. In this area there is a need to find a delicate balance between aggressively seeking out the information needed to protect and avoid places of concern to American Indians, and respect for the privacy and secrecy which surround these places. Ongoing ethnographic studies are intended to meet the first goal, but the best protection for traditional cultural properties is the maintenance of open decision making processes and strong lines of communication with the affected American Indian groups.

L12-I (Paleontological Analysis). As is noted on page 4-21 of the DEIS, paleontological clearances are required before any surface-disturbing activity can occur in areas with paleontological resources. Prior to the approval of an APD, identified sites must either be proven to have no significant fossils or appropriate mitigative measures must be taken. If a site could not be avoided and if the disturbed area is significant, it would have to be excavated or the resource otherwise protected. This protection is provided in the Standard Terms and Conditions of all oil and gas leases.

Scientifically important paleontological materials will be managed and protected (1) as stated in the New Mexico Supplemental Manual 8200 (Paleontological Resource Management) and (2) Albuquerque District Guidance for the Management of Paleontological Resources (IM No. NM-010-91-070 dated September 12, 1991).

L12-J (Timber Analysis). The change in habitat (5 to 8 acre patches) from pinyon-juniper dominated areas to a mixture of pinyon-juniper, shrubs, and grasslands will not cause a change in the ecosystem of the area.

L12-K (Visual Impacts). Under the multiple use context of FLPMA and the principle that BLM uses to manage public lands, it is not the intent to protect all visual values in the same manner. Therefore, different Visual Resource Management (VRM) classes are established. These classes are categorized based on a combination of factors such as scenic quality, sensitivity levels, and distance from the viewer. VRM classes are assigned in the development of the Bureau's land use management plans. The assignment of the management classes is ultimately based on the management decisions made in these plans. VRM classes were established in the previous land use management plans.

The intrusions that existed at the time VRM inventories were conducted were the only intrusions considered in the process of identifying VRM classes for public lands. This was true for any surface disturbing activity. The classes, established at that time, were to be used to guide future development of the visual resources that existed at the time the land use plan was completed. BLM staff, however, did not consider undeveloped mineral and/or other lease rights issued prior to FLPMA with "grandfathered" rights and uses (prior existing rights), during the process of establishing VRM classes. As a result, the amount of acreage and visual values in each VRM class, at the time VRM classes were established, cannot be maintained.

This amendment provides a system for evaluating the anticipated degree or extent of visual impacts caused by leasing activities within the different visual resource management classes. Even if the visual impacts of a site-specific proposal may exceed the management objectives of the VRM class at that location, the BLM manager may accept a site-specific proposal. Many of the leases, issued before the passage of FLPMA (1976), do not contain stipulations specifically for the protection of visual resource values. However, COAs, special management area prescriptions, standard operating procedures, and other mitigation measures are used to minimize or avoid visual resource impacts.

L12-L (Vegetative Impacts). See comment response to comment L2-L. Disturbance to vegetation and non-sensitive habitat was evaluated. Minimal impacts were indicated by this evaluation therefore further analysis was not considered necessary.

L12-M (Methane Migration). The BLM, in cooperation with NMOCD, has developed special casing and cementing requirements specifically addressing the protection of all usable water zones (water with 10,000 or less ppm TDS) and hydrocarbon bearing zones in the San Juan Basin. See Appendix L (NTL-FRA 90-1. Casing and Cementing Requirements) for casing and cementing details.

The NMOCD has a monitoring program that has been in place for approximately 10 years. This program "cycles" Bradenhead tests in 3-year cycles. Each year approximately one-third of all wells in the basin are tested for casing integrity. Wells failing a Bradenhead test are identified for corrective action.

In addition to the NMOCD program, BLM Fluid Minerals Inspection and Enforcement staff regularly inspect well facilities for environmental, site security, and safety compliance. Well facilities found to be in noncompliance are identified for remedial action.

These problems indicate the need for substantial revision of the DEIS.

I. FAILURE TO CONSIDER THE NO-LEASING ALTERNATIVE

The refusal by the District to consider closing to leasing any more than the 36,300 acres proposed (out of the more than 5,607,000 acres in the District) raises serious questions about BLM's desire and ability to protect other resources from the impacts of oil and gas development.

The District's failure to give "full and meaningful" consideration to the no-leasing alternative in areas involving potential resource conflicts violates the National Environmental Policy Act.¹ The failure of BLM to seriously consider the no-leasing alternative is demonstrated by the absence of any discussion about the impacts of a no leasing alternative in comparison to other alternatives.

In revising this DEIS, BLM should actually consider and analyze the no leasing alternative in comparison with the other alternatives in order to comply with NEPA and federal case law. Chapter Two of the DEIS compares the three analyzed alternatives; Table 2-4 summarizes the acreage available for leasing and/or development by management category and alternative. At a minimum, this table should be expanded to include the no leasing alternative and a table developed which provides a comparison of the impacts of the alternatives on the resources present in the District. Additionally, the revised DEIS should include a no leasing alternative in the full discussion of environmental consequences in Chapter Four.

¹ In *Bob Marshall Alliance v. Hodel*, 852 F.2d 1223, 1229 (9th Cir. 1988), cert. denied sub nom. *Kohlman v. Alliance*, 109 S.Ct. 1340 (1989), the Ninth Circuit summarized NEPA's requirement that the no-leasing alternative be considered:

NEPA requires that federal agencies consider alternatives to recommended actions whenever those actions "involve[] unresolved conflicts concerning alternative uses of available resources." 42 U.S.C. § 4332(2)(E)(1982)...NEPA's requirement that alternatives be studied, developed and described both guides the substance of environmental decision making and provides evidence that the mandated decision making process has actually taken place[.]...NEPA therefore requires that alternatives -- including the no-leasing alternative -- be given full and meaningful consideration.

852 F.2d 1223, 1228-29 (9th Cir. 1988)(citations omitted).

II. NO BASIS FOR MEANINGFUL CHOICE AMONG ALTERNATIVES

The public and decisionmakers cannot make meaningful choices among the alternatives from the information and alternatives presented in the DEIS. The DEIS's alternatives present the same development scenario, with only minor variations in impacts and in protection for wildlife and other non-oil-and-gas values.

This DEIS fails to consider altering the amount of lands within the District to be made available for leasing — this amount is essentially identical for all three of the proposed alternatives. (DEIS, Tables 2-2, 2-3, and 2-4). *No more than one percent* of the land in the District under each alternative is closed to leasing under the "discretionary no-leasing" designation. (*Id.*) Similarly, all three alternatives forecast a total number of acres disturbed that vary by less than 6 percent from each other with nearly identical numbers of wells drilled in the District. Throughout the DEIS the reader encounters language such as "The type of visual impacts caused by oil and gas leasing and development under this alternative [production] is the same as those discussed for the No Action Alternative." (DEIS, at 4-25).

The difference in extent of impact between alternatives is similarly indistinguishable. For example, in Table 4-4, which documents the lumber in Mbf for each alternative, timber production varies only from 5,200 for the "No Action Alternative" to 5,145 for the "Preferred Alternative." Even if the plan discussed impacts in a manner that included habitat loss as well as timber production, this would not be sufficient to meet the criteria for NEPA.

Since NEPA requires decisionmakers to look at a real range of alternatives rather than nearly identical versions, the plan is currently flawed.² This tunnel vision of leasing deprives readers of a "clear basis for choice among options."

We recommend that BLM seriously evaluate whether the following areas should be closed to oil and gas leasing under BLM's discretionary authority:

- threatened and endangered species habitat including endangered bald eagle and American peregrine falcon nesting, breeding and wintering areas;

² NEPA requires federal agencies to "study, develop, and describe appropriate alternatives to recommend courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources." 42 U.S.C. § 4332(2)(E). Council on Environmental Quality regulations mandate that the alternatives chosen must "sharply define" the issues presented and provide the agency and the public with a "clear basis for choice among options." 40 C.F.R. § 1502.14.

- all suitable habitat for the Mexican Spotted Owl until a complete inventory can be made of the affected areas;
- crucial riparian and wetland areas;
- big game calving and crucial winter range areas;
- important waterfowl and raptor breeding and nesting habitat;
- other areas of important wildlife habitat including areas crucial to the survival of the Pronghorn Antelope;
- areas managed primarily for recreational values including undeveloped campsites;
- areas with unstable soils;
- areas of Critical Environmental Concern; and
- sites listed in the National Register of Historic Places.

We recommend these areas for closure because these resources may not be adequately protected by stipulation, and the resource values in these areas often outweigh onshore oil and gas development values.

III. UNDUE RELIANCE ON INADEQUATE SEASONAL STIPULATIONS

The DEIS begins with the assertion that Standard Terms and Conditions (STCs) provide for the general protection of surface and subsurface resources under normal operation. (DEIS at 2-19). With much of this DEIS detailing the loss of vegetation, wildlife habitat, water resources, air quality, and cultural and paleontological resources, it is difficult to believe in the adequacy of the STCs even under normal conditions.

The BLM admits that "occasionally" STCs are not adequate to protect resource values and uses, and a management constraint is necessary to modify the lease. (Id.) No details with respect to the numbers of such occasions are given. Although the lessee is allowed to bid on such a modified lease, the BLM then assumes that the lease holder will comply with the modifications. No documentation is given to support the implied assertion that the lessee voluntarily complies with the constraint.

Management constraints such as the Condition of Approval (COA) may be imposed to "mitigate impacts to the environment, public health, and safety." (DEIS at 2-21). These COAs are imposed by BLM staff and managers, presumably without

the opportunity for public comment. For such important considerations, and with so little review of such decisions, one would hope for a high degree of confidence in the accuracy of these judgments.

Unfortunately, a recent report by the General Accounting Office³ ("GAO Federal Land Management Report") substantiates our concerns that COAs, even if applied, will not provide adequate protection for wildlife and recreation values. After evaluating four BLM state offices-including the Farmington office-GAO found that, at the stages of lease issuance and approval of a drilling permit, these offices:

continue to approve some drilling permits even though additional environmental studies, identified as needed by the agencies, have not been completed; and...do not always include mitigating measures (stipulations or conditions of approval) required in the leases or permits to minimize the environmental impact of oil and gas development.

GAO Federal Land Management Report, at 25.

GAO estimates that "an average of 10 percent of drilling permits, in the offices we visited were approved without one or more of the required conditions of approval." (Id., at 31).

The GAO report casts substantial doubt on whether BLM is willing to or able to enforce all conditions of approval. When BLM does not set forth mandatory conditions of approval which it has identified as necessary prior to approving an Application for Permit to Drill, significant wildlife and recreational resources are at serious risk during development and production stages.

In sum, assertions by BLM that stipulations and conditions of approval will be properly applied to drilling permits do not provide sufficient assurance that the surrounding environment will be protected. More reliable protection must be applied *at the leasing stage* to prevent unnecessary environmental damage.

Even if appropriate conditions of approval do restrict the operation of the lessee, exceptions, waivers or modifications of management constraints are available. If the proposed exception, waiver, or modification is consistent with the land use plan, the exception can be granted without public notice. The lessee merely must

³ United States General Accounting Office, Federal Land Management: Better Oil and Gas Information Needed to Support Land Use Decisions, GAO/RCED-90-71 (June 1990).

show that operations can be conducted without causing unacceptable impacts, and that less restrictive constraints will protect public resource values and uses. (DEIS at 2-20).

It is difficult to see how a constraint applied by BLM personnel after findings of potential damage to the environment, public health, or safety can be so easily defeated by the lessee showing only a lack of "unacceptable impacts." No guidelines are given as to what may be acceptable impacts on the environment, public health or safety. This is a deficiency which should be corrected in the revised EIS.

Geophysical exploration may be authorized in "No Lease" areas. (DEIS at 2-21). The potential damage of such exploration and the lack of certainty as to the criteria used to allow such disregard of management constraints requires a more detailed analysis than the conclusory one given in this DEIS.

Finally, modifications to a management constraint can be made when BLM managers determine the constraint is found unnecessarily restrictive. (*Id.*). No mention is made as to the frequency of such modifications, or the ultimate environmental impact of such modifications. No procedure is cited for modification of a management constraint to a less restrictive form. It is unclear if this procedure is available, and if so, how often it has been used compared to the loosening of restrictions.

IV. INADEQUACY OF WILDLIFE CONSIDERATIONS

FLPMA, the Endangered Species Act of 1973, the Public Rangelands Improvement Act of 1978, as amended, and BLM Manual Section 6840 direct the BLM to improve the management of wildlife habitat to meet wildlife needs. (DEIS at 2-28). However, it is clear that in much of the district the BLM is unaware of the wildlife resources present, the amount and type of forage, or the impacts on such resources from any of the alternatives presented. What is clear that all alternatives will lead to a decline in the numbers of those species that were considered. Deer loss will be approximately 300 under all alternatives, elk loss approximately 200, and antelope loss approximately 60. (DEIS Table S-1).

These harmful wildlife impacts include the Pronghorn Antelope, whose population is declining in the Farmington Resource Area even though "large areas of apparently suitable habitat exist in the resource area..." (DEIS at 3-13). The DEIS analysis only guesses at the possible cause. It does not even consider the connection between the area with the greatest amount of development and land disturbance, and the only area with a declining population of antelope. This disturbing trend should be further addressed in the revised EIS.

The distressing lack of even the most basic wildlife inventory for the affected area (see Appendix F) calls into question the care taken in any of the analyses of wildlife impact. It is difficult to see how the Bureau or the public can have a "clear basis for choice among options" when there is virtually no discussion of the types and numbers of wildlife in the affected area.

Even more disturbing is the lack of discussion of endangered or threatened wildlife or plant life, except to summarily dismiss them as environmental concerns considered but dropped from study. (DEIS at 1-13). In that brief section, the BLM admits that up to 2.6% of Special Management Areas (SMAs) and Areas of Critical Environmental Concern (ACECs) will be disturbed by oil and gas development under one or more of the alternatives considered. (Id.) Although small in the total area involved, it is not clear that wildlife populations would decline in a linear manner. This may be especially true for species that are threatened or endangered. In addition, the Endangered Species Act directs Federal agencies to "use...all methods and procedures which are necessary" to preserve endangered species. 16 U.S.C.A. §§ 1531(c), 1532(2).

With the dearth of information supplied, it is unclear how the BLM can reconcile its duty to preserve endangered species and its plan to lease habitat used by such species. It remains unclear even to what extent threatened and endangered species are present on affected land. The dismissal of this evaluation should be reconsidered.

Finally, although the DEIS briefly analyzes the impact of each alternative on wildlife, there is no discussion of protecting migratory birds and mammals from contamination from uncovered drilling waste pits and lagoons. The U.S. Fish and Wildlife Service found that 225,000 birds were being killed annually in waste oil and chemical pits in eastern New Mexico alone.⁴ In addition to birds, mammals have been lost to these uncovered pits. The BLM should develop a new COA, applicable to all leases, which mandates the covering with mesh or wire of all pits and pools used for the storage of oil and hazardous chemicals.

V. INADEQUATE PROTECTION OF SUITABLE HABITAT OF THE MEXICAN SPOTTED OWL

Leasing will be allowed on the uninventoried portion of 119,000 acres deemed suitable for the Mexican Spotted Owl. Although the inventory process has begun, existing facilities placed on suitable habitat area will be maintained even if Owls were found in that Core Area. New disturbances on Owl Territory would be allowed as well. (DEIS, Appendix G). These actions, detailed in BLM Policy Summary for the Mexican Spotted Owl (DEIS at G-3) allow a great deal of

⁴ "Fatal Attraction: Oil Pits Are Death Traps for Wildlife," Conservation 90, NATIONAL WILDLIFE FEDERATION, August 17, 1990, at 4.

intrusion on such territory. With no further discussion of the biology and territorial needs of the Owl such information is inadequate for either the Agency or the public to judge its adequacy in protecting this species.

VI. SOIL EROSION AND WATER QUALITY DEGRADATION

At page 1-13, grazing is discussed in the context of lease development. The DEIS estimates that temporary amounts of forage will be taken out of production due to the new wells but that the development will not affect grazing management. The soil disturbance and erosion caused by the construction and drilling in conjunction with past, current, and future grazing impact creates a cumulative impact of the kind that NEPA was intended to address. Yet the one paragraph allotted to the analysis does not document the assumption that the forage loss will be temporary; nor does it analyze the condition of the soil prior to or after drilling, the consequence of new road and pipeline networks added to those already existing, or the combined impact of grazing and drilling on the soils. If BLM has concluded that "future oil and gas development will not measurably affect grazing management," it should document how it reached this conclusion rather than state conclusions which are based on no discernible evidence or analysis.

Under the Preferred alternative, the DEIS acknowledges that "Even with implementation of mitigating measures, the acreage affected by long-term surface disturbances associated with 4,465 wells would equal the acreage reclaimed for wells abandoned in the future." DEIS, at 4-40. As a result, the plan concludes the "amount of surface disturbance would be maintained at current levels or increased slightly." DEIS, at 4-40. It is not clear how a practice to mitigate soil disturbance can properly be called 'mitigation' when it does not mitigate.

The no action alternative for the Farmington Resource Area describes the primary impact associated with oil and gas surface disturbance as increased runoff, which contributes sediment and salt loads to basin and downstream users. It concludes that both the sedimentation and salt loading are considered non-point source pollutants to major waters and watersheds. The section concludes that "Disturbance (202,675 acres) associated with existing long-term oil and gas development has resulted in sedimentation, salt loading of the Colorado River system, and non-point source pollution of major waters and watersheds. The amount of these disturbances occurring in the San Juan Basin is above acceptable levels, although the extent to which acceptable levels have been exceeded is not known." DEIS, at 4-17.

The effects under the preferred alternative are also discussed briefly: "However, the impacts associated with the drilling of 4,465 wells in the Farmington Resource Area would result in long-term surface disturbance and impacts to soil and water." The sections also discuss the requirement of standard mitigation measures to

rehabilitate wells. DEIS at 4-16. However, it is clear from the prior language that the mitigation will not be effective.

As a result, the conclusion is that there will be significant long-range water pollution that mitigation does not address and that may be in violation of the Clean Water Act or other laws. The FEIS should discuss what mitigation measures can be employed to resolve this problem or the final RMP should be modified to prevent further violations.

VII. INADEQUACY OF CUMULATIVE IMPACTS ANALYSIS

Although the DEIS addresses cumulative impacts it does not analyze them, it simply lists different impacts. Impacts were intended to be analyzed cumulatively because it is through such analysis that the actual impact of the development can be seen. A detailed discussion of the interactions among the various analyzed factors would be helpful to understand these impacts. Even the list is inadequate since it leaves off hazardous waste or water pollution from non-point sources. The DEIS must be changed to show that all of the impacts have been considered and analyzed and that the resulting alternative chosen reflects consideration of the cumulative impacts.

VIII. INADEQUACY OF CULTURAL RESOURCE ANALYSIS

This DEIS admits the District has undertaken cultural resource inventories for only 282,900 acres of the more than 5.6 million acres in the three resource areas. DEIS, at 3-20. Prior to this time, the DEIS notes that inventory was done during construction. It also notes that the Rio Puerco and Taos Resource Areas have not seen much construction in the past and little is known about them.

Based on BLM's past experience in the Albuquerque area, allowing leases in areas that has not even been inventoried would most likely result in the BLM violating the National Historic Preservation Act and the American Indian Religious Freedom Act, since the DEIS freely admits that subsurface sites were frequently identified and damaged during the construction process and that mitigation was not always possible.

This presents a serious problem for the BLM since the DEIS projects that this trend will continue. For example, under the no action alternative in the Farmington area, the DEIS admits that:

An average of one archeological site is being found for each well developed ... two out of three of these archeological sites can be avoided, but the remainder are impacted in some way by oil and gas development. Based on the projected development of 4,527 new wells

over the 20-year life of this plan amendment, approximately 1,500 archeological sites would suffer direct impacts that would require some form of mitigation.

DEIS, at 4-19. However, mitigation is later described to be data recovery, i.e., "Data recovery through excavation would mitigate some of the adverse effects of the development." see p. 4-20. Of course, instances where subsurface sites are "Directly impacted by construction and not discovered constitute a total loss." (DEIS, at 4-20).

Such a system of inventory and protection does not protect the resource and can best be described as conservation by bulldozer. From past results mentioned in the plan, pre-project inventories have not discovered all the sites, and have not protected those that it identified. In short, the current system damages sites and then mitigates them by doing data recovery. Even under the no action alternative, the BLM projects that development will result in discovery of 9,452 cultural sites with 'recovery' on 1,530 of them. This does not protect the resource; it exploits and destroys it.

The FEIS should be modified to reflect inventory and analysis of the area. Further, the RMP should be modified to include contact with the tribes to ensure that their interests are protected and the Plan should have a system in place to ensure that the resources are protected to the maximum degree, including a commitment to finding and avoiding destruction of the resource.

IX. INADEQUATE ANALYSIS OF PALEONTOLOGICAL RESOURCES

The DEIS describes the Farmington Area as having the greatest potential for damage to paleontological resources due to the number of wells to be drilled. The DEIS notes in one sentence that paleontological clearances are required before any surface-disturbing activity can occur. The DEIS also states that "Without appropriate management actions designed to mitigate the impact of oil and gas development, potentially important paleontological resources can be damaged or destroyed." Without further discussion, the next paragraph claims "Continuation of current management practices (described in the Continuing Management Guidance section of Chapter 2) would be adequate to prevent significant impacts to the paleontological resources in the district." (DEIS, at 4-21).

The Continuing Management Guidance in Chapter 2 indicates that the existing system is composed of "Objectives" and "Components" that are not met on a daily basis. For example, item one of the objectives is "Identify and evaluate paleontological resources so they may be adequately addressed through the BLM's planning and environmental analysis system." (DEIS, at 2-33). The second "objective" involves having an activity plan to carry out objectives of RMPs or

other approved land use plans to protect the resource, and the final objective is to "accord the protection provided under law." It is misleading to claim the existing system will adequately protect paleontological resources when identifying and evaluating the resource, a plan to protect them, and enforcement of the law are only 'objectives'.

The "Component" section describes how the resources are protected and include "Developing and maintaining paleontological information..." (DEIS, at 2-33). If BLM is developing and maintaining information, it would be helpful to the reader to be more specific. For example, if the BLM has a system that requires lessees to report any paleontological finds, or if BLM sends a staff person to the area and records the resulting information in a computer database, the DEIS should say so. Instead, the reader is forced to conclude that the existing system is more of a goal than a reality. As such, there's no certainty it will protect the resource. These comments apply no matter which alternative is selected since each alternative refers back to current management practices as capable of protecting the resource.

X. TIMBER RESOURCES

The DEIS observes that "The forests and woodlands are located generally in the high-intensity oil and gas development regions." see p. 4-22 and 4-23. The DEIS concludes this will have both "beneficial and adverse impacts" at 4-22. The BLM considers it beneficial because roads would cut through these areas allowing replacement of "decadent" trees with "young, vigorous, and more desirable tree seedlings." (DEIS, at 4-22). Unfortunately, the DEIS neither discusses whether any old growth inventory has been done nor the benefits of older trees and communities versus younger ones. Current silvicultural practices recognize that there are benefits to older stands and individual trees - including habitat for wildlife — that is not duplicated in younger stands.

The draft plan suggests "A provision should be included in the STCs to require compensation for any forest and/or woodlands destroyed" (for regeneration purposes). (DEIS, at 4-22). It is troubling that the phrasing is "should be" rather than "will be." Language of this kind throughout the document raises the concern that the BLM is not committed to the mitigation measures it discusses.

The DEIS raises the concern of overcutting on forest and woodlands three times; in the context of roadbuilding and pad construction leading to loss of land in and of themselves; as well as creating demand for wood products due to the new roads and apparent availability; and due to unauthorized cutting. The BLM projects that as a result, production losses would be long-term under the no action alternative, that the fire hazard would increase (DEIS at 4-23), and that the damaged land would shift from the pinon-juniper woodland to shrub or grassland (DEIS, at 4-22).

Despite impacts so drastic as to equate to a change in ecosystem, there is no discussion of environmental impacts at all, much less any discussion of avoiding roadbuilding in the forest or woodland areas. Instead, the discussion is limited to board feet and production loss. The BLM should change this section to reflect other concerns that exist besides timber production, such as protection of native species.

These same comments would apply to all of the other alternatives, since they refer back to the no action alternative and because Table 4-4 indicates very little difference in the loss of trees (as measured in board feet).

XI. VISUAL QUALITY IMPACTS

The detrimental impact to visual quality evidenced by a failure to meet VRM Class I and II objectives under all alternatives is contrary to the BLM mandate to manage the public lands, "in a manner that will protect the quality of ... scenic ... environmental, air and atmospheric ... values." Federal Land Policy and Management Act, 43 USCS § 1701(a)(8).

Additionally, if the Ah-shi-sle-pah Wilderness Study Area is not designated as wilderness and is subsequently leased under the production alternative, it will add a further 6563 acres of Class II VRM area which does not meet mandated standards. (DEIS, at S-4 n.5). VRM classes have not even been assigned in the Taos RMP, and therefore it is likely that the total area not in compliance with VRM objectives will be higher than reported.

None of the phases of oil and gas operations would meet the criteria for VRM Class I areas (DEIS, at 4-6), even though these areas are ones "where the current management situation requires maintaining a natural environment essentially unaltered by humans." (DEIS, at 3-5). Further, "Degradation of the landscape character ... would directly affect the scenic quality class, which would lower the rating and management class." Id.

It therefore appears that BLM's solution to the problem of degraded visual quality is to relegate the landscape to a lower class of visual quality, presumably one which would be easier to meet. Indeed, standard operating procedures would be employed under the no action alternative (which gives the lowest estimate of area not meeting VRM standards) "without particular regard for visual resources. The STCs lack the minimum controls necessary for the achievement of VRM objectives and for the protection of visual resources." (DEIS at 4-7). It appears that there would be no attempt to meet either VRM standards, or the FLPMA mandate under any of the alternatives.

The only solution proposed to the long term degradation of sightseeing values, impacts to the landform, vegetation and structural features of the characteristic

landscape would be implemented at the time of abandonment of the drill site. (DEIS at 4-7). However, a great deal of uncertainty is reflected in the DEIS regarding the success of such a solution. "If drill pads and portions of roads were recontoured..." and, "Revegetation, if successful...." (Id., emphasis added).

The revised EIS should more fully consider mitigation measures aimed towards the requirement for maintenance of visual quality.

XII. VEGETATION IMPACTS

The impact to vegetation and non-sensitive habitat is relegated to the listing of environmental concerns considered but dropped from study.

30,000 acres will be disturbed during the life of the plan. Of this, 14,000 acres will be affected by long term disturbance. (DEIS at 1-13). No distinction is made as to the time period differentiating the long term from the presumably short term land disturbance, but from further comments made in the same paragraph, it appears that rehabilitation of the short term disturbed areas will be over the 20 year life of the plan amendment. Id. The mechanism of how abandoned wells and roads will make up for the long term disturbed land is unclear. From the comments, it is impossible to determine whether there will indeed be no net loss in vegetation. A conclusory statement is made that "Other vegetative uses will not be measurably affected by ... development and are not analyzed further in this document." Id.

In the revised EIS, further data should be presented to support this contention. Additionally, the DEIS gives no indication with respect to the success of prior rehabilitation efforts, likewise, it makes no comment regarding the means of enforcement of any rehabilitation provisions on the lessee.

Assumptions are made that 30,000 acres of disturbed land will be compensated for by rehabilitation of "some wells and roads." DEIS p. 1-13. No analysis or citation is given for this conjecture.

XIII. METHANE MIGRATION

Methane Migration is discussed but the impacts of the migration are not. The DEIS assumes the problem will not continue because "state of the art drilling methods will prevent methane migration." (DEIS, at 1-14 and 1-15). It would be helpful to the reader to have more than two paragraphs on this concern. Specifically, there should be information on impacts of the migration and clarification as to whether the old wells have been upgraded to the prevent the problem and whether new wells are being inspected to ensure there is no methane problem. Finally, the results of rechecking the areas where the gas has been found should be presented. This section should be revised to reflect the recent

IBLA decision in Powder River Basin, 90-511, 91-11 which concluded that the Board was unable to affirm a finding of no significant impact to the environment where the Bureau's environmental analysis failed to give appropriate consideration to obvious alternatives, such as staggering development. Powder River Decision at 120 IBLA 47-48.

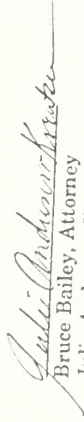
XIV. CONCLUSION

The Albuquerque BLM should redraft this DEIS; the new document should consider meaningful alternatives which provide the public with a clear basis for choice among options. The additional alternatives must provide adequate protection for increasingly scarce wildlife and recreation resources.

This DEIS is of crucial importance since it revises oil and gas leasing procedures affecting 4.2 million acres of BLM administered surface lands. The errors, flaws, and inadequacies described above indicate the need for revision of the document so that it complies with federal law, common sense, and the public interest in protection of scarce natural resources.

Thank you for the opportunity to comment on this document.

Respectfully submitted,



Bruce Bailey, Attorney
Julie Andersen-Kreutzer, Legal Intern
Michael Girard, Legal Intern

TDL:pcy

September 6, 1991

Mr. Robert Dale, District Manager
Bureau of Land Management
435 Montano NE
Albuquerque, NM 87107

Re: The Draft Albuquerque District Resource Management Plan (RMP)
Amendment/Environmental Impact Statement (EIS)

Dear Mr. Dale:

The purpose for this letter is to provide the Bureau of Land Management (BLM) with written comments concerning the above referenced document.

Dugan Production Corp. is a privately owned independent oil and gas producer that has successfully operated wells in the San Juan Basin for more than 30 years. Most of our wells are considered low volume and marginally productive or stripper wells. As an independent operator, we have been able to maintain production in many wells that major companies have abandoned. We must therefore protest any new regulations, stipulations, guidelines or policy changes that will further burden the petroleum industry. The economics of recovering our domestic petroleum reserves is dwindling with each new RMP. Dugan Production feels that the requirements and stipulations imposed by the Bureau of Land Management significantly impede the development of our country's petroleum resources. With each stipulation, the BLM is further curtailing an industry that is vital to our national security. Drilling on federal lands comes with enough laws, acts and policies to make one think twice about the risk involved without having new policies and new special stipulations thrown on top of it.

Oil and gas recovery has been a productive part of the San Juan Basin development for 70 years! We do not believe the petroleum industry and the environment are opposite positions. After reviewing the draft document, it becomes apparent that the most significant differences in the plans are with the Visual Resource Management cases. We live and play in the San Juan Basin and do not see the existence of a gas or oil well in the panorama as a blight to the aesthetics of the view. We see it as common sense and the prudent development of resources in a time when domestic petroleum production should be encouraged. How can we consider closing more lands to development when our country is paying other

Mr. Robert Dale, BLM
September 6, 1991
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countries for their petroleum instead of supporting our own petroleum production? We must protest the closure of any lands to oil and gas leasing. We must also protest to any special stipulations added to new leases which will in any way add to the cost of drilling or production.

Recently, Senator Jeff Bingaman (D-NM) introduced an energy strategy bill that sets two broad goals:

- a.) to reduce oil imports from the current 45% to 33% of total domestic petroleum consumption by the year 2010, and
- b.) to increase the energy efficiency of the economy 20% by the year 2000 and 40% by the year 2010.

It is obvious that Canadian gas imports enjoy a competitive advantage in the U.S. marketplace. How can the U.S. effectively reduce energy imports and curtail leasing of federal minerals for energy development? World oil consumption reached a record 66 million barrels of oil per day in 1990. U.S. demand also was at its highest level since 1979, totaling 17.32 million barrels per day. The U.S. was the only major non-OPEC nation that failed to adjust its fiscal regime to maintain oil output after the 1986 oil price collapse. From February 1986 to August 1990, U.S. oil production fell by more than 2 million barrels per day. The crisis in the Persian Gulf only serves to underscore renewed focus on our nation's energy security. In our nation's history, is now the time to curtail federal mineral leasing for visual aesthetics? As managers of federal minerals, we urge the BLM to continue leasing and request the federal energy agencies make more leases available for exploration and development. The United States energy strategy for the decades to come must include aggressive mineral leasing from the Federal Government.

The draft document assumes a great deal as to the amount of development that may or may not take place. The recent flurry of activity in the Basin has been due to the coalseam gas tax credit deadline. With the volatility of past and current oil and gas markets, we believe that the BLM is assuming what the petroleum industry would call the best case for development (no doubt to the BLM, it is the worst case scenario). The future development will be a function of market conditions and world politics. The additional petroleum resources recovered and the increase in the number of jobs projected by encouraging development in an area that has had drilling and production activity for 70 years make the Production Alternative by far the most rational and reasonable path. The Production Alternative presented in the draft document would encourage the petroleum industry which is so vital to our

Mr. Robert Dale, BLM
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nation by fully developing OUR resources.

In closing, the 1920 Mineral Leasing Act, as amended, authorizes the Secretary of the Interior to lease federal oil and gas resources on all public domain and acquired lands. Dugan Production Corp. emphatically urges the continued leasing of federal minerals not only in the Albuquerque District Management area, but throughout the western United States. The staff and management of Dugan Production Corp. requests that more federal minerals be available for lease, encouraging economic growth and much needed strength of the American Petroleum Industry reserves.

The staff and management of Dugan Production Corp. extends our sincere thanks for careful review of management plans and decisions that will effect the economic infrastructure of New Mexico.

Sincerely,

DUGAN PRODUCTION CORP.



Sherman E. Dugan
Vice-President

SED/cg

THE RIO GRANDE CHAPTER OF THE SIERRA CLUB

440 Cerrillos Road
 Santa Fe, NM 87501
 6 September 1991

Robert Dale, District Manager
 Bureau of Land Management
 435 Montano NE
 Albuquerque, NM 87107

Comment on Albuquerque
 District RMP Amendment
 on O & G Development

Dear Mr. Dale:

For the Farmington Resource Area the Preferred Alternative proposes to decrease the acreage that is closed or partially protected from oil and gas development from 705100 to 412100 acres, a 42% decrease. From the point of view of total acreage, that's a decrease from 31% to 18% of the RA having some measure of protection, including, most strikingly, a decrease from 5.2% to 3.3% of the total acreage that is entirely closed to O & G development. Whether wilderness study areas, if released by the Congress from interim WSA protection, would be opened to standard leasing conditions is left unclear by the document, Table 2-4 saying "no" but p. 2-16 saying "yes."

L14-A

L14-A (Leasing of Wilderness Study Areas). Wilderness Study Areas (WSAs), if released by Congress from interim wilderness management protection and not designated wilderness, wilderness study, or other special designation would be managed under this RMP and other applicable existing land use plans. If not designated, most of the WSAs would be managed under other special management area designations i.e., SMAs, ACECs, RNAs, etc. The WSAs or portions of WSAs that do not have overlapping designations in existing RMPs would be returned to multiple use management.

In spite of these large decreases in protected acreage (much of them explained in an unconvincing way on p. 4-15), the Amendment projects a slight decrease in drilling activity and related disturbance--for instance 1% fewer wells over 20 years on the Farmington RA--under the Preferred Alternative.

The reliability and the meaning of this projection of less disturbance are unclear from the document. The main source of added protection attached to the increases from 0 to 189400 acres with "controlled surface use" and from 0 to 20000 of "no surface occupancy," from which should be subtracted the change from 118100 to 75500 acres closed to development, for a net increase in relatively strongly protected acres from 118100 to 166800 or 48700 acres. We praise this 41% increase. But we have a lot of trouble, on the basis of the document, figuring out whether this increase, which amounts to only 2% of the resource area, really meets any significant part of the tremendously damaging (as well as tremendously lucrative) cumulative effects of O & G development on the Farmington RA. We all know, and Map 2 confirms, that the San Juan Basin area is, from the points of view of Mother Nature and lovers of the out-of-doors, a first-class mess. Do we declare it a sacrifice area, or do we try to protect a framework of soils, vegetation, and wildlife from which this area may one day re-achieve the status of real outdoors, after the Fossil Fuel Frenzy fades?

Speaking for (I'm sure) a very strong majority of our Chapter's 5800 members, we plead with you to do better than a 2% increase in significantly protected acreage. Protect all Special Management Areas completely from surface occupancy. Consider again the proposed SMA's that were not designated; see for instance letters #21, 23, 28 and others and Reply L156


L14-B

The statement on page 2-16 of the DEIS refers to WSA lands released from further consideration. As stated, WSA lands that do not have other special management designations assigned to them in the previous RMP documents, would be open to leasing and development. Except for Ah-shi-sle-pah (6,563 acres), Manzano (881 acres) and portions of Empedrado, La Lena, and Rio Chama, most of the acreage in WSAs has overlapping special management designations. Lands released from further wilderness consideration and not assigned other special management designations would be available for leasing. Lands within these areas would then be included in the open to leasing, under standard terms and conditions, management category. Footnote number 2 of Table 2-4 was incorrect and has been revised to state: "If WSAs are designated as wilderness, they would be discretionarily closed to leasing."

L14-B (Special Management Area Protection and Designations). Existing leases in the SMAs, or elsewhere in the resource area, cannot be rescinded or canceled. A no surface occupancy leasing stipulation is the only measure that would "protect all

L14-B Cont. in the Proposed Farmington RMP, and protect them from surface occupancy. Consider new areas--cliffs, mesas, washes--that may by their topography preserve vestiges of plant and animal diversity, draw lines around them, and protect them from surface occupancy.

Oil, gas, and money come and go quickly. The land belongs to our grandchildren.

Sincerely,


Roger S. Peterson
 BLM Issues Chair

L 14-B Cont.

Special Management Areas completely from surface occupancy". This, however, results in more wells being drilled on adjacent, older leases. A NSO stipulation does not decrease the amount of surface disturbing activities, it merely changes the location as to where these activities could occur. Additionally, this stipulation can only be included as part of the lease terms for new leases. This stipulation cannot be added to existing leases. With the exception of "may affect" situations that would result in a jeopardy decision for T&E species, surface disturbing activities can and will continue to occur on pre-NEPA/FLPMA leased portions of SMAs.

The focus of this document is on oil and gas leasing and development in the Albuquerque District. Areas are not being considered for special management designation. An extensive evaluation of special areas for ACEC designation was conducted during the preparation of resource management plans. The "decisions on areas considered but not proposed" still stand. Additionally, with the amount of oil and gas estate that is leased and held by production, SMA designations of other management areas or areas with special features i.e., cliffs, mesas, washes, would not preclude oil or gas development in the leased portions of such areas.

The basic problem in protecting resource values, by designating areas as special management areas, is based on the fact that @88 percent of the Farmington Resource Area's oil and gas estate is leased. The lease rights on the older pre-NEPA/FLPMA leases, allows for development of these leases even in special management areas. Except for wilderness area designations, special management area designations do not preclude, limit, or restrict development of the older leases. However, COAs, special management area prescriptions, standard operating procedures, and other mitigation measures are used to minimize or avoid visual resource impacts.



United States Department of the Interior

NATIONAL PARK SERVICE
SOUTHWEST REGION
P. O. BOX 728
SANTA FE, NEW MEXICO 87504-0728



IN REPLY REFER TO:

15 L7619 (SWR-REC)

SEP 0 6 1991

Memorandum

To: District Manager, Bureau of Land Management,
Albuquerque, New Mexico

From: Associate Regional Director, Resources Management,
Southwest Region

Subject: Review of draft Albuquerque District
Resource Management Plan Amendment and
Environmental Impact Statement for Oil and Gas
Leasing and Development (DES-91/16)

We have reviewed the subject document and have the following comments.

GENERAL COMMENTS

Under preferred Alternative C, all federally owned oil and gas in the Albuquerque District that is adjacent to National Park System units, except in "national conservation areas" and "wilderness areas" around El Malpais National Monument would be open for leasing and development by the Bureau of Land Management (BLM). National Park System units that could be adversely affected by such action include Aztec Ruins National Monument, Bandelier National Monument, Capulin Volcano National Monument, Chaco Culture National Historical Park, El Malpais National Monument, El Morro National Monument, Fort Union National Monument, Pecos National Monument, Petroglyph National Monument, and Salinas Pueblo Missions National Monument.

Oil and gas exploration and development on BLM-administered lands adjacent to these units would be subject only to "standard lease terms and conditions" (STC's). Other available oil and gas development stipulations, e.g., "no surface occupancy" (NSO), "controlled surface use" (CSU), or "timing limitation (TL) would NOT be applied to nearly all BLM-administered lands adjacent to National Park System units in the Albuquerque District. Leasing of federal oil and gas with only STC's on



lands adjacent to units of the National Park System would likely not afford the level of protection necessary to ensure the preservation and protection of the cultural, natural, historic, and visual resources and values in these nationally significant areas.

L15-A We recommend that information from the National Park Service (NPS) related to specific park units be made part of this plan so that preservation of park resources and values is adequately considered in the planning process. Information concerning sensitive resources, such as cultural resources near unit boundaries and areas of high scenic values, would support the development of protection stipulations, or development restrictions, beyond STC's for these specific lands. Lease development stipulations could then be defined for specific tracts before the lands are advertised for leasing.

In that regard, the NPS is in the process of developing park specific information concerning: locations of sensitive cultural resources/landscapes and areas of high scenic value; destination points near park units where the natural quiet, or the lack of noise, is an important value; designated wilderness areas adjacent to BLM lands; habitat for threatened and endangered species such as nesting and foraging areas; and, annual and seasonal park visitation statistics.

This information will be provided to your office in the near future and will support application of the following federal oil and gas leasing stipulations, with modifications based on park-specific information, to certain lands in the Albuquerque District.

No Surface Occupancy Stipulation (for visual, audio and recreation resource protection): This stipulation should be applied to all new leases issued in the foreground areas (e.g., distance at which details can be perceived, at least 1/2 mile from the viewer) adjacent to National Park System units to prevent disturbance from geophysical exploration, drilling activity, collection, treatment, and storage facilities in areas of high sensitivity due to scenic quality, recreation value and audio resource protection.

Controlled surface use Stipulation (for visual resource protection): This stipulation should be applied to new leases near National Park System units to prevent visual disturbances from drilling operations, treatment, storage

L15-A (National Park Service Information). As is noted in your comment letter, "...information will be provided to your office in the near future...". We will review the information submitted by your office when we receive it. COAs will be attached to APDs where possible to provide the desired protection. New stipulations will be considered if data is provided in BLMs next plan amendment.

and collection facilities on areas of high scenic values. Use of this CSU stipulation should pertain to middle ground areas (e.g., from the foreground area to the area 3-5 miles from the viewer) from primary and secondary viewpoints and significant areas of interest in park units.

This CSU stipulation would afford the BLM the flexibility to relocate proposed oil and gas exploration and development activity farther than the allowable 200 meters under SIC's. This is particularly important in order to take advantage of limited topographic relief and vegetation available for screening and siting of facilities to prevent intrusions on scenic features, focal points, cultural features or "skylighting" of facilities. This stipulation should further require operators to paint equipment to minimize contrast by selecting a color that blends with soils and vegetation and by selecting a finish that is flat and non-reflective.

Controlled Surface Use Stipulation (for cultural resource protection): This stipulation should be applied to all BLM lands open to leasing and development within at least 1 mile of sensitive cultural resources (e.g., standing ruins walls) in National Park System units. This stipulation would prevent adverse impact to significant cultural resources that are sensitive to ground and atmospheric vibration caused by explosions (e.g., blasting) associated with geophysical exploration and well-site construction.

This CSU stipulation should further require proper planning, monitoring (e.g., real-time vibration detection) and modification of operations, if necessary, conducted within at least 1 mile of sensitive cultural resources managed by the NPS to ensure that any blasting near the unit does not endanger or adversely affect such cultural resources.

Timing Limitation Stipulation (for visual, audio and recreation resource protection): This stipulation would prohibit all geophysical exploration, drilling operations, and construction of production, storage, treatment and transportation facilities in areas of high sensitivity adjacent to National Park System units due to scenic, audio, and recreation values during peak visitation periods (e.g., June 1-August 31). This TL stipulation should be applied to foreground and middle ground visual and audio zones surrounding park units.

These resource management concerns and stipulations should also apply to NPS units for oil and gas leases underlying National Forest lands, since the BLM is a cooperating agency on Forest Service Land and Resource Management Plans and the BLM generally provides the Forest Service with information about current oil and gas leasing and development, oil and gas occurrence potential, and reasonably foreseeable development projections (page 1-2 and 1-5).

The air quality analysis in the draft statement is totally inadequate. Simply stating that natural processes and standard mitigation measures will disperse air pollutants which "may result in legal emission standards being exceeded in localized areas for short periods of time" is not sufficient (page 1-13). Even the appendices which discuss standard mitigation measures have no direct statement of any air pollution control techniques, regulations or requirements.

The draft statement also does not include an analysis which estimates the total air pollutant emissions and their impacts from the 22,000 existing oil and gas wells in the region, nor cumulative emissions from all sources, much less any estimate of the impacts of 9,084 (Preferred Alternative) to 9,624 (Production Alternative) additional wells. Individual wells can be major sources of air pollution, emitting more than 100 tons per year of regulated pollutants such as hydrocarbons (HC), nitrogen oxides (NO_x), carbon monoxide (CO) and hydrogen sulfide (H_2S).

There are several Class I areas which could be adversely impacted by air pollution from existing and future oil and gas development in the Albuquerque District. These include Mesa Verde National Park and Weminuche Wilderness (San Juan National Forest) in Colorado; and, San Pedro Parks, Pecos and Wheeler Wildernesses (Forest Service), Chaco Culture National Historical Park, and Bandelier National Monument in New Mexico. Under the Clean Air Act, stringent standards (increments) are established for Class I areas which allow little additional air quality impacts in the vicinity of those areas. Also, the federal land managers (the Secretary of Agriculture and the Assistant Secretary of the Interior for Fish, Wildlife and Parks) and the managers of the individual Class I areas have an affirmative responsibility to protect the air quality related values (AQRV's) of those areas from adverse air pollution impacts. AQRV's include visibility, plants, animals, soils, water

quality, historic and cultural objects and structures, and visitor/employee health.

L15-B [We recommend that, prior to issuing the final statement for this proposal, the BLM conduct an air quality study similar to the study the BLM conducted in North Dakota. The Williston Basin Regional Air Quality Study estimated the impact of existing and future oil and gas development on mandatory Class I clean air areas in western North Dakota (Theodore Roosevelt National Park and Lostwood National Wildlife Refuge Wilderness).]

L15-C [The final statement should include a detailed discussion of the potential air pollution impacts of the oil and gas development on the Class I areas as well as mitigation measures to be utilized to minimize or eliminate the impacts.]

SPECIFIC COMMENTS

L15-D [Page B-24, Paragraph D: This states that "any plastic material used to line pits must be removed to below-ground level before pits are covered." Burying debris, such as this plastic liner, is a poor practice. Any erosion of the buried pit could expose this debris and contaminate the site. We recommend removing all debris from the location.]

L15-E [Page B-24, Paragraph E: This discussion fails to address the netting of the reserve, production, or blow pits. Severe injury or death could occur to any animal entering a pit contaminated with hydrocarbons. We recommend this paragraph be revised to require a net which would prevent animals from entering the pit.]

L15-F [Page B-24, Paragraph I: This section states that "berms or fire walls will be constructed around all storage facilities sufficient in size to contain the storage capacity of the tanks, or the combined capacity of tanks if a rupture could drain more than one tank." To account for the additional capacity necessary for rain water, we recommend this statement be changed to reflect that the berm or fire wall have enough capacity to contain 1-1/2 times the storage capacity of the tanks.]

We appreciate the opportunity to review this proposal.

P. B. Smith

L15-B (Air Quality Study). See the comment response for comment L8-B.

L15-C (Air Impacts to Class I Areas). See the comment response for comment L8-B.

L15-D (Page B-24, Paragraph D – Stipulations). The purpose of this document is to "...establish fluid minerals [oil and gas] determinations [areas closed to leasing and areas open to leasing with and without constraints] that...are required (for the entire oil and gas mineral estate) in every resource management plan (RMP) prepared by the BLM (BLM Handbook H-1624-1 I-A)."
 Conditions of approval, as defined in this document, are site-specific operational requirements attached to permitted actions. These requirements are developed by staff specialists who periodically review and occasionally revise them to reflect changing regulations and technology. COAs developed by the BLM and Other Surface Managing Agencies, as presented in Appendix B, are included for the purpose of clarification. Comments addressing operational requirements of Other Surface Managing Agencies are outside the scope of this document. Recommended changes to operational requirements may be submitted to the appropriate BLM resource area office or Other Surface Managing Agencies' Authorized Officer for further consideration and review.

L15-E (Page B-24, Paragraph E – Stipulations). See comment response to comment L15-D.

L15-F (Page B-24, Paragraph I – Stipulations). See comment response to comment L15-D.

cc: Superintendent, Aztec Ruins
Superintendent, Bandelier
Superintendent, Capulin Volcano
Superintendent, Chaco Culture
Superintendent, El Malpais
Superintendent, El Morro
Superintendent, Fort Union
Superintendent, Pecos
Superintendent, Petroglyph
Superintendent, Salinas Pueblo Missions



Southern
Rockies
Business
Unk

September 6, 1991

Mr. Robert Dale, District Manager
 Bureau of Land Management
 435 Montano NE
 Albuquerque, NM 87107

File: BRC-138-031

Draft Albuquerque District Resource Management Plan (RMP)
Amendment/Environmental Impact Statement (EIS)

Amoco Production Company, a subsidiary of Amoco Corporation, is incorporated for the purpose of exploring for and developing oil and gas resources. Amoco Production Company has extensive operations and a substantial leasehold position within the boundaries of the Farmington Resource Area. As a result, our company is very interested in any land use planning amendments that would affect oil and gas availability in the Albuquerque District, particularly in the Farmington Resource Area.

A review of the document indicates it is thorough and addresses all pertinent requirements for RMP's. It is encouraging to see the emphasis oil and gas has received in the Farmington Resource Area. However, there are some concerns identified with the document which we have chosen to address in this letter. Our comments will be identified by chapter and/or page number.

Chapter Two of the DEIS provides information on the plan alternatives. The preferred alternative indicates that the Farmington Resource Area will contain 21,100 acres of land which would be discretionarily closed to oil and gas leasing. As indicated in the DEIS, the closure of these areas is based on management constraints for Special Management Areas (SMA's) and Areas of Critical Environmental Concern (ACEC's). Amoco cannot support a no leasing decision for these areas considering the availability of leasing constraints available to BLM. Instead of not leasing, the BLM should attach a leasing constraint for these areas. This would not only allow oil and gas activities, but should provide for necessary protection of the resources in the SMA's and ACEC's. It would appear very likely that a controlled surface use stipulation would provide the necessary resource protection which justified the establishment of an ACEC or SMA. While we also have concerns with a no surface

L16-A [Leasing in SMAs with Lease Stipulations]. See comment response for comment L4-A.

occupancy lease constraint being applied, it would at least allow for directional drilling for oil and gas and not completely preclude these lands from exploration and development. Therefore, Amoco recommends that the 21,100 acres of land shown as discretionarily closed be leased with appropriate stipulation constraints which would be consistent with providing necessary resource protection for the applicable ACEC's and SMA's.

L16-A
Cont.

Appendix B-3 contains condition of approval for a variety of operations including drilling permits (APD's), seismic work, pipelines, and road right of ways. The following are our comments on the specific items as identified by page number.

Page B-23, 21. This stipulation states "off-site mitigation will be required, and is attached". While off-site mitigation has proven effective in addressing impacts, it can be very costly and time consuming to implement. This particular stipulation, as written, does not suggest that any justification be provided before requiring its use. Therefore, we recommend that the stipulation be rewritten to read: "The off-site mitigation attached has been developed with input from the lessee/operator and has been based on scientific merit compiled and justified in an environmental analysis associated with this project".

L16-B

L16-B (Page B-23, 21 - Stipulations). See comment response for comment L15-D.

Page B-24, 23.I. This requirement states that "berms or fire walls will be constructed around all storage facilities..." It should be noted that Spill Prevention Control and Countermeasure (SPCC) regulations found at 40 CFR 112 require containment around only oil storage facilities. Therefore, the word "oil" should be inserted before the term "storage facilities".

L16-B
Cont.

L16-B (Page B-24 23.I. - Stipulations). See comment response for comment L15-D.

Page B-25, 26.C. This stipulation states that "all cattle guards must have clearly visible identification marks welded into them indicating the ownership, well name and number associated with the cattle guard". It is unclear why this requirement is necessary. While the companies using the roads where cattle guards are located maintain them, they are not owned by the companies. The need to place the information requested on the cattle guard is also unclear and not justified anywhere in the DEIS. The benefits to be realized from this stipulation does not appear to justify the time and cost to compile the information and weld it on the cattle guard. Therefore, we request this item be removed from the standard list of stipulations for fencing.

L16-B
Cont.

L16-B (Page B-25 26.C. - Stipulations). See comment response for comment L15-D.

Page B-27, 7.f. This stipulation addresses archaeological clearances that would be applicable to

geophysical operations for the drilling of shot holes or shot points and reads: "A 100 foot radius survey will be required around shot holes or shot points". The necessity of requiring this large a radius around these areas is not clear. As stated earlier with stipulation 7.d., the center line of the seismic line would be cleared 50 feet on either side of the line. Activities occurring at the shot hole are not that extensive and would not venture outside the 50 foot area already cleared. Considering the site density for cultural resources in this area, requiring clearances of a 100 foot radius around a shot hole or shot point could become an extensive effort, both economically and logistically. Also, seismic operators need the flexibility to move shot points along the line for a variety of reasons during project implementation. If pre-project archaeological surveys are required for shot holes, this will not be possible. Therefore, it would be more appropriate to revise this stipulation to read: "When a cultural survey has been determined to be necessary by the Bureau, all shot hole and shot point activities must be confined to the 50 foot inventoried area along the seismic line unless a larger area has been previously cleared".

**L16-B
Cont.**

L16-B (Page B-27 7.f. - Stipulations). See comment response for comment L15-D.

Page B-28, 11. The wording of this stipulation is not consistent with current prudent practice because it mentions cementing of the shotholes. We recommend that the cementing language be removed and the condition read as follows: "Drill hole cuttings will be returned to the hole and any surplus will be scattered so that the pile is less than six(6) inches in height".

**L16-B
Cont.**

L16-B (Page B-28 11. - Stipulations). See comment response for comment L15-D.

Shotholes are not cemented, but rather are plugged with cuttings or bentonite, depending on whether or not water is present. If water is present in the hole, then a bentonite plug(s) is set to isolate the water source(s). When no water is present, the drill cuttings are backfilled into the shotholes.

Page B-28, 12. This stipulation deals with explosives and hole loading practice. Specifically it states that loaded shotholes will not be left unattended. We recommend that the second sentence of this stipulation, which is "Loaded shotholes will not be left unattended.", be removed from this stipulation because it is practically impossible to comply with the stipulation as worded and does not result in a substantially safer operation.

**L16-B
Cont.**

L16-B (Page B-28 12. - Stipulations). See comment response for comment L15-D.

When shotholes are being drilled and loaded, two groups are involved, the "drillers" and the "pluggers". The drillers drill and load the holes with explosives and leave only the firing leads at the surface. The

"pluggers" then backfill the hole with the firing leads exposed. Shotholes are left unattended between the drilling and plugging for a time of a couple of minutes to several hours and between the plugging and the shooting for a time of a few hours to several weeks.

Once plugged, the shotholes are then in a safe condition until they are shot. With the hole plugged, a detonated shothole will not cause harm to an individual. To "attend" a "loaded" shothole would require a substantially larger work force (ie. one person constantly at each shothole) than is currently utilized with little or no significant increase in safety.

In conclusion, we would like to acknowledge the effort by the BLM in thoroughly assessing oil and gas resources in this document.

Thank you for considering our comments.

D. R. Brown

D.R. Brown
Southern Rockies Business Unit
Environmental Affairs



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REG-0016
MAILING SERVICE UNIT 1990
EPA/AS/ENV/5000/016

17

SEP 18 1991

Mr. Robert Dale
District Manager
Bureau of Land Management
435 Montano NE
Albuquerque, NM 87107

Dear Mr. Dale:

In accordance with our responsibilities under Section 309 of the Clean Air Act, the National Environmental Policy Act (NEPA), and the Council on Environmental Quality (CEQ) Regulations for Implementing NEPA, the Environmental Protection Agency (EPA) has reviewed the Resource Management Plan (RMP) and Draft Environmental Impact Statement (DEIS) prepared by the Bureau of Land Management (BLM) for the development of federal oil and gas leases within the Albuquerque District of New Mexico.

This DEIS describes and analyzes the future options for managing the federal mineral estate situated within and administered by the BLM, Albuquerque District through the Farmington, Rio Puerco, and Taos Resource Areas. In addition to the no-action (current management) alternative, the DEIS considers two additional alternatives, the production and preferred alternatives.

EPA appreciates the opportunity to review the RMP\DEIS. EPA is concerned, however, that the DEIS does not adequately assess the potentially significant impacts of the action which should be analyzed in order to reduce impacts. We believe the document to be too general in the type of information that is presented and fails to provide the public with an understanding of the management options available to BLM. The DEIS fails to provide any specific data to justify the absence of additional requirements related to the protection of endangered and threatened species; and underground sources of drinking water during the exploration, drilling, and operation of oil and gas wells in the Albuquerque District.


Basically, insufficient information is provided in the DEIS to fully evaluate the proposal. EPA believes that by excluding the impacts from methane migration, produced water disposal, and hazardous materials from the EIS, the assessment of this proposal is incomplete. Furthermore, the scope of analysis in the DEIS for cumulative and secondary impacts associated with the preferred alternatives is far too brief.

The DEIS states that environmental assessments will be undertaken when the plans are implemented. While we question whether this document will be useful as a guide for assessing site specific impacts, the DEIS does not fully describe when or how the assessments will be made. Since it is assumed that the umbrella EIS would be used as a broad comprehensive source to make decisions, criteria should be developed that detail when and how an assessment will be prepared.

In accordance with EPA's policies, we have rated this Draft EIS as EO-2 (Environmental Objections--Insufficient Information). The basis for our environmental concerns and the additional information which we believe is needed in the Final EIS is discussed above and in our enclosed detailed comments. Our classification will be published in the Federal Register according to our responsibility under Section 309 of the Clean Air Act, to inform the public of our views on proposed Federal actions.

Please contact Ms. Yvonne Vallette of my staff at (214)655-2260 if we may provide further explanation of our concerns and comments. We request that you send our office (2) copies of the Final EIS at the same time that it is sent to the Office of Federal Activities, U.S. Environmental Protection Agency, 401 M Street S.W., Washington, D.C. 20460.

Sincerely yours,


Robert E. Layton, J.D., P.E.
Regional Administrator

Enclosure

cc w/enclosure:
U.S. EPA, Region 8, Denver

Detailed Comments of the
U.S. Environmental Protection Agency
concerning the Bureau of Land Management's
Resource Management Plan/Environmental Impact Statement
for Oil & Gas Leasing and Development in the Albuquerque District

I. Page 1-13/14 Environmental Concerns Considered but Dropped
from Study.

- Threatened and Endangered Species
- Disposal of Produced Water
- Methane (Coal Gas) Migration
- Hazardous Materials

As indicated in the RMP/EIS, these concerns were not considered significant for the purposes of this study. As explained in the following, EPA does not concur with the rationale that was used to drop these concerns from further consideration in this document.

A. Threatened and Endangered Plant and Animal Species [Pg. 1-13]
A total of 27,611 acres have been identified by BLM as Special Management Areas and Areas of Critical Environmental Concerns for the protection of species that are proposed for listing, officially listed, or candidates for listing under the Endangered Species Act (ESA). 706 of these acres may be disturbed by the proposed alternatives. There is no list provided in the DEIS of those species or special habitats that may be found or impacted within the project area.

It would appear from this document that Section 7 Consultation under the ESA has not been initiated with the U.S. Fish and Wildlife Service on this action. We would suggest that BLM in order to facilitate compliance with the ESA, initiate Section 7 consultations with the USFWS by requesting information on whether there are any species which are listed or proposed to be listed within the project area. If the USFWS determines that such species may be present, a biological assessment must be conducted for the purpose of identifying any endangered or threatened species which is likely to be affected by each of the alternatives.

These assessments are usually undertaken as part of a Federal agency's compliance with the requirements of Section 102 of NEPA. By failing to consider the impacts to threatened or endangered species, BLM may not be in compliance with the objectives of NEPA. The Final EIS should include any consultation or comments obtained from any Federal agency which has jurisdiction by law or expertise with respect to any environmental impact involved.

L17-A (Consultation and Coordination). All comments by agencies and individuals whether regulatory, jurisdictional, private, or special interests are included in and have been responded to in this document.

L17-A

B. Disposal of Produced Waters [Pg. 1-14]
The lack of concern about the disposal wells where trucking of produced waters occurs, is inconsistent with recent discussions between EPA and the Directors of State Underground Injection

Control (UIC) Class II Primary Programs. These same concerns are provided in the report of the Class II UIC Program Midcourse Evaluation Workgroup (attached). The two major concerns are:

- 1) Illegal dumping of produced waters before reaching the disposal well; and
- 2) illegal disposal of hazardous waste at the well by the mixing of these wastes with produced waters.

As a result of recent discussions with State, Federal (including BLM), and industry officials; EPA is recommending that some type of manifest system be implemented to assure the proper disposal of produced waters. One such example is the manifest system now in place in North Dakota for the transport of produced waters.

EPA has begun inquiries regarding National Pollutant Discharge Elimination System (NPDES) permits for potential discharges of water associated with oil and gas development activities. Currently, produced water disposal via injection wells are approaching volumes of 100,000 bbls/day in the San Juan Basin.

The concern about illegal disposal in the San Juan Basin was raised as recently as July 2, 1991 at a meeting in the BLM Farmington office by representatives of the U.S. Fish and Wildlife Service (USFWS). The USFWS has been conducting fish sampling studies along the San Juan River during the past year and noted numerous occasions of where water trucks appear to be dumping produced waters into the river. These same studies indicate abnormally high levels of organic toxins common to oil and gas production.

EPA believes that improper disposal continues to be a problem in the San Juan Basin and therefore recommends a thorough analysis be included in the EIS. A closer look should be taken at produced water trucking and the need for monitoring and reporting these activities to assure compliance in proper disposal practices.

C. Methane Migration [Pg. 1-14]

Existing and proposed activities in the San Juan Basin involving the production of methane gas by means of coal-bed degasification has resulted in the development of the largest coal-bed gas base in the United States (88 TCF of probable reserves).

Current requirements for new APDS include cementing around well casings through the Fruitland Coal Formation. This would usually be accomplished by simply circulating cement to the surface adjacent to the long string. There are no requirements, however, that the adequacy of the cement be determined by the use of a valid cement bond log or some other equivalent method. The development of channels capable of transmitting fluids

L17-B (Water Disposal). The BLM regulates the disposal of produced water. The office transport and disposal of produced water to an authorized collection point is an appropriate method of water disposal.

If agencies or individuals believe that unauthorized disposal is taking place, incidents should be reported to the BLM. BLM uses it's legal authority and law enforcement personnel to see that proper disposal practices are followed.

(especially gas) is an ongoing problem of oil and gas wells. Cases of significant channels in the cement have been noted even when cement is circulated to the surface. The Final EIS should discuss the need for logs to verify the quality of the cement and the absence of channels adjacent to the Fruitland Coal Formation.

L17-C

The DEIS indicates the methane migration problem is only associated with old wells. This may not be entirely correct as gas has been noted venting in areas where leaking wells are not evident. Gas movement up fractures, potentially too tight to transmit significant amounts of water, is a suspected migration pathway. A major difficulty in pinpointing the potential migration pathway is the absence of a sufficient data base containing chemical analyses of gas from Fruitland producing wells. Isotope data should be collected to determine if migrating gas is from the Fruitland Formation or some other source. We recommend that BLM require operators to sample a statistically valid percentage of their gas wells and analyze for chemical make-up, including isotopes. This would provide a data base for assessing the origin of gases if future problems occur.

Another potential (future) pathway for gas migration is the small fractures through the Kirkland Formation which are essentially impermeable to water but could allow gas to move if under adequate enough pressure. The static (current) condition in the Fruitland Formation presently binds the gas to the coal surface. As the coal is dewatered, a traditional gas cap may develop adjacent to the wellbore. Gas would then be available to move into the small fracture systems and begin migrating into other formations.

The increase in production of coal-bed methane in the San Juan Basin has coincided with natural gas observed in domestic wells in the alluvial aquifers along the Animas River Valley near Bondad, Colorado and Cedar Hill, New Mexico. In other documentation prepared by the BLM for the northern portion of the San Juan Basin, BLM has concluded thus far that there is no direct connection between these demonstrated events or that the path of migration is along natural faults and cannot be curtailed (BLM, Problems and Considerations Associated with Water Injection and Coal-bed Methane Development as they relate to Groundwater in the Northern San Juan Basin, Colorado, July 27, 1989, page 5).

In cooperation with the U.S. Geological Service, BLM is continuing to investigate this condition. Results of chemical and isotopic analyses for 48 gas samples obtained from seeps, domestic wells and Bradenhead tests were reported by the USGS from the Bondad/Cedar Hill area (D.D. Rice, Summary of Chemical and Carbon Isotopic Composition Data of Gas Samples Collected in the Bondad area, August 3, 1989, and in the Cedar Hill area, July 25, 1990, USGS, Denver). Based upon the thermogenic properties of coal-bed methane, Rice concluded that about half of the gases detected in domestic water wells and in field and river seeps

L17-C (Cementing of Wells). Protection of near surface aquifers during drilling operations is addressed in Onshore Oil and Gas Order No. 2 - Drilling Operations. In addition to the above Onshore Order, Notice to Lessees' (FRA 90-1, issued June 1, 1990) notifies lessees in the Farmington Resource Area of special casing and cementing requirements developed to protect usable water resources (water containing 10,000 ppm or less of TDSS). Quality cement applications, with special enhancements in selected critical intervals, are required for all wells drilled in the Farmington Resource Area. Cement placement for all stages of cement used to protect usable water zones must be verified by cement circulated to the surface and/or by wireline log (i.e., temperature surveys or cement bond logs).

originating from Fruitland coal beds. Fruitland gas was also found in Bradenheads and surface casings of several deep conventional gas wells (ibid, page 1).

Furthermore, these results appear to coincide with the anecdotal accounts of long-term residents in the area who have reported substantial increases in gas migration since 1981 (Chris Shuey, Policy and Regulatory Implications of Coal-Bed Methane Development in the San Juan Basin, New Mexico and Colorado, Southwest Research and Information Center, Albuquerque, September 1990, pg. 7). The uncertainty in the origin of gas migration could be improved if BLM would require operators to chemically type Fruitland gas production.

This issue has never been satisfactorily addressed by BLM other than to claim it was not a potential issue as it was not presently occurring. The development of a data base on gas quality and existing seeps will give BLM the ability to assess future problems if they occur.

D. Hazardous Materials [Pg. 1-15]

The DEIS states that the authorization for disposal of hazardous waste on Federal land will be suspended until investigations of existing sites are completed. Thus, hazardous waste disposal was not considered an issue for inclusion in the EIS.

It should be noted that oil and gas activities do generate wastes which are now regulated pursuant to the Resource Conservation and Recovery Act (RCRA). These chemicals, such as motor oil, unused solvents, and well worked-over fluids such as acids, solvents, etc., are not exempt from RCRA regulations and are not wastes that can be disposed of in a Class II well. Even if the unused materials are not hazardous, they must be properly disposed of offsite. The absence of disposal facilities on BLM land increases the possibility of improper disposal practices. A major problem in the area of waste disposal is the lack of knowledge by operators of disposal practices and the availability of authorized sites. EPA recommends that these issues be addressed in the Final EIS.

L17-D

E. Cumulative Impacts [Pgs. 4-23, 32, and 41]

The DEIS states that "this cumulative impact analysis identifies the impacts of oil and gas leasing and development... to the extent that data is available". Cumulative impacts are defined in section 1508.7 of the regulations implementing NEPA as those impacts which result from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions. While there are some numbers offered in the DEIS that speculate changes to the ecosystem with each of the alternatives, the impact from the collective effect of these specific impacts may result in major impairment of resources (including those resources previously discounted in the DEIS) and interfere with the productivity of the existing ecosystem. A

L17-D (Disposal of Oil and Gas Activity Wastes). Within the Farmington Resource Area, authorized disposal sites for waste generated by oil and gas operations are extremely limited. One site, however, is approved by NMOCD for the disposal of oil field waste. This private operation accepts waste material that has passed EPA mandated Toxicity Characteristic Leaching Procedure (TCLP) requirements for solid waste and is, therefore, exempt from RCRA. According to EPA toxicity criteria, any waste whose leachate contains one of 38 organic toxicants in concentrations at or exceeding specified levels is considered a hazardous waste subject to the stringent cradle-to-grave management standards established under Subtitle C of the Resource Conservation and Recovery Act (RCRA).

reasonable and foreseeable future has been identified in the document (pg. 2-2) of modifying the spacing of gas wells in the Fruitland Formation from 320 to 160 acres. The analysis of cumulative impacts does not address the effects of this possible future.

L17-E (Well Spacing). See comment response to comment L2-E.

II. Additional Needs for General Information

A. Chapter 3, Resource Area Hydrology [Pg. 3-16]

The information in the DEIS on ground water hydrology does not provide any thing useful on which to base decisions or evaluate potential impacts and mitigative measures.

The document fails to provide any data on the typical geologic and hydrologic conditions of each resource basin. Additional details are necessary; including:

- 1.) Geologic cross sections showing all water bearing units;
- 2.) Information on depth of water wells in each area;
- 3.) Data on total dissolved solids content of water bearing zones; and,
- 4.) Information on depth to various aquifers, their thickness and specific yields.

EPA requires protection of all aquifers which have a total dissolved solids content of less than 10,000 mg/liter, which are defined as Underground Sources of Drinking Water (USDW). Injection wells are required to be constructed such that no injected fluids can enter USDWs and no inter-formational flow occurs between aquifers.

We also suggest that BLM contact the State's Wellhead Protection Program Manager and establish a coordination process to develop wellhead protection areas around public water supply systems in the resource areas. The wellhead Protection Manager for the State of New Mexico is:

Robert Gallegos, Manager
Wellhead Protection Program
New Mexico Environment Department
(505) 827-2778

B. Soils and Hydrology [Pg. 4-16]

The sections on potential impact to soils and hydrology do not address the potential impacts to ground water aquifers. A number of oil and gas activities can result in significant impacts on shallow and deep aquifers, including:

- 1.) Incomplete casing and cementing of wells which may allow the mixing of poor quality

L17-F (Resource Area Hydrology). General hydrologic information and ground water analyses for the San Juan Basin is readily available from the United States Geological Survey Water Resources Division. Depth to water, water quality, and aquifer conditions vary widely across the basin. Therefore, basin wide cross-sections or water chemistry maps would be of little value in interpreting site specific hydrologic conditions. Site specific ground water information for much of the San Juan Basin is available from USGS WATSTORE records. Hydrologic information for more than 1,200 wells and springs are stored in WATSTORE's water quality file. In addition to USGS data, well log data from thousands of oil and gas wells in the basin are available from the American Petroleum Institute (API).

water from one aquifer with aquifers containing higher quality water;

- 2.) Inadequate well plugging such that individual USDWs of different quality are not isolated;
- 3.) Cathodic protection wells which are open to more than one water bearing zone;
- 4.) Improper dumping of drilling, completion and production fluids;
- 5.) Potential discharges from surface pits associated with shallow alluvial aquifers; and,
- 6.) Improperly plugged seismic exploration holes.

L17-G [This section does not address the activities that can impact ground water nor assess the impacts of any proposed alternatives.

C. Lease Stipulations [Appendix B-2]

The lease stipulations do not address surface releases of produced water from pipeline leaks. Operators should be required to immediately shut-in pipelines, report the spill, contain and collect as much of the spill as possible, and determine if aquifer mitigation is necessary.

D. Conditions of Approval - Geophysical Exp. [Appendix B-3]

EPA believes the conditions for approval to be inadequate. They fail to address potential impact to shallow ground water caused by seismic holes. Most seismic holes penetrate at least one shallow aquifer and often connect more than one aquifer. The state of Wyoming requires that seismic holes be filled with bentonite pellets on top of the charge prior to detonation. This contains the blast and facilitates the final plugging of the hole with bentonite to the top of the water table. Drill cuttings are back filled into the portion of the hole above the water table. As part of implementing these provisions, Wyoming has inspectors that visit each seismic shot line to assure compliance.

E. Conditions of Approval - Well Construction [Appendix B-3]

The Final EIS should provide more detail on the casing and cementing policy that is utilized for the protection of USDWs. EPA guidance recommends that surface casings be set to isolate all aquifers with a IDS less than 5,000 mg/liter. The long string should be cemented to protect the remaining USDWs.

F. Indian Issues

One of the concerns within the San Juan Basin is the resolution of land ownership issue. The various Public Land Orders, Executive Orders, withdrawals and laws involving land in the basin have resulted in unclear ownership of thousands of acres.

L17-G (Ground Water Impacts). Ground water impacts are now considered in Chapter 4.

L17-H (Conditions of Approval for Geophysical Exploration). The preferred method of geophysical exploration in the San Juan Basin is the "vibroscopes" or the thumper/vibrator method (see Appendix C, Page C-3). The drilling method, which utilizes explosives to send shock waves below the earth's surface, is not commonly used.

Since 1989, the Farmington Resource Area has authorized 4 permits for geophysical exploration, none of which involved the drilling of seismic holes. For Notices of Intent for Geophysical Exploration that involve the drilling of seismic holes, measures that protect surface and ground water are developed on a case-by-case basis. Compliance inspections during and after the operation ensure that stipulations are complied with and geophysical lines are properly reclaimed and drill holes properly plugged.

L17-I (COA of Well Construction). See the comment response to comment L17-C and Appendix L.

In addition, the checkerboard ownership pattern in the area makes the lands difficult to manage. The developed Farmington Resource Management Plan (RMP) was to address these ownership and management issues. One of the first actions resulting from the RMP was the development of a Tri-Party Agreement among the BLM, Bureau of Indian Affairs, and the Navajo Nation. No mention of these developments or of any coordination activities with regard to this proposal that may affect related issues of the Navajo Nation are mentioned in the DEIS.

G. Project Schedule

There is no timing schedule provided for the implementation of site-specific measures that are referred to in the DEIS such as identifying mitigating measures, leasing schedules, further analysis, etc.



BRUCE KING
GOVERNOR

STATE OF NEW MEXICO
OFFICE OF CULTURAL AFFAIRS
HISTORIC PRESERVATION DIVISION

HELMUTH J. NAUMER
CULTURAL AFFAIRS OFFICER

VILLA RIVERA, ROOM 101
228 EAST PALACE AVENUE
SANTA FE, NEW MEXICO 87503
(505) 827-6320

THOMAS W. MERLAN
DIRECTOR

18

September 20, 1991

Robert Dale
District Manager
Albuquerque District
Bureau of Land Management
435 Montano NE
Albuquerque, NM 87107

Dear Mr. Dale:

I am writing in response to the request for comments on the draft Albuquerque District Resource Management Plan Amendment and EIS. From a cultural resources standpoint, it is difficult to know how to comment on a document that offers three alternatives, none of which will make any difference in the impacts of oil and gas leasing on cultural resources.

L18-A

Page 2-18 states that an additional "Conservation Alternative" was considered, but was rejected because it would not have provided significantly more protection to the resources under consideration than the preferred alternative. This means, in the case of cultural resources, that the "conservation" alternative provided no more protection for the resources than the "production" alternative. Which leads one to wonder how the "conservation" alternative came to have that particular designation.

The impacts of oil and gas development on cultural resources in the Farmington Resource area have been and continue to be enormous. The Fruitland coal gas development alone is the biggest single threat to cultural resources in New Mexico and probably in the entire Southwest. Because of the intensity of the development, because the coal gas requires the construction of separate pipeline gathering systems, and because the BLM requires these lines to parallel existing pipe where possible, avoidance of archaeological sites is becoming a less and less viable option. As Table 4-3 indicates, hundreds of archaeological sites have been impacted so far, and page 4-19 indicates that hundreds more are at risk.

Historic and prehistoric sites are a nonrenewable resource. When they are destroyed, whether by a bulldozer or by an archaeologist, they are gone forever. "Mitigation through data recovery" is not an alternative to preservation; it is an admission of failure to preserve. I don't see anything in this document that addresses the issue of preservation.

L18-B

L18-A (Alternatives). In addition to the small number of acres remaining to be leased influencing the difference between alternatives, cultural impacts will be lower because of BLMs commitment to comply with our responsibility to protect cultural resources. Even under the production alternative, BLM is committed to protecting cultural resources through the use of COAs on APDs. Therefore, BLM would not anticipate a measurable difference in the impacts between alternatives. See response L2-A.

L18-B (Cultural Resources Preservation). This RMPA designates a number of special management areas, which are managed primarily to protect cultural resources. In most cases, the RMP either withdraws from or closed these areas to leasing or stipulates "no surface occupancy" for lease operations for the 20-year life of the plan. The management decisions were made to ensure cultural resources will not be disturbed by either development or mitigation as a result of oil and gas activities. In general, these are the most unique, high value cultural resources, which BLM has determined (through land use planning) warrant absolute preservation in the face of other multiple use considerations. Other properties outside of special management areas may also receive special protection up to and including absolute preservation on a case-by-case basis, as they are discovered and evaluated through the normal procedures for compliance with the Historic Preservation Act.

The BLM recognizes that mitigation through data recovery is not an alternative to preservation. However, in evaluating the levels of surface disturbance and numbers of sites potentially subjected to impacts, it is important to realize that only a small proportion of the total acres and sites on federal mineral estate will be affected. For example, in the Farmington Resource Area, where development is most intensive, only 1.4% of the surface overlying federal mineral estate will be disturbed. Allowing for all of the oil and gas development, which has already occurred, over 90 percent of this acreage will remain undisturbed. Even considering other sources of surface disturbances not related to oil and gas development, this allows considerable latitude for preservation of cultural resources. BLM will continue to work closely with the SHPO throughout development phases to ensure that complete avoidance of key cultural resources is required when appropriate.

L18-C [The area in which the most intense development is taking place is the Dinétah, the historic homeland of the Navajo people. The degradation of this historic landscape with its strong cultural and religious associations is a subject of great concern to the Navajo and is an issue under the National Historic Preservation Act. I do not see this issue addressed in the Plan Amendment.]

Neither do I see anything in this document that addresses the issue of long-term effects from oil and gas development. Current BLM cultural resource management practices are designed to protect resources from the effects of construction of well pads, pipelines, etc. The "undertaking" here, however, in the terms of Section 106 of the National Historic Preservation Act, is not the construction but the granting of the right-of-way. Those grants are made for a period of years without any effort to take into account the cumulative effects of years of postconstruction maintenance and other activities.

L18-A Cont. [I do not have any opinions to offer about these alternatives since, from the perspective of historic preservation, there are no alternatives. I would have preferred to see a true "conservation" alternative developed.]

Sincerely,

Lynn Sebastian

Lynn Sebastian
Deputy State Historic Preservation Officer

cc: John Roney

L18-C (Dinétah). The BLM recognizes that the Dinétah is the historic homeland of the Navajo people and that it is a source of great concern to them. A major ethnographic study has been required to begin addressing these concerns. In addition, the BLM continues to coordinate historic preservation issues closely with the Navajo Nation Cultural Resources Division. As examples, the Navajo Nation has been given the opportunity to

- (1) comment on National Register eligibility determinations in this area,
- (2) review the Fruitland Research Design and data comparability standards in both draft and final forms,
- (3) review and comment upon the selection of Navajo sites for data recovery, and
- (4) review all site-specific data recovery plans affecting Navajo sites in the Dinétah.

We expect to maintain at least this level of consultation with the Navajo Tribe throughout the life of the RMP amendment.

L18-D (Long-term Effects). Current BLM cultural resource management practices are designed to either avoid or mitigate the potential effects of both construction and post-construction activities within a right-of-way or well pad. Energy companies are required to restrict all subsequent activities to the right-of-way or well pad and are liable for damages, including potentially costly data recovery if their activities stray outside the authorized area. To assist in enforcing these provisions inventories are also required in appropriate buffers on either side of the construction project and in some situations data recovery is required in the buffer area as well. BLM believes that these measures adequately address potential long-term effects from oil and gas development.

GOVERNOR
BRUCE KING

State of New Mexico

STATE GAME COMMISSION
JAMES H. (JAMIE) KOCH, CHAIRMAN
SANTA FE

DIRECTOR AND SECRETARY
TO THE COMMISSION
BILL MONTROYA



THOMAS P. ARVAS, O. D., VICE-CHAIRMAN
ALBUQUERQUE

BOB JONES
DELL CITY, TX

J. W. "JOHNNY" JONES
ALBUQUERQUE

BRUCE WILSON
MESILLA PARK

DAVID M. SALAMAN
LA CUEVA

ANDREA MAES CHAVEZ
NAVAJO DAM

DEPARTMENT OF GAME AND FISH

VILLAGRA BUILDING
SANTA FE
8300

19

September 26, 1991

Mr. Robert Dale, District Manager
Bureau of Land Management
435 Montano, NE
Albuquerque, New Mexico 87107

Dear Mr. Dale:

The Department of Game and Fish (Department) has reviewed the Draft Albuquerque District Resource Management Plan (RMP) Amendment/Environmental Impact Statement (EIS) for oil and gas lease development. The primary focus of this Draft RMP Amendment/EIS is to resolve oil and gas leasing and development issues within the Albuquerque District. The issues include: (1) determining if additional federal mineral estate should be considered for oil and gas leasing; (2) based on reasonable foreseeable development scenarios, determining the effects of developing oil and gas leases in designated Special Management Areas (SMAs) and other areas of concern; (3) determining the impact of management constraints on oil and gas development; and (4) identifying the cumulative impacts of oil and gas development. Following are comments in response to each identified issue:

Issue 1. Determining if additional federal mineral estate should be considered for oil and gas leasing.

The Department is opposed to oil and gas leasing in areas currently receiving protective management for specific resource attributes. These areas were designated due to their sensitivity and need for special protection to maintain existing conditions. Oil and gas leasing in these areas

L19-A (Oil and Gas Leasing in Areas Requiring Protective Management). In most instances, the unleased oil and gas estate in SMAs, ACECs, and RNAs were closed to new leasing, for the 20 year life of the plan, in the previous RMPs. Except for leases held by production, portions of special management areas remain in the closed to

L19-A

Mr. Robert Dale

-2-

September 26, 1991

would jeopardize the integrity of sensitive resources due to current spacing order decrees, the amount of surface disturbance associated with exploration and development, and the extent of associated human activity during and after development. The detrimental affect these factors have on wildlife and its habitat is demonstrable by the degree of historic development in the Farmington Resource Area as illustrated on Map 2, page I-9 of the document. That map presents an example of fragmentation and degradation of what was once excellent mule deer habitat. We encourage the Bureau of Land Management (BLM) not to sacrifice the remaining fragments of wildlife habitat.

Issue 2. Based on reasonable foreseeable development (RFD) scenarios, determining the effects of developing oil and gas leases in designated SMAs and other areas of concern.

This issue involves many of the same concerns identified for Issue 1, including the number of conditions for approval attached to an Application for Permit to Drill (APD). The Preferred Alternative (C) did not identify sufficient cumulative impact differences between alternatives to warrant development of oil and gas leases by implementation of a RFD scenario. We need additional information regarding SMA sensitivity to energy development and associated activity, and an example depicting how development could be coordinated to maintain the intent of SMA designation. We recommend implementation of the No Surface Occupancy Stipulation until additional information is available.

Issue 3. Determining the impact of management constraints (lease stipulations, conditions of approval, and no leasing) on oil and gas development.

The Department recognizes the legal right of the oil and gas industry to explore and develop energy resources and is willing to coordinate with industry in that regard. However, we do not believe that other natural resources should be compromised by being subjected to significant adverse impacts and that industry should be more cognizant of the needs and requirements of wildlife and its habitat.

Issue 4. Identifying the cumulative impacts of oil and gas development.

The document indicates the potential of 31,390 wells (22,000 existing and 9,390 projected) to be drilled by the year 2010. The San Juan Basin in the Farmington Resource Area is identified as a "high-intensity development region" receiving the greatest impact (approximately 90%) of oil and gas development. Cumulative impacts resulting from oil and gas

L19-A Cont.

leasing category in the proposed alternative for the Rio Puerco and Taos Resource Areas. Unleased portions of special management areas remain in the closed to leasing category in the no action alternative for the Farmington Resource Area. The BLM, in line with its multiple-use management policy, is applying the limiting limitation stipulation to new leases and as a COA on approved APDs for development of older leases in big game winter range areas. These COAs, special management area prescriptions, standard operating procedures, and other mitigation measures are used to avoid or minimize impacts to big game.

Approximately 88 percent of the Farmington Resource Area's oil and gas estate is leased. Protection was limited to the stipulations that were in place when the existing leases were issued. The lease rights on the older pre-NEPA/FLPMA leases, allows for development of these leases even in special management areas. Except for wilderness area designations, special management area designations or do not preclude, limit, or restrict development of the older leases.

The effects of habitat fragmentation have been considered. See the comment response for comment L2-L and Appendix J.

L19-B

(Oil and Gas Development in Special Management Areas). See the comment response to comments L4-A and L6-F concerning protection and management of special management areas. Additional policy, management goals and objectives, and management prescriptions for special management areas are presented in the Appendix for Special Management Areas in each of the resource area RMPs.

Existing leases in the SMAs, or elsewhere in the resource area, cannot be rescinded or canceled. A no surface occupancy leasing stipulation would protect only those portions of special management areas that are not leased. Additionally, this stipulation results in more wells being drilled on adjacent, older leases. A NSO stipulation does not decrease the amount of surface disturbing activities, it merely changes the location as to where these activities could occur. Additionally, this stipulation can only be included as part of the lease terms for new leases. This stipulation cannot be added to existing leases. With the exception of "may affect" situations that would result in a jeopardy decision for T&E species, surface disturbing activities can and will continue to occur on pre-NEPA/FLPMA leased portions of SMAs. The comment response to comment L4-A also addresses the NSO stipulation.

Mr. Robert Dale

-3-

September 26, 1991

development include surface disturbance of approximately 310,000 acres by the year 2010. Surface disturbance involves construction of well pads, roads, and pipelines over a minimum of 40 years. Potential impacts include soil erosion, water quality degradation, significant daily and yearlong human activity, habitat fragmentation, and wildlife displacement.

The Department strongly disagrees with the BLM assumption that all impacts should be considered unavoidable. We recommend that an interim road management plan be developed and implemented until such time that a final plan can be established. This plan should include enforced road closures and the open off-road policy be changed to a closed off-road policy. New road construction should be kept to a minimum.

Information concerning big game winter range in the Farmington Resource Area is available and should be illustrated on Map 9. Guadalupe Mountain in the Taos Resource Area should be indicated on Map 12. The Department also recommends that elk calving and deer fawning seasonal restrictions be included in the BLM Lease Stipulations, Pipeline and Rights-Of-way Permit, and in the Conditions of Approval Attached to APDs. We also recommend that seasonal closures be included in the Notice of Intent To Conduct Geophysical Exploration documents.

We appreciate the opportunity to review and comment on this Draft RMP Amendment/EIS. Should you need any additional information, please feel free to contact Byron Donaldson (827-9908) in our Santa Fe office.

Sincerely,



Bill Montoya
Director

DM/DRD/mlm

cc: Jennifer Fowler-Propst (Ecological Services Supervisor, USFWS)
Jim Piatt (Surface Water Quality Bureau Chief, NMRD)
Dan Pursley (NW Area Supervisor, NMGF)
Bob Culp (District Wildlife Officer, NMGF)
Randy Isler (NW Area Game Manager, NMGF)
Dan Sutcliffe (Division of Wildlife Chief, NMGF)
Andrew Sandoval (HEL Division Chief, NMGF)
Robert Jenks (Environmental Section Chief, NMGF)
Lisa Fisher (Habitat Specialist, NMGF)

L19-C (Road Policy). The BLM has qualified its statement on unavoidable impacts on page 4-42 of the draft. With the implementation of COAs, standard operating procedures, etc, most impacts identified at the time impact analysis is conducted for an APD would be mitigated. Residual impacts, after mitigation measures are applied, can not be determined or quantified until the site specific analysis is conducted for specific locations identified in APDs.

BLM has reviewed and updated the road management policy for oil and gas roads in the Farmington Resource Area office. Roads in the oil and gas fields will remain open. Roads no longer needed for oil and gas development will be permanently closed and rehabed.

L19-D (Seasonal Closures). With big game winter range closures in effect from December 1 to March 31, critical big game winter habitat is the only habitat identified on maps 9 and 12. Impact analysis focused on the effects of oil and gas leasing and development to critical winter range. The elk calving seasonal restriction has and is being used as a standard part of the oil and gas permitting process. This was inadvertently missed in the preparation of the DEIS. This restriction has been incorporated into the appropriate sections of Appendix B. Deer fawning areas have not been identified on BLM administered lands.

1 UNITED STATES DEPARTMENT OF THE INTERIOR

2 BUREAU OF LAND MANAGEMENT

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5 DRAFT ALBUQUERQUE DISTRICT)
6 RESOURCE MANAGEMENT PLAN AMENDMENT/)
7 ENVIRONMENTAL IMPACT STATEMENT)
8 OIL & GAS LEASING DEVELOPMENT)

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13 BE IT REMEMBERED that the above-referenced cause came on
14 for hearing before the Bureau of Land Management, Bob Armstrong,
15 Hearing Officer, at the hour of 7:00 p.m., on Tuesday, August 6,
16 1991, at 435 Montano Rd., N.E., Albuquerque, New Mexico, before
17 Jeanne M. Hirmer, Notary Public and Court Reporter within and
18 for the County of Bernalillo, State of New Mexico.

19
20 A P P E A R A N C E S

21
22 Hearing Officer: Bob Armstrong
Branch Chief
23 Bureau of Land Management
1474 Rodeo Road
24 Post Office Box 1449
Santa Fe, New Mexico 87504
25

Dale Elliott Court Reporters

P.O. BOX 1701
SUITE 1400, 201 THIRD STREET, N.W.
ALBUQUERQUE, NEW MEXICO 87103 TELEPHONE 243-6688

A P P E A R A N C E S (Continued)

L. Kent Hamilton
 Community Planner
 Bureau of Land Management
 435 Montano Rd., N.E.
 Albuquerque, New Mexico 87107

Albert Abee
 Area Manager, Rio Puerco Resource Area
 Bureau of Land Management
 435 Montano Rd., N.E.
 Albuquerque, New Mexico 87107

I N D E X

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Opening Statement by The Hearing Officer 3

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 ALBUQUERQUE, NEW MEXICO 87103 TELEPHONE 243-6688

P R O C E E D I N G S

HEARING OFFICER ARMSTRONG: This hearing is called to order. Ladies and gentlemen, I'm Bob Armstrong with the Bureau of Land Management, New Mexico state office. I'm the hearing

officer for this evening. Notice of this hearing appeared in the Federal Register May 24, 1991, on Page 23931. The purpose of this hearing is to receive public comment on the Draft

Albuquerque District Resource Management Plan Amendment and the Environmental Impact Statement for Oil and Gas Leasing Development.

This draft updates management constraints on, and analyzes environmental impacts of northern gas leasing and development. When completed, the Resource Management Plan Amendment will amend the Albuquerque district's three existing resource management plans that include Farmington, Rio Puerco and Taos resource areas.

Written comments on the draft will be accepted through September 7, 1991. Any written comments should be sent to Robert T. Dale, District Manager, Bureau of Land Management, 435 Montano, Northeast, Albuquerque, New Mexico, 87107.

On my left is a court reporter taking a transcript of this hearing. On my right is a two-person panel here to listen to the comments and, if necessary, ask clarifying questions. The panel members are Kent Hamilton, the team leader for the resource management plan amendment team, and Albert Abee, area

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ALBUQUERQUE, NEW MEXICO 87103 TELEPHONE 243-6688

1 manager for the Rio Puerco resource area.

2 Ladies and gentlemen, from here on we have the ground rules
3 for the hearing. Since we have no one signed up to speak, I'm
4 going to ask the question: Is there anyone here who would like
5 to make a statement for the record? I see none and hear none.

6 There will be two more hearings, in addition to this one;
7 tomorrow, Wednesday, August 7 at 7:00 p.m. at Taos,
8 New Mexico at the County Commission chambers. The next one will
9 be Thursday, August 8 at 1:00 p.m. at Farmington, New Mexico, at
10 the Bureau of Land Management, La Plata Highway. This hearing
11 is adjourned. Thank you.

12 (The Proceedings were adjourned at 7:10 p.m.)

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SUITE 1400, 201 THIRD STREET, N.W.
ALBUQUERQUE, NEW MEXICO 87103 TELEPHONE 243-6688

C E R T I F I C A T E

I, Jeanne M. Hirmer, a Certified Shorthand Reporter, do hereby certify that the Proceedings of the above-entitled cause were reported by me stenographically on August 6, 1991, and that the within transcript, numbered Pages 1 through 4, is a true and accurate transcription of my shorthand notes.

I further certify that I am neither an attorney nor counsel for, nor related to or employed by any of the parties to the action, and that I am not a relative or employee of any attorney or counsel employed by the parties hereto, or financially interested in the action.

Jeanne M. Hirmer
Jeanne M. Hirmer, CSR, RPR
Notary Public

My Commission expires:
5-12-93

Dale Elliott Court Reporters

P.O. BOX 1701
SUITE 1400, 201 THIRD STREET N.W.
ALBUQUERQUE, NEW MEXICO 87103 TELEPHONE 243 6688

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1 UNITED STATES DEPARTMENT OF THE INTERIOR
2 BUREAU OF LAND MANAGEMENT
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5 DRAFT ALBUQUERQUE DISTRICT RESOURCE)
6 MANAGEMENT PLAN AMENDMENT/)
7 ENVIRONMENTAL IMPACT STATEMENT)
8 OIL & GAS LEASING DEVELOPMENT)

9
10
11 BE IT REMEMBERED that the above-referenced
12 cause came on for hearing before the Bureau of Land
13 Management, Bob Armstrong, Hearing Officer, at the
14 hour of 7:00 p.m., on Wednesday, August 7, 1991, at
15 the Taos County Commission Chambers, Taos, New
16 Mexico, before BRENDA CASIAS, Notary Public and Court
17 Reporter within and for the County of Santa Fe, State
18 of New Mexico.
19

20 A P P E A R A N C E S

21 HEARING OFFICER: MR. BOB ARMSTRONG
22 Branch Chief
23 Bureau of Land Management
24 1474 Rodeo Road
25 Post Office Box 1449
Santa Fe, New Mexico 87504

Dale Elliott Court Reporters

317 PASEO DE PERALTA
SANTA FE, NEW MEXICO 87501 TELEPHONE 989-8243

1 A P P E A R A N C E S, Continued

2
3 MR. L. KENT HAMILTON
4 Community Planner
5 Bureau of Land Management
6 435 Montano Road, N.E.
7 Albuquerque, New Mexico 87107

8 MS. MICHELLE CHAVEZ
9 Area Manager
10 Taos Resource Area
11 Bureau of Land Management
12 Cruz Alta Street
13 Taos, New Mexico 87571

14 I N D E X

15 Opening Statement By Hearing Officer 3

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1 OPENING STATEMENT

2 BY HEARING OFFICER:

3 This hearing is called to order. My name is Bob
4 Armstrong. I am with the Bureau of Land Management
5 of the New Mexico State Office. I'll be the Hearing
6 Officer.

7 Notice of this hearing appeared in the Federal
8 Register on May 24, 1991 on page 23931. The purpose
9 of this hearing is to receive a public comment on the
10 Draft Albuquerque District Resource Management Plan
11 Amendment and Environmental Impact Statement for Oil
12 and Gas Leasing and Development. This draft updates
13 the management constraints on and analyzes the
14 environmental impact of oil and gas leasing and
15 development. When completed, the Resource Management
16 Plan Amendment will amend the Albuquerque District
17 III Existing Resource Management Plans that include
18 the Farmington, Rio Puerco, and Taos resource areas.

19 Any comments on the draft will be accepted
20 through May 7, 1991. Written comments should be sent
21 to Robert T. Dale, District Manager, Bureau of Land
22 Management, 435 Montano Northeast, Albuquerque, New
23 Mexico 87107.

24 MR. HAMILTON: Those comments should be through
25 September and I think you said May.

Dale Elliott Court Reporters

317 PASEO DE PERALTA
SANTA FE, NEW MEXICO 87501 TELEPHONE 989-8243

1 HEARING OFFICER: Correction. The draft
 2 comments will be accepted through September 7, 1991.
 3 We have a court reporter with us taking a transcript
 4 of this hearing. On my right is a two-person panel
 5 to listen to any comments. Kent Hamilton on the far
 6 right, team leader for the Resource Management Plan
 7 Amendment Team, and Michelle Chavez, Area Manager for
 8 the Taos Resource Area.

9 The rest of my opening comments consist of
 10 ground rules for the hearing for the speakers and I
 11 have no speakers registered to speak tonight. I will
 12 ask the question, is there anyone present here who
 13 would like to make a statement? I hear none and I
 14 see none. So this hearing will be adjourned.

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C E R T I F I C A T E

I, BRENDA CASIAS, a Certified Shorthand Reporter, do hereby certify that the Proceedings of the above-entitled cause were reported by me stenographically on August 7, 1991, and that the within transcript, numbered Pages 1 through 5, is a true and accurate transcription of my shorthand notes.

I further certify that I am neither an attorney nor counsel for, nor related to or employed by any of the parties to the action, and that I am not a relative or employee of any attorney or counsel employed by the parties hereto, or financially interested in the action.

Brenda Casias
BRENDA CASIAS
Notary Public, CSR No. 295

My Commission expires:

1-10-93

1 UNITED STATES DEPARTMENT OF THE INTERIOR
2 BUREAU OF LAND MANAGEMENT

3
4
5 DRAFT ALBUQUERQUE DISTRICT)
6 RESOURCE MANAGEMENT PLAN AMENDMENT/)
7 ENVIRONMENTAL IMPACT STATEMENT)
8 OIL & GAS LEASING DEVELOPMENT)

9
10
11
12
13 BE IT REMEMBERED that the above-referenced cause came on
14 for hearing before the Bureau of Land Management, Bob Armstrong,
15 Hearing Officer, at the hour of 1:00 p.m., on Thursday,
16 August 8, 1991, at 1235 La Plata Highway, Farmington, New
17 Mexico, before Jeanne M. Hirmer, Notary Public and Court
18 Reporter within and for the County of Bernalillo, State of
19 New Mexico.

20
21 A P P E A R A N C E S

22
23 Hearing Officer: Bob Armstrong
Branch Chief
24 Bureau of Land Management
1474 Rodeo Road
Post Office Box 1449
25 Santa Fe, New Mexico 87504

Dale Elliott Court Reporters

P. O. BOX 1701
SUITE 1400, 201 THIRD STREET, N.W.
ALBUQUERQUE, NEW MEXICO 87103 TELEPHONE 243-6688

A P P E A R A N C E S (Continued)

L. Kent Hamilton
Community Planner
Bureau of Land Management
435 Montano Rd., N.E.
Albuquerque, New Mexico 87107

John Phillips
Area Manager, Farmington Resource Area
Bureau of Land Management
1235 La Plata Highway
Farmington, New Mexico 87401

I N D E X

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KENDRICK, A. R.	4

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SUITE 1400, 201 THIRD STREET, N.W.
ALBUQUERQUE, NEW MEXICO 87103 TELEPHONE 243-6688

P R O C E E D I N G S

HEARING OFFICER ARMSTRONG: Ladies and gentlemen, this

hearing is called to order. My name is Bob Armstrong. I'm with the Bureau of Land Management New Mexico state office and I'll be your hearing officer for this afternoon. Notice of this hearing appeared in the Federal Register May 24, 1991, on Page 23931.

The purpose of this hearing is to receive public comment on the Draft Albuquerque District Resource Management Plan Amendment and Environmental Impact Statement for Oil and Gas Leasing and Development. The draft updates management constraints on, and analyzes environmental impacts of oil and gas leasing and development. When completed, the Resource Management Plan Amendment will amend the Albuquerque district office's three existing RMPs, Resource Management Plans, that include the Farmington, Rio Puerco and Taos resource areas. Written comments on the draft will be accepted through September 7, 1991. Written comments should be sent to Robert T. Dale, District Manager, Bureau of Land Management, 435 Montano, Northeast, Albuquerque, New Mexico, 87107.

On my left is a court reporter who will be taking a transcript of this hearing. Also on my left with me is a two-person panel to listen to your comments and, if necessary, ask any clarifying questions. Furthest from me is Kent Hamilton, team leader for the resource management plan

Dale Elliott Court Reporters

P.O. BOX 1701
SUITE 1400, 201 THIRD STREET, N.W
ALBUQUERQUE, NEW MEXICO 87103 TELEPHONE 243-6688

1 team. Sitting next to me is John Phillips, acting area manager
2 for the Farmington resource area.

3 The ground rules for the hearing will be as follows: Both
4 oral and written comments will be received. If you wish to
5 speak, please register first. We have the registration right
6 here. Any written comments should be provided to the court
7 reporter in order that they may be made a part of the record.
8 Speakers will be limited to ten minutes, and the purpose of the
9 time limit is to ensure that each person has a reasonable time
10 in which to speak.

11 At the conclusion of the hearing, I will ask if anyone else
12 wishes to provide additional information. If a speaker has a
13 question they would like considered, would you please ask that
14 question into the record as part of your presentation. A copy
15 of the transcript will be available for public inspection at the
16 Bureau of Land Management Albuquerque district office in about
17 two weeks. To help myself and the court reporter, when you're
18 called on to speak, please come forward and state your name and
19 address and who you represent. Are there any questions
20 concerning the ground rules? I hear none. At this time I'll
21 call on our first registered speaker, A. R. Kendrick.

22 MR. KENDRICK: My name is A. R. Kendrick, representing
23 Evergreen Resources, Incorporated, out of Denver. My comment is
24 that the operation of oil and gas needs to continue on the
25 federal lands, especially in New Mexico. This is a list of the

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P.O. BOX 1701

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ALBUQUERQUE, NEW MEXICO 87103 TELEPHONE 243-6688

1 amounts of dollars that the New Mexico Oil and Gas Association
 2 advised me this morning have been received since 1971, as
 3 New Mexico's share of the revenue from oil and gas activity on
 4 the federal lands.

5 The lowest number in the last ten years was \$84,400,000 in
 6 1990. Excuse me. That was 1990. The lowest number was
 7 \$64,420,520 in 1988. I would like to request permission to add
 8 written commentary at a later time.

9 HEARING OFFICER ARMSTRONG: You may do that, yes. The
 10 deadline is September 7th for any additional written comments.
 11 Thank you.

12 Our next registered speaker is Skip Franker.

13 MR. FRANKER: I'm Skip Franker with Meridian Oil here in
 14 Farmington. I just have a couple of concerns. I again, would
 15 echo Al Kendrick's request that we do everything possible to
 16 continue the type operation we've got up here, as it does
 17 generate a lot of income for the state and also for the BLM.

18 One of my main concerns, I will address several other
 19 things, is that this particular plan seems to be a little bit
 20 vague in that it outlines areas of how things will be handled,
 21 but doesn't specifically address what areas they're going to be

22 addressed in. I would like to see more information on where the
 23 SMAs may be or ACECs. I'm not sure, and I have not always been
 24 in the process on some of this stuff, but these SMAs and ACECs
 25 sometimes appear to come out of nowhere, and I'm not sure we're

T3-A (SMAs and ACECs). See the Farmington, Rio Puercos, and Taos Resource Management Plans for a complete listing, description, and management prescriptions for SMAs and ACECs designated in these land use plans.

T3-A

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T3-B

T3-B. (Change in Leasing Categories for SMAs and ACECs by Alternative). See comment response to comment LIT-A.

1 getting the proper notification on them.

2 The other concern is that there doesn't appear to be strong

3 enough guidelines written in such a way that there's room for

4 too much local interpretation of what these rules are. You go

5 from one area to the other, and it's considerably different the

6 way things are handled. That would be probably my biggest

7 suggestion in this area is that these rules and everything be

8 written in such a way that we'll know what we've got to deal

9 with and how to work with it. That's pretty much all I've got.

10 HEARING OFFICER ARMSTRONG: Thank you.

11 Our next registered speaker is Karen Hopkins.

12 MS. HOPKINS: My name is Karen Hopkins. I'm with Meridian

13 Oil. I would just like to add to Skip's comments that in the

14 Farmington area there are some SMAs that are closed to oil and

15 gas leasing that have the potential for oil and gas production

16 that need to be reevaluated under Alternatives B or C.

17 HEARING OFFICER ARMSTRONG: Thank you.

18 The next registered speaker is Patrick Hagerty.

19 MR. HAGERTY: I'm Patrick Hagerty with Meridian Oil and

20 gas. I would like to reiterate the concerns that have already

21 been stated here regarding the banning of oil and gas leasing in

22 areas in New Mexico. We had just recently been made aware of

23 this hearing and we will be following up these comments with a

24 written statement at a later date. One point or one area I

25 would like to address today, and I've got some specifics, and if

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T3-A (SMAs and ACECs). See the Farmington, Rio Puerco, and Taos Resource Management Plans for a complete listing, description, and management prescriptions for SMAs and ACECs designated in these land use plans.

T3-A

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3 enough guidelines written in such a way that there's room for
4 too much local interpretation of what these rules are. You go
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14 Farmington area there are some SMAs that are closed to oil and
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21 been stated here regarding the banning of oil and gas leasing in
22 areas in New Mexico. We had just recently been made aware of
23 this hearing and we will be following up these comments with a
24 written statement at a later date. One point or one area I
25 would like to address today, and I've got some specifics, and if

T3-B

T3-B. (Change in Leasing Categories for SMAs and ACECS by Alternative). See comment response to comment L11-A.

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1 I could have some interaction with you-all here -- I don't know
2 if you're allowing that in this format?

3 HEARING OFFICER ARMSTRONG: No, we're not. If you have
4 questions, please ask them into the record so we can answer them
5 for you.

6 MR. HAGERTY: Okay. Basically, I think the main point I
7 would like to say is that rather than banning oil and gas
8 leasing, I think we could work with stipulations so that you can
9 allow the valuable resources that can feed the federal coffers
10 to be produced, and that is a very valuable resource. There was
11 an article that was written in the Albuquerque Journal
12 Wednesday, May 8, and it basically -- or the comments were of
13 Larry Woodard in stating that there can be a very productive and
14 mutually beneficial relationship between the producers and the
15 environmentalists and the BLM, that we can protect endangered
16 species. And that was the gist of the conversation in that
17 article was protecting endangered species, both animal and
18 plant.

19 One area that we have been trying to get leased for quite
20 some time is the Catracas Mesa area. That's in 32 North,
21 5 West. Basically what our concerns are there is, there was a
22 stipulation to one of the earlier Farmington management plans,
23 and I think it was F-11, that banned leasing since 1979, and it
24 was a de facto withdrawal of leasing without going through the
25 congressional stipulations that were spelled out to banning

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1 leasing. That's been going on for 12 years. This is probably
2 the first public hearing -- and I haven't had a chance to review
3 your amendment to see if this area is included. I'm assuming it
4 is, but it's long overdue. And I think that's stipulation
5 Exhibit F-11 is what I'm referring to.

6 Anyway, there is a unit, the Carracas Mesa unit, that was
7 approved by the State of New Mexico and ratified by the BLM.

8 And there is a unilateral withdrawal of that area from leasing
9 which violates the terms of that unit agreement which was

10 ratified by the BLM. That's something of concern to us. That's
11 a precedence that, I don't think, should be allowed without
12 comment and without objection by us in the industry.

13 Another matter of concern in that particular area is that
14 there are no endangered species. This area is an area of --
15 it's a winter range for elk and a year-long range for deer.
16 There are no endangered species of any kind. And I think that
17 rather than banning oil and gas leasing in this specific area,
18 stipulations to the leases that are granted would make more
19 sense.

20 For example, maybe during the calving period of the deer --
21 not the deer, the elk, or whatever, during this time period
22 where it's environmentally sensitive that operations are
23 occurring or drilling is occurring and it might affect the
24 calving or might affect -- whatever reason it is that you banned
25 leasing in this area, just call in the lease that nothing be

T3-C (Withdrawal of Carracas Mesa SMA From Leasing). Your comment about the Carracas Mesa SMA may be referring to the management prescription that states: "Withdraw from future mineral entry and close to mineral material disposal and oil and gas leasing." Under this management prescription, hard rock minerals would be withdrawn from the filing of future mining claims. The unleased oil and gas estate in the Carracas Mesa SMA is not withdrawn from oil and gas leasing. It is, however, closed to new leasing and development in the Farmington Resource Management Plan (1988). This closure would remain in effect for the 20 year life of this plan.

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1 done during that time period, "nothing" being drilling. I think
 2 the ongoing operations of production, especially during the
 3 winter months, would be important. But this is an alternative,
 4 I think, that needs to be looked at rather than a complete ban.

5 If you look at some of Conoco's operations up in Alaska,
 6 and they are dealing in some of the most environmentally
 7 sensitive areas in the United States, it's not a complete ban of
 8 operations that they have been faced with, it's more of dealing
 9 with certain contingencies of operation, certain stipulations,
 10 and I think that's a much more palatable alternative for
 11 everyone involved. Everybody benefits under that type of
 12 scenario, because we are extracting the oil and gas that is
 13 enriching the federal coffers while, at the same time, paying
 14 attention to the sensitive nature of the endangered species or
 15 the particular environmental problems in that area.

16 That's what I'm pleading for is a little bit of rational
 17 thinking here that, you know, it makes it a win-win situation
 18 for both the industry as well as the BLM and the
 19 environmentalists. That's primarily what I had come here to say
 20 today and we will be backing up these comments with a written
 21 statement before the 7th of September. Thank you.

22 HEARING OFFICER ARMSTRONG: I have no more registered
 23 speakers at this time. Is there anyone else who would like to
 24 make a statement for the record? I see one hand. Sir, would
 25 you please come forward and state your name and who you

T3-D

T3-D (Carracas Mesa SMA Closed to Leasing). Of the 7,690 acres in the Carracas Mesa SMA, approximately 4,650 acres are leased. There are approximately 24 wells in this SMA. Based on the assumption that if there is at least one producing well on the lease(s), the lease(s) would be held by production. This then results in approximately 2,400 acres of unleased federal oil and gas mineral estate in this SMA.

As is noted above, much of the federal mineral estate (61 percent) is leased in this SMA. Issuing a lease(s) with a leasing stipulation(s) (timing limitation, controlled surface use, or no surface occupancy) is less restrictive than closing the area to leasing. The NSO leasing stipulation is the most restrictive and the only one that was considered for this SMA. Although wells would not be drilled in portions leased with a NSO stipulation, development of such leases would have to occur on adjacent, older leases in this SMA. Any additional development on existing leases, as a result of NSO stipulations, would not be consistent with or provide the level of protection specified for this area in the 1988 RMP. Additionally, as is noted in the Fruitland Coal Gas EA (1988), "undisturbed habitat is extremely limited in the FRA. Only about 14 sections of public land in the Fruitland (coal-gas) area contains habitat in 320 acres or more without roads. These areas are primarily limited to portions of the Carracas Mesa and Negro Canyon SMAs, and Laguna Seca Mesa." For these reasons, the 2,400 unleased acres in the Carracas Mesa SMA will remain in the closed to leasing category in the proposed alternative.

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1 represent?

2 MR. BAYLESS: My name is Robert L. Bayless, P.O. Box 168,
3 Farmington. I'm an independent oil and gas producer here. I
4 would just like to echo the sentiments that you have heard
5 expressed today and the concerns. And in a general philosophic
6 stance, what this appears to me is that it's deviating from the
7 multiple-use concept of public lands that has been the base
8 policy, I believe, and the law over a very long period of time.

9 I have read nothing or seen nothing that indicates that
10 this deviation from the multiple-use concept should be done on
11 the area that is of concern at this time. Again, I will follow
12 this up with written comments.

13 HEARING OFFICER ARMSTRONG: Thank you, sir. Is there
14 anyone else who would care to make a comment for the record? I
15 see none and hear none; therefore, this hearing is closed.
16 Thank you.

17 (The Proceedings were adjourned at 1:20 p.m.)

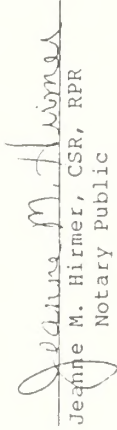
18 * * * * *

C E R T I F I C A T E

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I, Jeanne M. Hirmer, a Certified Shorthand Reporter, do hereby certify that the Proceedings of the above-entitled cause were reported by me stenographically on Thursday, August 8, 1991, and that the within transcript, numbered Pages 1 through 10, is a true and accurate transcription of my shorthand notes.

I further certify that I am neither an attorney nor counsel for, nor related to or employed by any of the parties to the action, and that I am not a relative or employee of any attorney or counsel employed by the parties hereto, or financially interested in the action.


Jeanne M. Hirmer, CSR, RPR
Notary Public

My Commission expires:
5-12-93

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ALBUQUERQUE, NEW MEXICO 87103 TELEPHONE 243-6688

DOLLARS TO THE STATE OF NEW MEXICO
FROM OIL AND GAS ACTIVITY ON FEDERAL LANDS

YEAR	FEDERAL RETURN
1971	\$11,629,557
1972	\$12,540,600
1973	\$13,313,700
1974	\$19,500,000
1975	\$23,069,000
1976	\$37,781,898
1977	\$49,058,189
1978	\$53,730,900
1979	\$70,242,268
1980	\$100,152,733
1981	\$120,494,250
1982	\$138,055,814
1983	\$126,832,600
1984	\$147,725,000
1985	\$128,000,000
1986	\$91,370,000
1987	\$73,545,300
1988	\$64,420,520
1989	\$78,568,000
1990	\$84,400,000

MERIDIAN OIL

3

August 8, 1991

Department of the Interior
Bureau of Land Management
Albuquerque District Office
Attn: Mr. Robert Dale,
District Manager
435 Montano NE
Albuquerque, NM 87107

RE: Albuquerque District Resource
Management Plan Amendment/
Environmental Impact Statement

Gentlemen:

T3-E Meridian Oil Inc. hereby respectfully requests that the Farmington Resource Management Plan dated July 1988 be amended to allow for the granting of oil & gas leases in the Thomas Canyon SMA. Alternative "C" would enable the BLM to maintain its primary objective to "enhance and protect semi-primitive non-motorized types of outdoor recreation opportunities" and at the same time allow important exploration efforts to take place.

Thank you for your time and consideration.

Very truly yours,



Karen L. Hopkins
Landman

KLH:11
ID#414+21

T3-E (Thomas Canyon SMA Closed to Leasing). See comment responses to comments L4-A, L6-F, and T3-D.



United States Department of the Interior

BUREAU OF LAND MANAGEMENT
FARMINGTON RESOURCE AREA
1235 LAPLATA HIGHWAY
FARMINGTON, NEW MEXICO 87401



IN REPLY REFER TO:
3100 (922)

3

Mr. Kent Beers
Regional Land Manager
Meridian Oil, Inc.
P.O. Box 4289
Farmington, NM 87499-4289

Dear Mr. Beers:

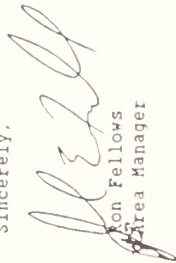
This is in regards to your letter of January 22, 1991 to the New Mexico State Office concerning the leasing of certain lands within the Thomas Canyon SMA. The District Manager has asked that we respond to the letter.

A Resource Management Plan Amendment for oil and gas leasing and development is currently being written for the Albuquerque District (including Farmington). Several alternatives are being considered in the draft of the amendment. It will be out for public review and comment within the next three months.

Any comments that Meridian has on the draft amendment will be considered.

Thank you for your interest.

Sincerely,


Ron Fellows
Area Manager



United States Department of the Interior

BUREAU OF LAND MANAGEMENT
NEW MEXICO STATE OFFICE

Post Office and Federal Building
P. O. Box 1449

Santa Fe, New Mexico 87504-1449

IN REPLY REFER TO:
3100 (922)

3

Kent Beers
Regional Land Manager
Meridian Oil, Inc.
P.O. Box 4289
Farmington, New Mexico 87499-4289

Dear Mr. Beers:

Thank you for your letter of January 22, 1991, concerning oil and gas leasing in the Thomas Canyon Special Management Area. The area was closed to leasing, effective July 1988, when the Farmington Resource Management Plan (RMP) was approved. Other management alternatives for this area are being considered as part of the RMP amendment process, presently under way.

By copy of this letter, we are directing our Albuquerque District Office to contact you concerning this process.

Sincerely,

Gilbert O. Lockwood
Deputy State Director
Mineral Resources

January 22, 1991

U.S. Department of the Interior
 Bureau of Land Management
 New Mexico State Office
 Attn: Larry Woodward, State Director
 P.O. Box 1449
 Santa Fe, NM 87504

RE: Thomas Canyon
 (Formerly Jones Canyon)
 Special Management Area (SMA)
 Sections 20 & 21 T32N-R13W
 San Juan County, New Mexico

Gentlemen:

The above captioned acreage was nominated for Competitive Sale under Serial Number NM-85796, but subsequently withdrawn from the April 1991 Sale due to its inclusion in the Thomas Canyon Area. This land is critical to Meridian's future exploration plans in this area and accordingly are hopeful that the following proposal would satisfy each of our needs.

Meridian Oil Inc. hereby respectfully requests that the Farmington Resource Management Plan (RMP), dated July 1988, be amended to allow for the granting of an oil and gas lease containing a limited or no surface occupancy provision. This would enable the BLM to maintain its primary objective to "enhance and protect semi-primitive non-motorized types of outdoor recreation opportunities", and at the same time allow important exploration efforts to take place. Without the opportunity to obtain a lease covering these lands, a significant portion of our planned activity will have to be abandoned.

Should a meeting to discuss our plans be useful, we would be happy to meet with you or your representatives at a place and time most convenient for you. Thank you for your consideration.

Very truly yours,

John F. Beefe for KLB
 Kent Beefe
 Regional Land Manager

KOB:KLH:11
 ID#30+7

cc: Bob Dale, District Mgr. -
 Albuquerque District
 Ron Fellows, Area Manager -
 Farmington Resource Area



United States Department of the Interior

BUREAU OF LAND MANAGEMENT
FARMINGTON RESOURCE AREA
1335 LAPLATA HIGHWAY
FARMINGTON, NEW MEXICO 87401



IN REPLY REFER TO:
6550(019)
2100(019)

3

Ms. Karen Hopkins
Meridian Oil Inc.
PO BOX 4289
Farmington, NM 87499-4289

Dear Ms. Hopkins:

This is in regard to your December 18, 1990 letter concerning oil and gas leasing in the Thomas Canyon Special Management Area (SMA). This area was identified in the Farmington Resource Management Plan (RMP) as an SMA for its natural and wildlife values.

The management decision for the area is to close future oil and gas leasing. Issuing leases on the Federal minerals within this area is prohibited. Management decisions in the RMP are in accordance with the Federal Land and Management Policy Act of 1976.

Thank you for your interest in public land management.

Sincerely,

Ron Fellows
Area Manager

December 18, 1990

Department of the Interior
Bureau of Land Management
Branch of Land Resources Management
Attn: Ron Fellows
1235 La Plata Highway
Farmington, NM 87401

RE: ME/4, E/2 NW/4, N/2 S/2,
Section 20
N/2 NE/4, SW/4 NE/4, W/2,
NW/4 SE/4 Section 21
T32N-R13W
San Juan County, New Mexico
Containing 880 acres, more or less

Dear Mr. Fellows:

The above captioned acreage was nominated for competitive sale under Federal Serial Number NM-85796. However, said lands were withdrawn from the April sale due to their inclusion in the Jones Canyon Area.

Meridian Oil Inc. is currently evaluating an exploration oil and gas play located in this area. The subject acreage will be critical to our prospect. Inasmuch as the Jones Canyon is a wildlife area, we would be interested in discussing the possibilities of re-nominating this acreage with a limited surface occupancy provision. Please contact the undersigned at 326-9789 to arrange a convenient time to meet with you to discuss this matter further.

Very truly yours,

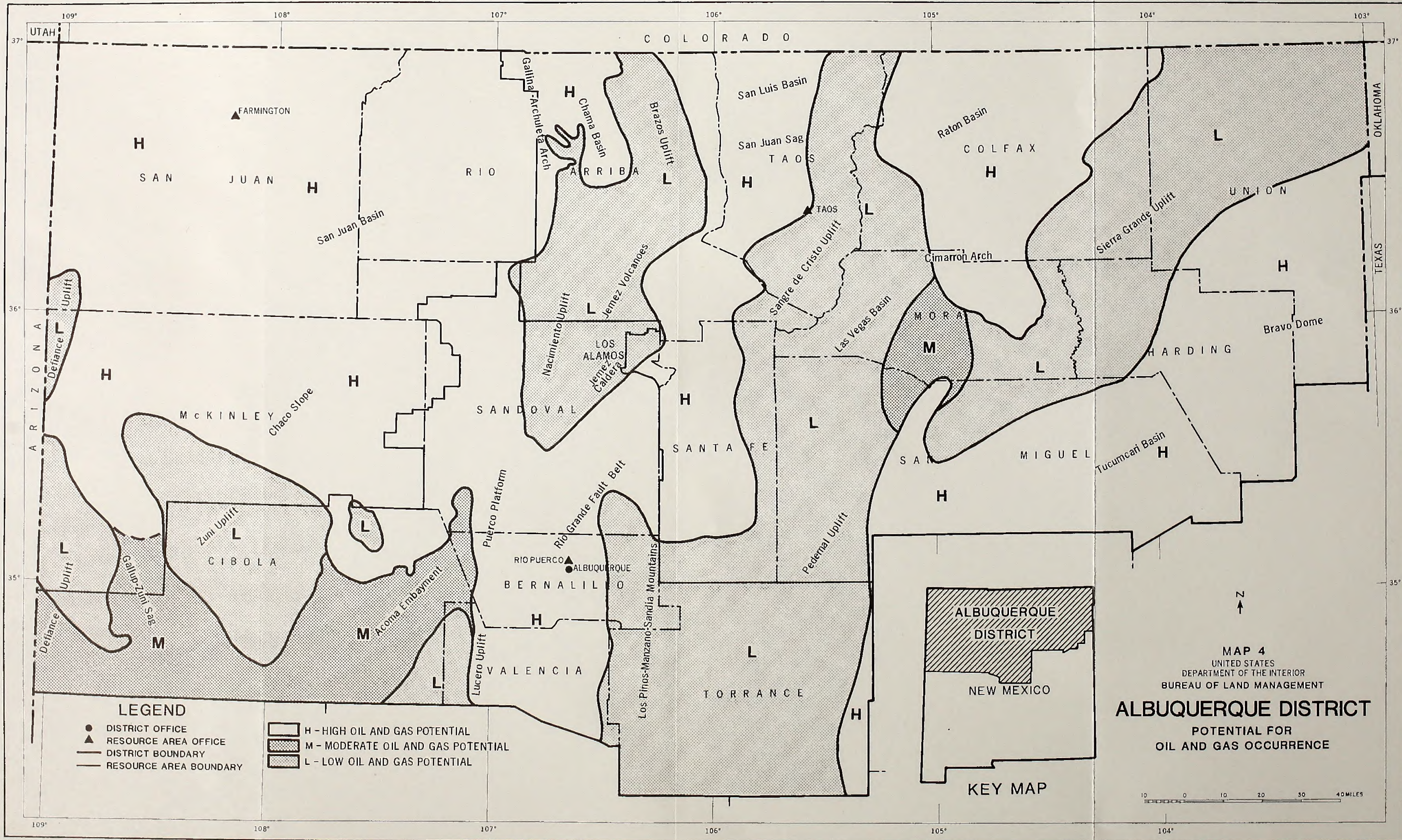


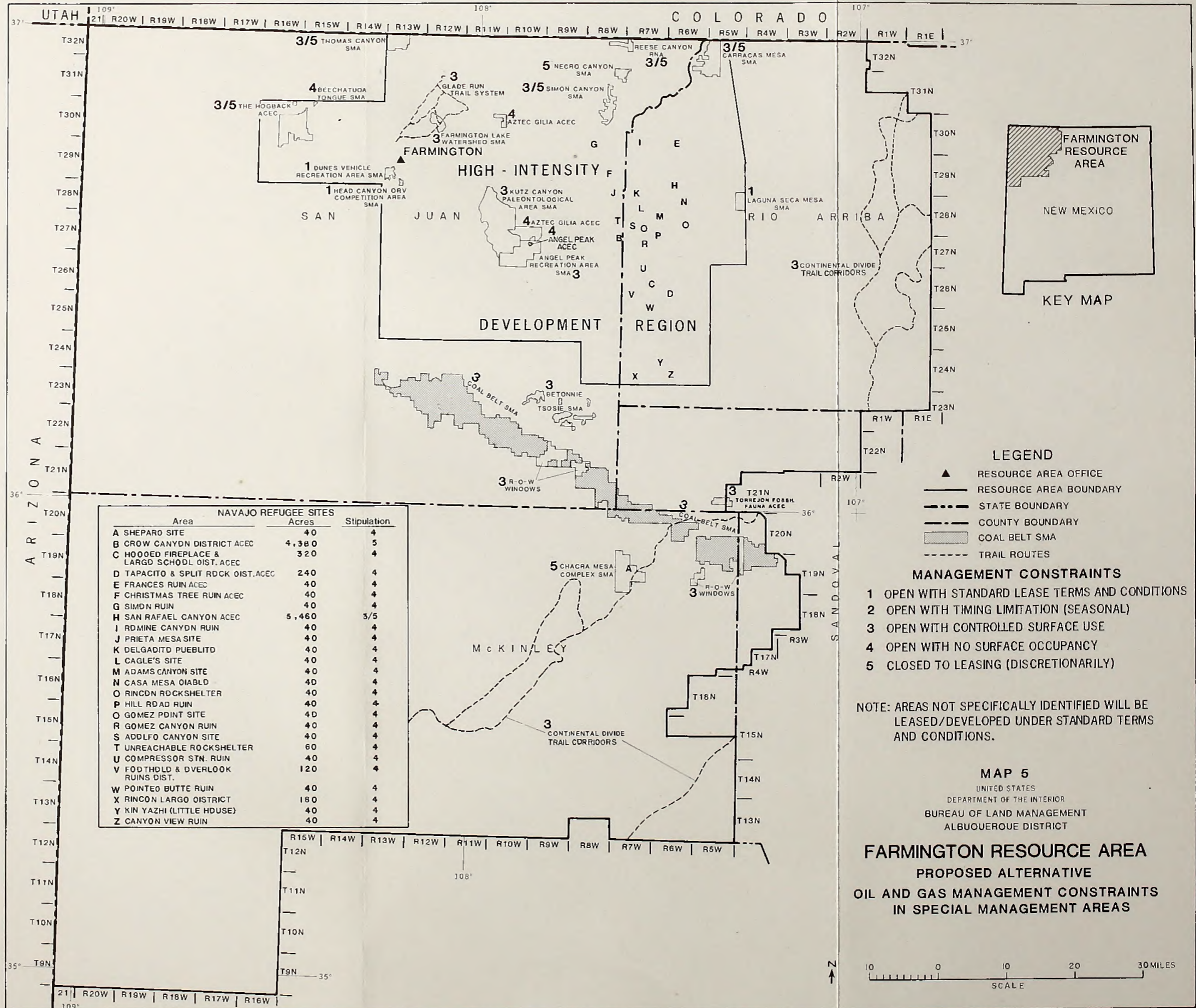
Karen L. Hopkins
Landman

KLH:11
ID#26461
Murphy's Canyon Prospect

Maps







Area	NAVAJO REFUGEE SITES	Acre	Stipulation
A	SHEPARO SITE	40	4
B	CROW CANYON DISTRICT ACEC	4,380	5
C	HOODED FIREPLACE & LARGO SCHOOL DIST. ACEC	320	4
D	TAPACITO & SPLIT ROCK DIST. ACEC	240	4
E	FRANCES RUIN ACEC	40	4
F	CHRISTMAS TREE RUIN ACEC	40	4
G	SIMON RUIN	40	4
H	SAN RAFAEL CANYON ACEC	5,460	3/5
I	RODMINE CANYON RUIN	40	4
J	PRIETA MESA SITE	40	4
K	DELGADITO PUEBLITO	40	4
L	CAGLE'S SITE	40	4
M	ADAMS CANYON SITE	40	4
N	CASA MESA OIABLD	40	4
O	RINCON ROCKSHELTER	40	4
P	HILL ROAD RUIN	40	4
Q	GOMEZ POINT SITE	40	4
R	GOMEZ CANYON RUIN	40	4
S	ADDLFO CANYON SITE	40	4
T	UNREACHABLE ROCKSHELTER	60	4
U	COMPRESSOR STN. RUIN	40	4
V	FOOTHLD & OVERLOOK RUINS DIST.	120	4
W	POINTEO BUTTE RUIN	40	4
X	RINCON LARGO DISTRICT	180	4
Y	KIN YAZHI (LITTLE HOUSE)	40	4
Z	CANYON VIEW RUIN	40	4

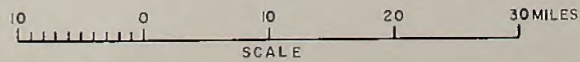
- LEGEND**
- ▲ RESOURCE AREA OFFICE
 - RESOURCE AREA BOUNDARY
 - - - STATE BOUNDARY
 - - - COUNTY BOUNDARY
 - ▨ COAL BELT SMA
 - - - TRAIL ROUTES

- MANAGEMENT CONSTRAINTS**
- 1 OPEN WITH STANDARD LEASE TERMS AND CONDITIONS
 - 2 OPEN WITH TIMING LIMITATION (SEASONAL)
 - 3 OPEN WITH CONTROLLED SURFACE USE
 - 4 OPEN WITH NO SURFACE OCCUPANCY
 - 5 CLOSED TO LEASING (DISCRETIONARILY)

NOTE: AREAS NOT SPECIFICALLY IDENTIFIED WILL BE LEASED/DEVELOPED UNDER STANDARD TERMS AND CONDITIONS.

MAP 5
 UNITED STATES
 DEPARTMENT OF THE INTERIOR
 BUREAU OF LAND MANAGEMENT
 ALBUQUERQUE DISTRICT

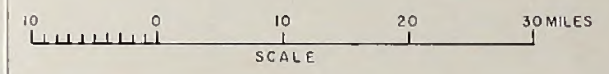
**FARMINGTON RESOURCE AREA
 PROPOSED ALTERNATIVE
 OIL AND GAS MANAGEMENT CONSTRAINTS
 IN SPECIAL MANAGEMENT AREAS**





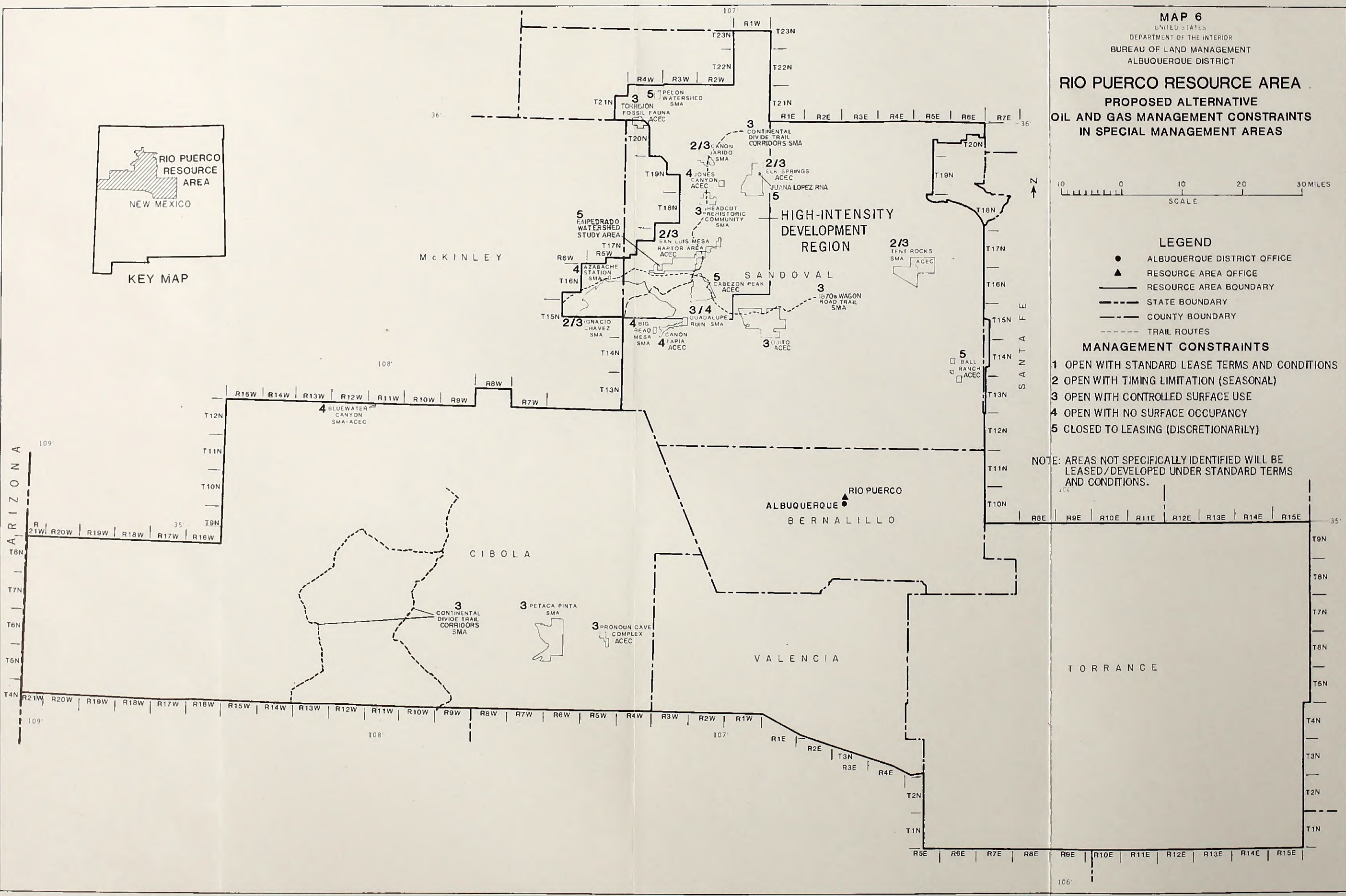
MAP 6
 UNITED STATES
 DEPARTMENT OF THE INTERIOR
 BUREAU OF LAND MANAGEMENT
 ALBUQUERQUE DISTRICT

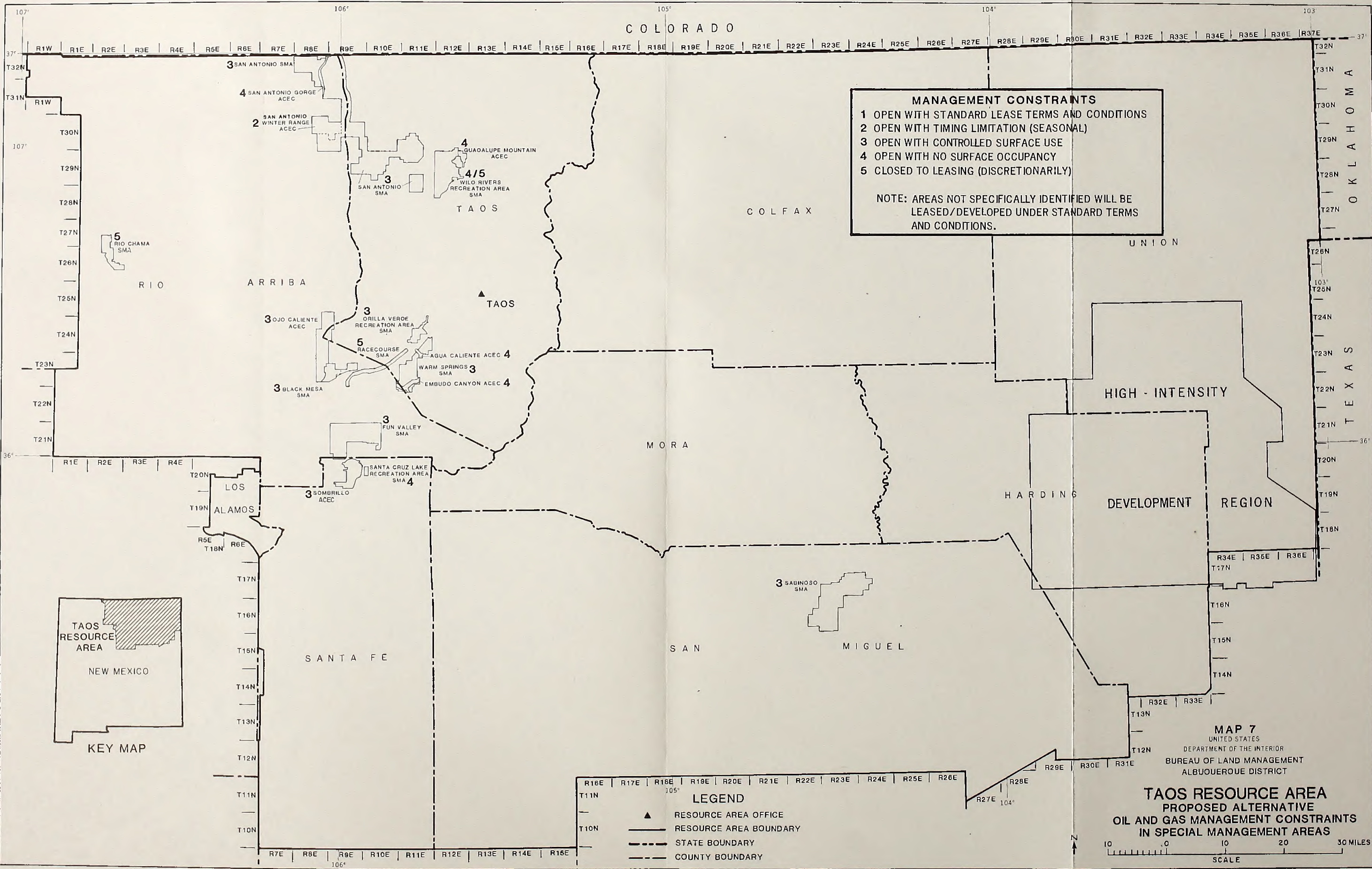
**RIO PUERCO RESOURCE AREA
 PROPOSED ALTERNATIVE
 OIL AND GAS MANAGEMENT CONSTRAINTS
 IN SPECIAL MANAGEMENT AREAS**



- LEGEND**
- ALBUQUERQUE DISTRICT OFFICE
 - ▲ RESOURCE AREA OFFICE
 - RESOURCE AREA BOUNDARY
 - - - STATE BOUNDARY
 - - - COUNTY BOUNDARY
 - - - TRAIL ROUTES
- MANAGEMENT CONSTRAINTS**
- 1 OPEN WITH STANDARD LEASE TERMS AND CONDITIONS
 - 2 OPEN WITH TIMING LIMITATION (SEASONAL)
 - 3 OPEN WITH CONTROLLED SURFACE USE
 - 4 OPEN WITH NO SURFACE OCCUPANCY
 - 5 CLOSED TO LEASING (DISCRETIONARILY)

NOTE: AREAS NOT SPECIFICALLY IDENTIFIED WILL BE LEASED/DEVELOPED UNDER STANDARD TERMS AND CONDITIONS.





MANAGEMENT CONSTRAINTS

- 1 OPEN WITH STANDARD LEASE TERMS AND CONDITIONS
- 2 OPEN WITH TIMING LIMITATION (SEASONAL)
- 3 OPEN WITH CONTROLLED SURFACE USE
- 4 OPEN WITH NO SURFACE OCCUPANCY
- 5 CLOSED TO LEASING (DISCRETIONARILY)

NOTE: AREAS NOT SPECIFICALLY IDENTIFIED WILL BE LEASED/DEVELOPED UNDER STANDARD TERMS AND CONDITIONS.



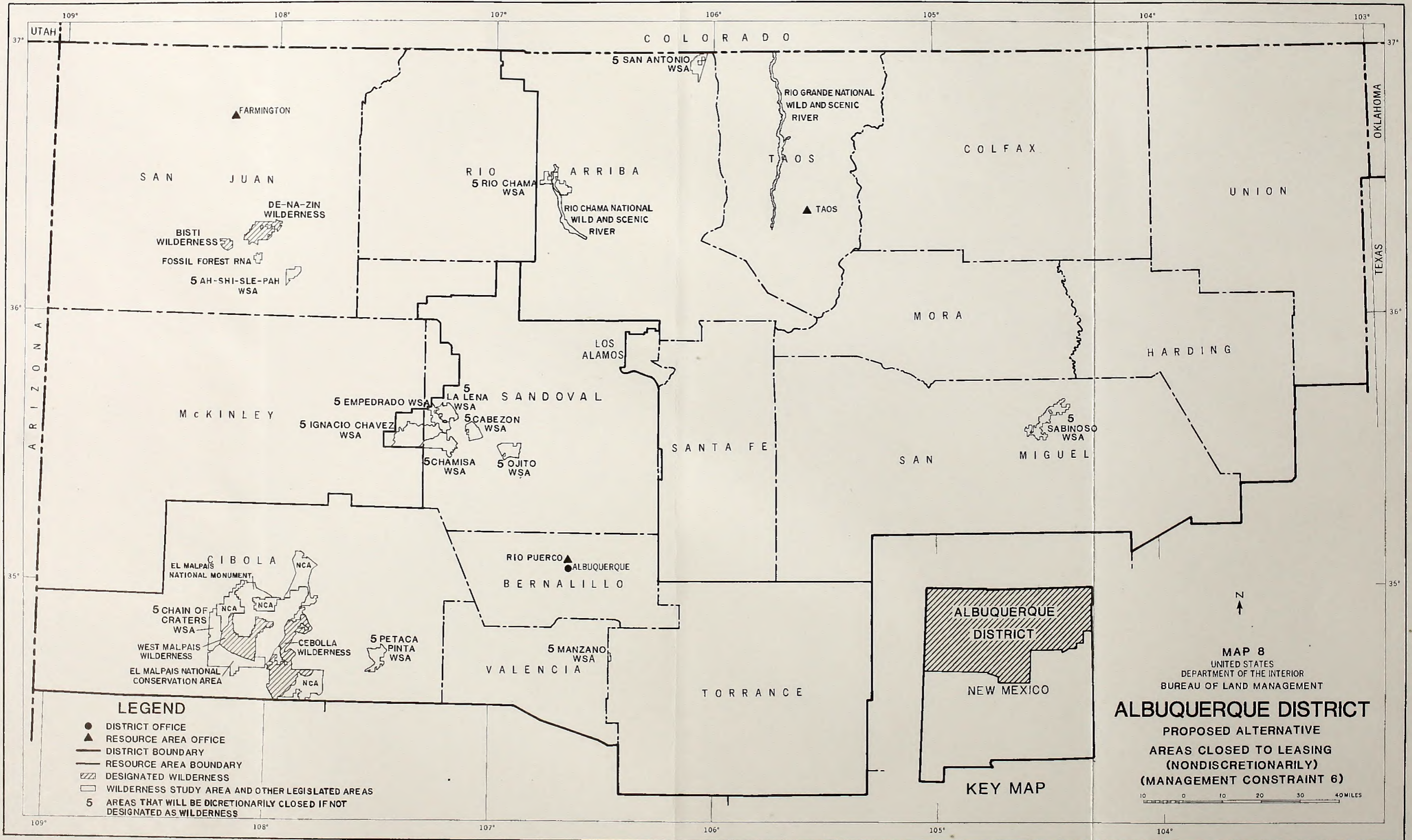
LEGEND

- ▲ RESOURCE AREA OFFICE
- RESOURCE AREA BOUNDARY
- - - STATE BOUNDARY
- - - COUNTY BOUNDARY

MAP 7
 UNITED STATES
 DEPARTMENT OF THE INTERIOR
 BUREAU OF LAND MANAGEMENT
 ALBUQUERQUE DISTRICT

**TAOS RESOURCE AREA
 PROPOSED ALTERNATIVE
 OIL AND GAS MANAGEMENT CONSTRAINTS
 IN SPECIAL MANAGEMENT AREAS**

SCALE
 0 10 20 30 MILES

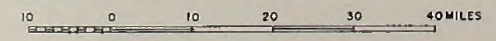


LEGEND

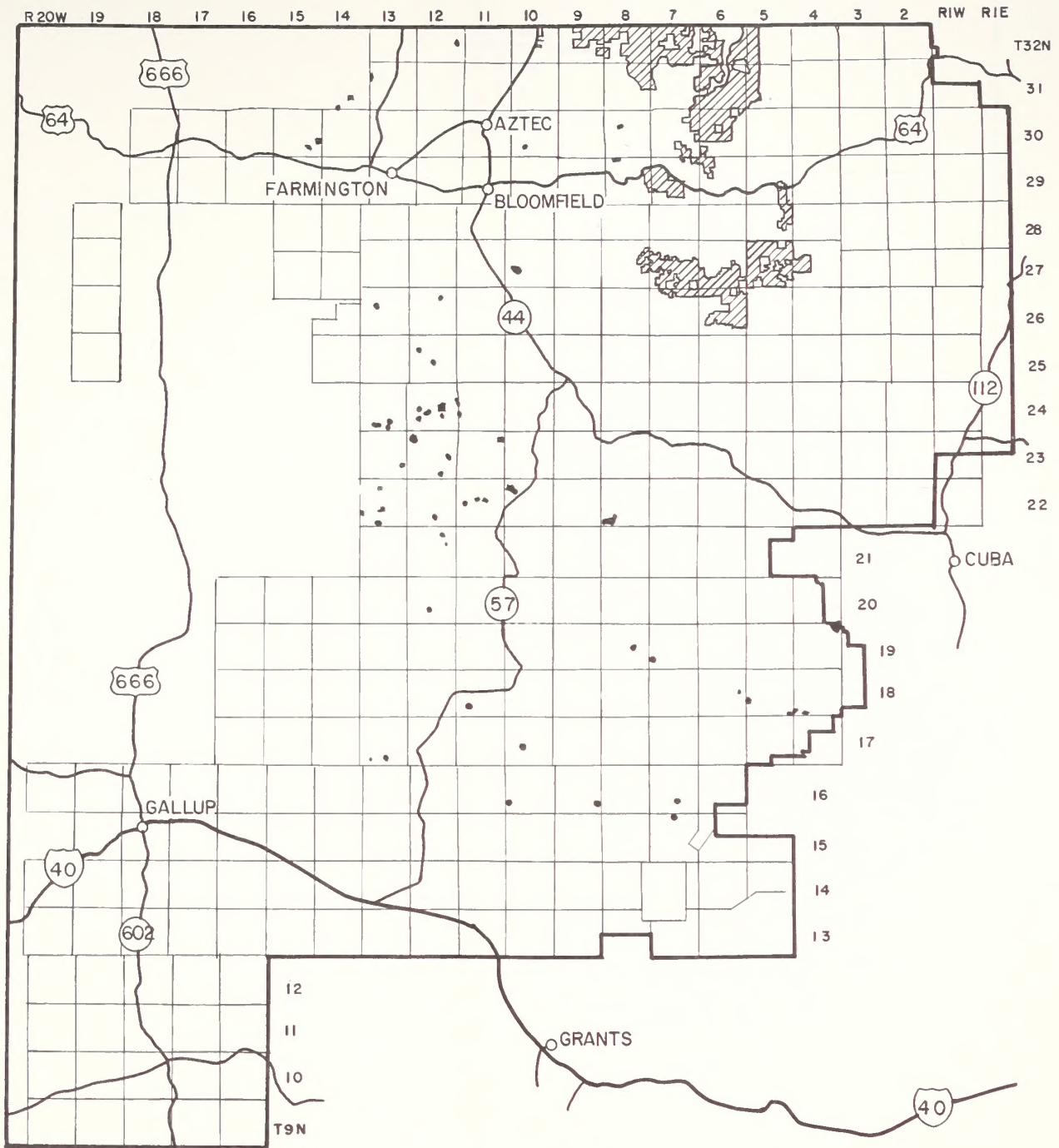
- DISTRICT OFFICE
- ▲ RESOURCE AREA OFFICE
- DISTRICT BOUNDARY
- RESOURCE AREA BOUNDARY
- ▨ DESIGNATED WILDERNESS
- - - WILDERNESS STUDY AREA AND OTHER LEGISLATED AREAS
- 5 AREAS THAT WILL BE DICRETIONARILY CLOSED IF NOT DESIGNATED AS WILDERNESS

MAP 8
 UNITED STATES
 DEPARTMENT OF THE INTERIOR
 BUREAU OF LAND MANAGEMENT

ALBUQUERQUE DISTRICT
 PROPOSED ALTERNATIVE
 AREAS CLOSED TO LEASING
 (NONDISCRETIONARILY)
 (MANAGEMENT CONSTRAINT 6)

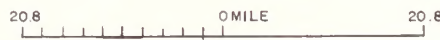


KEY MAP

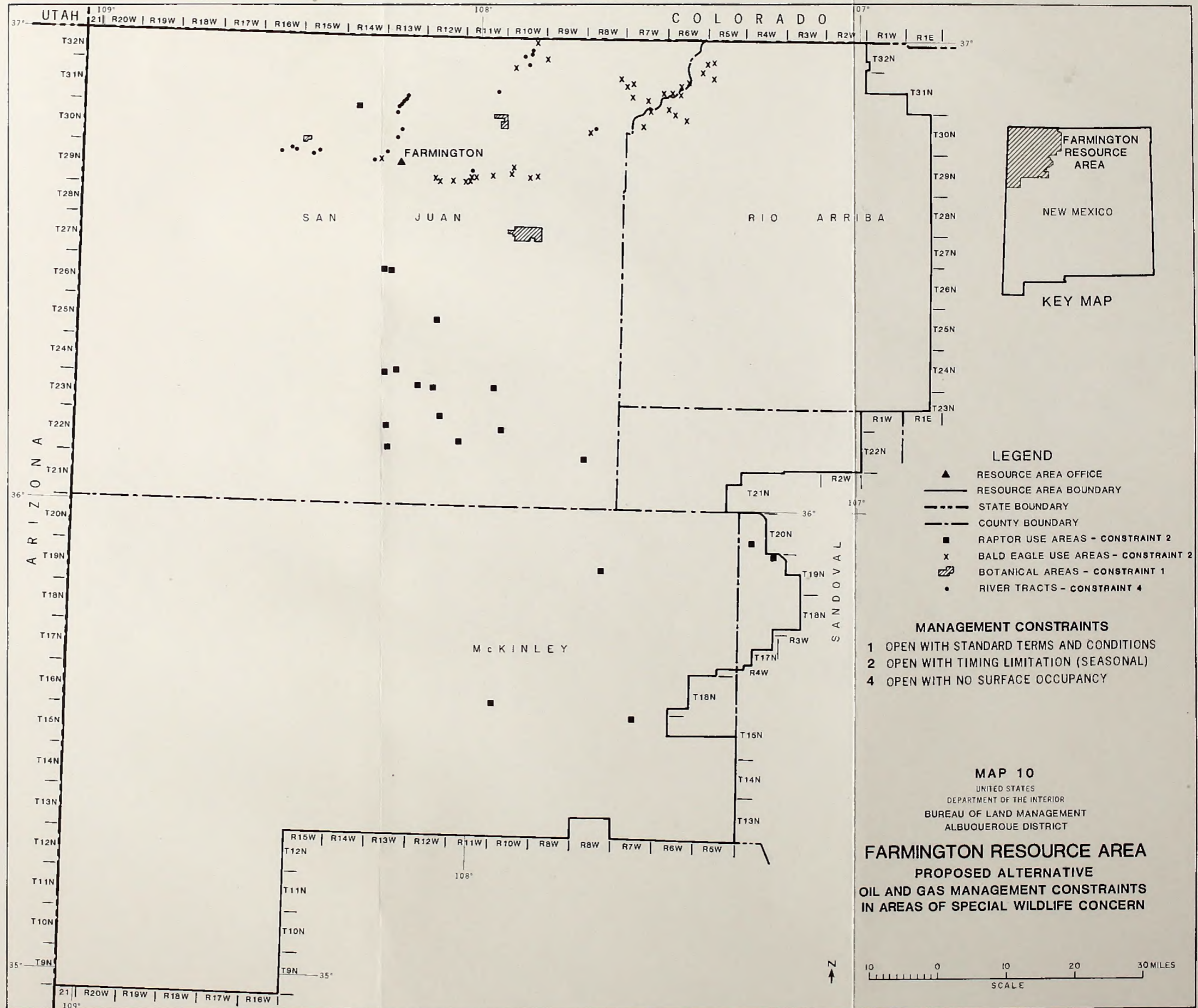


LEGEND

- BIG GAME HABITAT
 - RAPTOR NEST HABITAT
- } OPEN WITH TIMING LIMITATION (SEASONAL)
(MANAGEMENT CONSTRAINT 2)



MAP 9
FARMINGTON RESOURCE AREA
 CRITICAL RANGE FOR ELK, MULE DEER, ANTELOPE,
 AND RAPTOR NESTING HABITAT



ARIZONA

T32N
T31N
T30N
T29N
T28N
T27N
T26N
T25N
T24N
T23N
T22N
T21N
T20N
T19N
T18N
T17N
T16N
T15N
T14N
T13N
T12N
T11N
T10N
T9N

UTAH 109° 108° 107° COLORADO

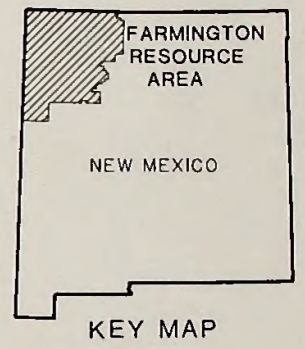
R21 | R20W | R19W | R18W | R17W | R16W | R15W | R14W | R13W | R12W | R11W | R10W | R9W | R8W | R7W | R6W | R5W | R4W | R3W | R2W | R1W | R1E

SAN JUAN RIO ARRIBA

McKINLEY SANDOVAL

R15W | R14W | R13W | R12W | R11W | R10W | R8W | R8W | R7W | R6W | R5W

21 | R20W | R19W | R18W | R17W | R16W | 109°



LEGEND

- ▲ RESOURCE AREA OFFICE
- RESOURCE AREA BOUNDARY
- - - STATE BOUNDARY
- · - · COUNTY BOUNDARY
- RAPTOR USE AREAS - CONSTRAINT 2
- x BALD EAGLE USE AREAS - CONSTRAINT 2
- ▨ BOTANICAL AREAS - CONSTRAINT 1
- RIVER TRACTS - CONSTRAINT 4

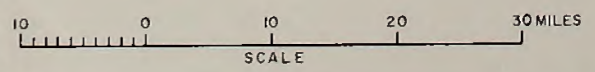
MANAGEMENT CONSTRAINTS

- 1 OPEN WITH STANDARD TERMS AND CONDITIONS
- 2 OPEN WITH TIMING LIMITATION (SEASONAL)
- 4 OPEN WITH NO SURFACE OCCUPANCY

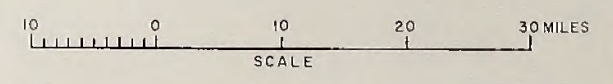
MAP 10

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
ALBUQUERQUE DISTRICT

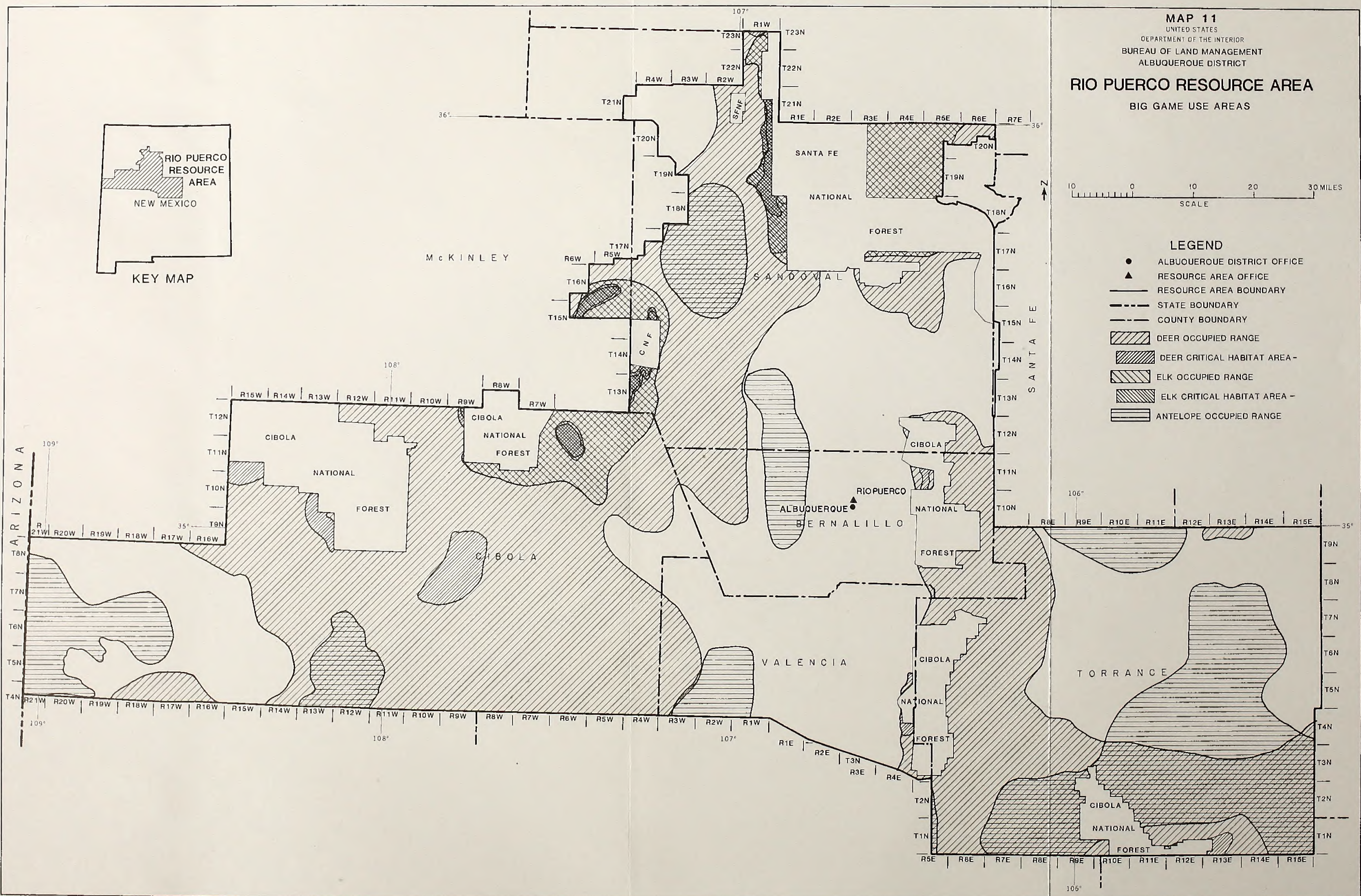
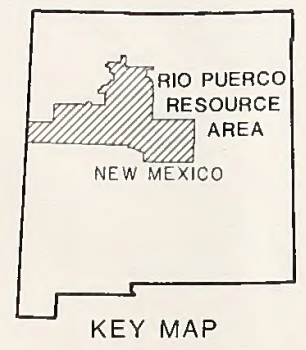
**FARMINGTON RESOURCE AREA
PROPOSED ALTERNATIVE
OIL AND GAS MANAGEMENT CONSTRAINTS
IN AREAS OF SPECIAL WILDLIFE CONCERN**

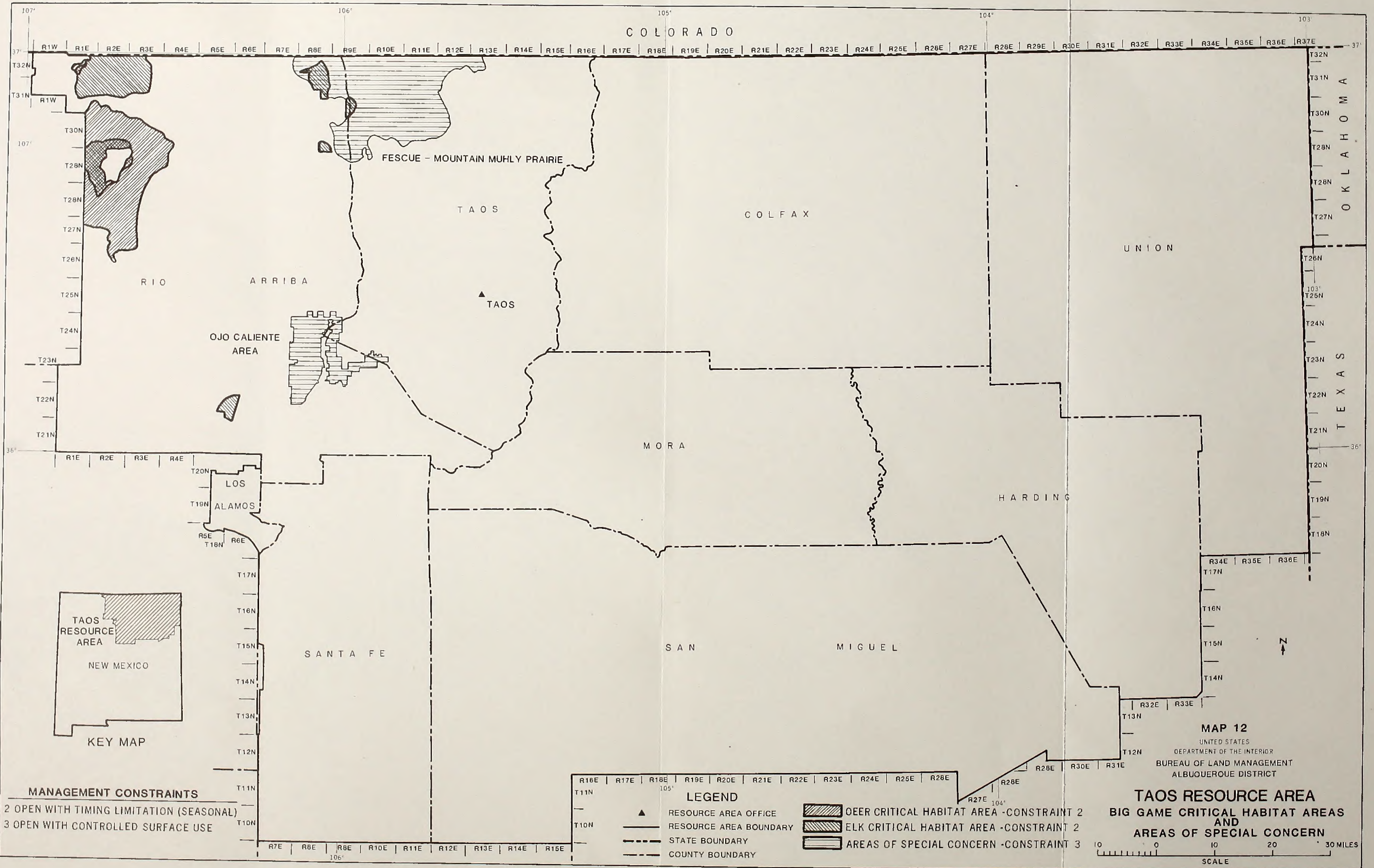


MAP 11
 UNITED STATES
 DEPARTMENT OF THE INTERIOR
 BUREAU OF LAND MANAGEMENT
 ALBUQUERQUE DISTRICT
RIO PUERCO RESOURCE AREA
 BIG GAME USE AREAS



- LEGEND**
- ALBUQUERQUE DISTRICT OFFICE
 - ▲ RESOURCE AREA OFFICE
 - RESOURCE AREA BOUNDARY
 - - - STATE BOUNDARY
 - - - COUNTY BOUNDARY
 - [Diagonal lines /] DEER OCCUPIED RANGE
 - [Diagonal lines \] DEER CRITICAL HABITAT AREA -
 - [Diagonal lines /] ELK OCCUPIED RANGE
 - [Diagonal lines \] ELK CRITICAL HABITAT AREA -
 - [Horizontal lines] ANTELOPE OCCUPIED RANGE





COLORADO

OKLAHOMA

TEXAS

FESCUE - MOUNTAIN MUHLY PRAIRIE

TAOS

COLFAX

UNION

RIO

ARRIBA

▲ TAOS

OJO CALIENTE AREA

MORA

HARDING

LOS

ALAMOS

SANTA FE

SAN

MIGUEL



MAP 12
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
ALBUQUERQUE DISTRICT

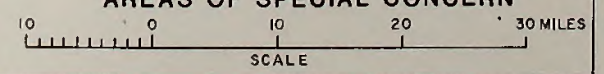
TAOS RESOURCE AREA
BIG GAME CRITICAL HABITAT AREAS
AND
AREAS OF SPECIAL CONCERN

MANAGEMENT CONSTRAINTS

- 2 OPEN WITH TIMING LIMITATION (SEASONAL)
- 3 OPEN WITH CONTROLLED SURFACE USE

LEGEND

▲	RESOURCE AREA OFFICE		DEER CRITICAL HABITAT AREA - CONSTRAINT 2
—	RESOURCE AREA BOUNDARY		ELK CRITICAL HABITAT AREA - CONSTRAINT 2
- - -	STATE BOUNDARY		AREAS OF SPECIAL CONCERN - CONSTRAINT 3
- · - · -	COUNTY BOUNDARY		



Appendices



APPENDIX A

**Management Categories by Alternative for Special
Management Areas in the Albuquerque District**

**TABLE A-1. SUMMARY OF MANAGEMENT CATEGORIES BY ALTERNATIVE
FOR SPECIAL MANAGEMENT AREAS,
BIG GAME, RAPTOR, AND OTHER RESOURCE AREA CONCERNS IN THE
FARMINGTON RESOURCE AREA^{1/}**

Concern/Area		Alt. A	Alt. B	Alt. C
RECREATION				
Dunes Vehicle Rec. Area	1,000 Ac.	1	1	1
Head Canyon ORV Comp.	150 Ac.	1	1	1
Simon Canyon Rec./ACEC	3,521 Ac.	5	1	3
Simon Canyon Rec./ACEC	250 Ac.	5	1	5
Angel Peak Rec. Area	9,740 Ac.	1	1	3
(a) Angel Peak (ACEC)	500 Ac.	5	1	4
Carracas Mesa	4,620 Ac.	5	1	3
Carracas Mesa	2,380 Ac.	5	1	5
Thomas Canyon	3,010 Ac.	5	1	3
Thomas Canyon	1,620 Ac.	5	1	5
Negro Canyon	1,600 Ac.	5	1	5
Glade Run Trail System	150 Ac.	1	1	3
Continental Divide Trail	31,120 Ac.	1	1	3
WILDERNESS				
Bisti Badlands				
Wilderness	3,946 Ac.	6	6	6
De-na-zin Wilderness	19,300 Ac.	6	6	6
(a) Log Jam ACEC	320 Ac.	6	6	6
(b) Lost Pine ACEC	80 Ac.	6	6	6
Ah-shi-sle-pah WSA	6,563 Ac.	6/5	6/1	6/1
CULTURAL RESOURCES				
Navajo Refugee Sites				
(a) Shephard Site	40 Ac.	5	1	4
(b) Crow Canyon Dist.	4,380 Ac.	5	1	5
(c) Hooded Fireplace & Largo School ACEC	320 Ac.	5	1	4
(d) Tapacito & Split Rock District ACEC	240 Ac.	5	1	4
(e) Frances Ruin ACEC	40 Ac.	5	1	4
(f) Christmas Tree Ruin	40 Ac.	5	1	4
(g) Simon Ruin	40 Ac.	5	1	4
(h) San Rafael Cyn ACEC	4,095 Ac.	5	1	3
(h) San Rafael Cyn ACEC	1,365 Ac.	5	1	5
(i) Romine Canyon Ruin	40 Ac.	5	1	4
(j) Prieta Mesa Site	40 Ac.	5	1	4
(k) Delgadito Pueblito	40 Ac.	5	1	4
(l) Cagle's Site	40 Ac.	5	1	4
(m) Adam's Canyon Site	40 Ac.	5	1	4
(n) Casa Mesa Diablo	40 Ac.	5	1	4

TABLE A-1. (continued)

Concern/Area		Alt. A	Alt. B	Alt. C
(o) Rincon Rockshelter	40 Ac.	5	1	4
(p) Hill Road Ruin	40 Ac.	5	1	4
(q) Gomez Point Site	40 Ac.	5	1	4
(r) Gomez Canyon Ruin	40 Ac.	5	1	4
(s) Adolfo Canyon Site	40 Ac.	5	1	4
(t) Unreachable Rockshelter	60 Ac.	5	1	4
(u) Compressor Station	40 Ac.	5	1	4
(v) Foothold & Overlook Ruins District	120 Ac.	5	1	4
(w) Pointed Butte Ruin	40 Ac.	5	1	4
(x) Rincon Largo District	180 Ac.	5	1	4
(y) Kin Yazhi	40 Ac.	5	1	4
(z) Canyon View Ruin	40 Ac.	5	1	4
Native American Traditional Use and Sacred Areas				
(a) Gobernador Knob	40 Ac.	5	1	4
(b) Salt Point ACEC	640 Ac.	5	1	4
(c) Huerfano Mesa	3,633 Ac.	5	1	3
(c) Huerfano Mesa	37 Ac.	5	1	5
East Side Rincon Site	100 Ac.	4	1	4
Chaco Outliers Group				
(a) Kin Nizhoni	800 Ac.	5	1	4
(b) Pierre's Site ACEC	440 Ac.	5	1	4
(c) Halfway House ACEC	40 Ac.	5	1	4
(d) Twin Angels ACEC	40 Ac.	5	1	4
(e) Holmes Group	100 Ac.	5	1	4
(f) Casamero Comm. ACEC	160 Ac.	5	1	4
Chacra Mesa Complex/ACEC	6,370 Ac.	5	1	5
Farmers Arroyo Site	40 Ac.	4	1	4
FORESTRY				
Laguna Seca Mesa	2,400 Ac.	1	1	1
MINERALS				
Beechatuda Tongue	80 Ac.	5	1	4
Coal Belt	77,945 Ac.	1	1	3
LANDS				
Right-of-Way Windows				
(a) Torreon	2,720 Ac.	5	1	3
(b) Continental Divide	1,760 Ac.	5	1	3

TABLE A-1. (continued)

Concern/Area		Alt. A	Alt. B	Alt. C
(c) Escavada	2,680 Ac.	5	1	3
(d) Betonnie Tsosie	5,440 Ac.	5	1	3
Towns & Cities	21,440 Ac.	6	6	6
WILDLIFE				
The Hogback ACEC	4,662 Ac.	5	1	3
The Hogback ACEC	2,858 Ac.	5	1	5
Reese Canyon RNA	1,914 Ac.	5	1	3
Reese Canyon RNA	286 Ac.	5	1	5
Aztec Gilia ACEC	6,400 Ac.	1	1	4
River Tracts	2,953 Ac.	4	1	4
Bald Eagle ACEC	1,700 Ac.	1	1	4
Wildlife Habitat				
Mule Deer, Elk Wintering/ Calving Ranges	584,030 Ac.	1		
Wildlife Habitat				
Mule Deer, Elk Wintering, Antelope/ Winter/Calving Ranges	104,789 Ac.		1	2
Raptor Nesting Areas	10,210 Ac.	1	1	2
Bald Eagle Roosting	11,491 Ac.	1	1	2
PALEONTOLOGY				
Torrejon Fossil Fauna	2,900 Ac.	1	1	3
Kutz Canyon Paleo. Area	25,826 Ac.	1	1	3
Betonnie Tsosie	2,880 Ac.	1	1	3
Fossil Forest RNA	2,770 Ac.	6	6	6
WATERSHED				
Farmington Lake Watershed	780 Ac.	1	1	3

Note: ¹Management categories are as follows:

- 1 - Managed Under Standard Lease Terms and Conditions.
- 2 - Managed Under Timing Limitation (Seasonal) Constraints.
- 3 - Managed Under Controlled Surface Use Constraints.
- 4 - Managed Under No Surface Occupancy Constraints.
- 5 - Closed to New Leasing. RMP decisions to close an area to future leasing will not affect development, uses, or rights, on existing leases.
- 6 - Closed to New Leasing Under Congressional Designations and Withdrawals.

**TABLE A-2. FARMINGTON RESOURCE AREA - NO ACTION ALTERNATIVE -
MANAGEMENT CATEGORIES FOR SPECIAL MANAGEMENT AREAS
(acreage given in columns 2 and 4)**

OPEN		Negro Canyon SMA	1,600
- HIGH-INTENSITY DEV. AREA		Shephard Site	40
Dunes Vehicle Recreation Area SMA	1,000	Crow Canyon District ACEC	4,380
Head Canyon ORV Competition Area	150	Hooded Fireplace/ Largo School District ACEC	320
Angel Peak Recreation Area SMA	9,740	Tapacito/Split Rock District ACEC	240
Glade Run Trail System	150	Francis Ruin ACEC	40
Laguna Seca Mesa SMA	2,400	Christmas Tree Ruin ACEC	40
Aztec Gilia ACEC	6,400	San Rafael Canyon ACEC	5,460
Kutz Canyon Paleo. Area SMA	25,826	Romine Canyon Ruin	40
Farmington Lake Watershed SMA	780	Prieta Mesa Site	40
Bald Eagle ACEC	1,700	Delgadito Pueblito	40
		Cagle's Site	40
- LOW-INTENSITY DEV. AREA		Adams Canyon Site	40
Continental Divide		Casa Mesa Diablo	40
Trail Corridors	31,120	Rincon Rockshelter	40
Coal Belt SMA	77,945	Hill Road Ruin	40
Torrejon Fossil Fauna ACEC	2,900	Gomez Point Site	40
Betonneie Tsosie SMA	2,880	Gomez Canyon Ruin	40
TOTAL	162,991	Adolfo Canyon Site	40
		Unreachable Rockshelter	60
		Compressor Station Ruin	40
		Foothold & Overlook	
TIMING LIMITATION CONSTRAINT		Ruins District	120
- HIGH-INTENSITY DEV. AREA		Pointed Butte Ruin	40
Mule Deer Winter Range	584,030	Rincon Largo District	180
Elk Winter Range (overlap)	98,665	Kin Yazhi	40
TOTAL	584,030	Canyon View Ruin	40
		Gobernador Knob	40
		Salt Point ACEC	640
		Huerfano Mesa	3,670
NO SURFACE OCCUPANCY CONSTRAINT		Kin Nizhoni Community	800
- HIGH-INTENSITY DEV. AREA		Pierre's Site ACEC	440
East Side Rincon Site	100	Halfway House ACEC	40
Farmer's Arroyo Site	40	Twin Angels	40
River Tracts	2,953	Holmes Group	100
TOTAL	3,093	Beechatuda Tongue	80
		Hogback ACEC	7,520
		Reese Canyon RNA	2,200
DISCRETIONARY CLOSURE		TOTAL	44,591
- HIGH-INTENSITY DEV. AREA		DISCRETIONARY CLOSURE	
Simon Canyon Recreation Area	3,771	- LOW-INTENSITY DEV. AREA	
Simon Ruin	40	Casamero Community ACEC	160
Angel Peak ACEC	500	Chacra Mesa Complex	6,370
Carracas Mesa SMA	7,000	Torrecon ROW	2,720
Thomas Canyon SMA	4,630		

Table A-2. (concluded)

Continental Divide ROW	1,760
Escavada ROW	2,680
Betonnie Tsoie ROW	5,440
TOTAL	19,130
NONDISCRETIONARY CLOSURE	
- HIGH-INTENSITY DEV. AREA	
Cities and Towns	21,440
- LOW-INTENSITY DEV. AREA	
Bisti Wilderness Area	3,946
De-na-zin Wilderness Area	19,700
Ah-shi-sle-pah WSA	6,563
Fossil Forest RNA	2,770
TOTAL	54,419

**TABLE A-3. FARMINGTON RESOURCE AREA - PRODUCTION ALTERNATIVE -
AREAS OPEN TO LEASING AND/OR DEVELOPMENT
UNDER STANDARD LEASE TERMS AND CONDITIONS
(acreage given in columns 2 and 4)**

OPEN			
- HIGH-INTENSITY DEV. AREA		East Side Rincon Site	100
Dunes Vehicle		Kin Nizhoni Community	800
Recreation Area SMA	1,000	Pierre's Site ACEC	440
Head Canyon ORV		Halway House ACEC	40
Competition Area	150	Twin Angels	40
Simon Canyon Recreation Area	3,771	Holmes Group	100
Simon Ruin	40	Casamero Community ACEC	160
Angel Peak Recreation Area SMA	10,240	Farmer's Arroyo Site	40
Carracas Mesa SMA	7,000	Laguna Seca Mesa SMA	2,400
Thomas Canyon SMA	4,630	Beechatuda Tongue	80
Negro Canyon SMA	1,600	The Hogback ACEC	7,520
Glade Run Trail System	150	Reese Canyon RNA	2,200
Shephard Site	40	Aztec Gilia ACEC	6,400
Crow Canyon District ACEC	4,380	River Tracts	2,953
Hooded Fireplace/Largo		Bald Eagle ACEC	1,700
School District ACEC	320	Kutz Canyon Paleo. Area SMA	25,826
Tapacito/Split Rock		Farmington Lake	
District ACEC	240	Watershed SMA	780
Francis Ruin Ruin ACEC	40	Mule Deer, Elk and Antelope	
Christmas Tree ACEC	40	Wintering/Calving Ranges	104,789
San Rafael Canyon ACEC	5,460	Bald Eagle Roosting Areas	11,491
Romine Canyon Ruin	40	- LOW-INTENSITY DEV. AREA	
Prieta Mesa Site	40	Continental Divide	
Delgadito Pueblito	40	Trail Corridors	31,120
Cagle's Site	40	Chacra Mesa Complex	6,370
Adams Canyon Site	40	Coal Belt SMA	77,945
Casa Mesa Diablo	40	Torreon ROW	2,720
Rincon Rockshelter	40	Continental Divide ROW	1,760
Hill Road Ruin	40	Escavada ROW	2,680
Gomez Point Site	40	Betonnie Tsosie ROW	5,440
Gomez Canyon Ruin	40	Torrejon Fossil Fauna ACEC	2,900
Adolfo Canyon Site	40	Betonnie Tsosie SMA	2,880
Unreachable Rockshelter	60	Raptor Nesting Areas	10,210
Compressor Station Ruin	40	TOTAL	373,993
Foothold & Overlook		NON-DISCRETIONARY CLOSURE	
Ruins District	120	- HIGH-INTENSITY DEV. AREA	
Pointed Butte Ruin	40	Cities and Towns	21,440
Rincon Largo District	180	- LOW-INTENSITY DEV. AREA	
Kin Yazhi	40	Bisti Wilderness Area	3,946
Canyon View Ruin	40	De-na-zin Wilderness Area	19,700
Gobernador Knob	40	Ah-shi-sle-pah WSA	6,563
Salt Point ACEC	640	Fossil Forest RNA	2,770
Huerfano Mesa	3,670	TOTAL	54,419

**TABLE A-4. FARMINGTON RESOURCE AREA - PROPOSED ALTERNATIVE -
MANAGEMENT CATEGORIES FOR SPECIAL MANAGEMENT AREAS
(BIG GAME, RAPTOR, AND OTHER RESOURCE AREA CONCERNS)
(acres given in columns 2 and 4)**

OPEN		Christmas Tree Ruin ACEC	40
- HIGH-INTENSITY DEV. AREA		Simon Ruin	40
Dunes Vehicle Recreation Area	1,000	Romine Canyon Ruin	40
Head Canyon ORV Competition Area	150	Priketa Mesa Site	40
Laguna Seca Mesa SMA	2,400	Delgadito Pueblito	40
TOTAL	3,550	Cagle's Site	40
		Adams Canyon Site	40
TIMING LIMITATION CONSTRAINT		Casa Mesa Diablo	40
- HIGH-INTENSITY DEV. AREA		Rincon Rockshelter	40
Mule Deer, Elk and Antelope		Hill Road Ruin	40
Wintering/Calving Ranges	104,789	Gomez Point Site	40
Bald Eagle Roosting Areas	11,491	Gomez Canyon Ruin	40
- LOW-INTENSITY DEV. AREA		Adolfo Canyon Site	40
Raptor Nesting Areas	10,210	Unreachable Rockshelter	60
TOTAL	126,490	Compressor Station Ruin	40
		Foothold & Overlook Ruins District	120
CONTROLLED SURFACE USE CONSTRAINT		Pointed Butte Ruin	40
- HIGH-INTENSITY DEV. AREA		Rincon Largo District	180
Angel Peak Recreation SMA	9,740	Kin Yazhi	40
Kutz Canyon Paleo. Area SMA	25,826	Canyon View Ruin	40
Glade Run Trail System	150	Gobernador Knob	40
Farmington Lake Watershed SMA	780	Salt Point ACEC	640
Continental Divide Trail Corridor	31,120	East Side Rincon Site	100
Simon Canyon Rec. ACEC	3,521	Kin Nizhoni Community	800
Carracas Mesa	4,620	Pierre's Site ACEC	440
Thomas Canyon	3,010	Halfway House ACEC	40
San Rafael Canyon	4,095	Twin Angels ACEC	40
Huerfano Mesa	3,633	Holmes Group	100
Hogback ACEC	4,662	Casamero Community ACEC	160
Reese Canyon RNA	1,914	Farmer's Arroyo Site	40
- LOW-INTENSITY DEV. AREA		Beechatuda Tongue	80
Coal Belt SMA	77,945	Aztec Gilia ACEC	6,400
Torreon ROW	2,720	River Tracts	2,953
Continental Divide ROW	1,760	Bald Eagle ACEC	1,700
Escavada ROW	2,680	TOTAL	20,753
Betonnie Tsosie ROW	5,440		
Torrejon Fossil Fauna	2,900	DISCRETIONARY CLOSURE	
Betonnie Tsosie SMA	2,880	- HIGH-INTENSITY DEV. AREA	
TOTAL	189,396	Simon Canyon Rec. Area/ACEC	250
		Carracas Mesa SMA	2,380
NO SURFACE OCCUPANCY CONSTRAINT		Thomas Canyon SMA	1,620
- HIGH-INTENSITY DEV. AREA		Negro Canyon SMA	1,600
Angel Peak ACEC	500	The Hogback ACEC	2,858
Shephard Site	40	Reese Canyon RNA	286
Hooded Fireplace/Largo		Crow Canyon District ACEC	4,380
School District ACEC	320	San Rafael Canyon ACEC	1,365
Tapacito/Split Rock		Huerfano Mesa	37
District ACEC	240	- LOW-INTENSITY DEV. AREA	
Frances Ruin ACEC	40	Chacra Mesa Complex & ACEC	6,370
		TOTAL	21,146

Table A-4. (concluded)

NON-DISCRETIONARY CLOSURE	
- HIGH-INTENSITY DEV. AREA	
Cities and Towns	21,440
- LOW-INTENSITY DEV. AREA	
Bisti Wilderness	3,946
De-na-zin Wilderness	19,700
Ah-shi-sle-pah WSA	6,563
Fossil Forest RNA	2,770
TOTAL	54,419

**TABLE A-5. SUMMARY OF MANAGEMENT CATEGORIES BY ALTERNATIVE
FOR BIG GAME, RAPTOR, CULTURAL AND OTHER RESOURCE AREA CONCERNS
IN THE RIO PUERCO RESOURCE AREA^{1/}**

Concern/Area		Alt. A	Alt. B	Alt. C
CULTURAL RESOURCES				
Big Bead Mesa SMA	311 Ac.	4	1	4
Canon Tapia ACEC	1,093 Ac.	4	1	4
Guadalupe Ruin and Community SMA	447 Ac.	3	1	3
(a) Fenced Area	40 Ac.	4	1	4
Headcut Prehistoric Community SMA	2,274 Ac.	3	1	3
Jones Canyon ACEC	649 Ac.	4	1	4
Pronoun Cave Complex ACEC	1,194 Ac.	3	1	3
Torrejon Fossil Fauna	2,981 Ac.	3	1	3
LANDS				
Cuba Airport	120 Ac.	4	1	4
Double Eagle Airport	1,400 Ac.	4	1	4
Shooting Range State Park	1,697 Ac.	4	1	4
Village of Milan	480 Ac.	4	1	4
RECREATION				
Azabache Station SMA	80 Ac.	4	1	4
Cabazon WSA	8,159 Ac.	6/5	6/5	6/5
(a) Cabazon Peak ACEC (outside of Cabazon WSA)	110 Ac.	5	5	5
Canon Jarido SMA	1,803 Ac.	3	1	2/3
Continental Divide Trail SMA	715 Ac.	3	1	3
Empedrado WSA	9,007 Ac.	6/5	6/5	6/5
Historic Homesteads SMA	16 Ac.	1	1	3
Ignacio Chavez SMA (portion outside WSA)	4,085 Ac.	3	1	2/3
(a) Chamisa WSA	10,605 Ac.	6/5	6/5	6/5
(b) Ignacio Chavez WSA	32,266 Ac.	6/5	6/5	6/5
La Lena WSA	10,438 Ac.	6/5	6/5	6/5
Manzano WSA	881 Ac.	6/5	6/5	6/5
Ojito ACEC (portion outside WSA)	3,991 Ac.	3	1	3
(a) Ojito WSA	10,903 Ac.	6/5	6/5	6/5
(b) Las Milpas Gas Storage Area (portion outside WSA)	380 Ac.	4	1	4
(c) Querencia Watershed (portion outside WSA)	58 Ac.	4	1	4

Table A-5. (concluded)

Concern/Area		Alt. A	Alt. B	Alt. C
Petaca Pinta SMA	413 Ac.	3	1	3
(portion outside WSA)				
(a) Petaca Pinta WSA	11,668 Ac.	6/5	6/5	6/5
Tent Rocks SMA	6,400 Ac.	3	4	2/3
(a) Tent Rocks ACEC	5,020 Ac.	3	1	2/3
1870's Wagon Road Trail SMA	630 Ac.	3	1	3
El Malpais National Conservation Area				
(a) West Malpais WA	39,600 Ac.	6	6	6
(b) Cebolla WA	62,800 Ac.	6	6	6
(c) Chain-of-Craters	18,300 Ac.	6	6	6
(d) Conservation Unit	92,900 Ac.	6	6	6
RIGHTS-OF-WAY				
San Luis Cliffs Window	7,680 Ac.	1	1	3
Ojito East Window	3,000 Ac.	1	1	3
THREATENED AND ENDANGERED SPECIES				
Ball Ranch ACEC	1,278 Ac.	5	1	5
WATERSHED				
Pelon Watershed SMA	858 Ac.	5	1	5
WILDLIFE				
Bluewater Canyon ACEC	89 Ac.	4	1	4
Elk Springs ACEC	9,445 Ac.	2	1	2/3
(a) Juana Lopez Research Natural Area	40 Ac.	5	1	5
San Luis Mesa				
Raptor Area ACEC	5,271 Ac.	2	1	2/3
(portion outside La Lena WSA)				
(a) Empedrado Watershed Study Area	640 Ac.	5	1	5

Note: ^{1/}Management categories are as follows:

- 1 - Managed Under Standard Lease Terms and Conditions.
- 2 - Managed Under Timing Limitation (Seasonal) Constraints.
- 3 - Managed Under Controlled Surface Use Constraints.
- 4 - Managed Under No Surface Occupancy Constraints.
- 5 - Closed to New Leasing. RMP decisions to close an area to future leasing will not affect development, uses, or rights, on existing leases.
- 6 - Closed to New Leasing Under Congressional Designations and Withdrawals.

**TABLE A-6. RIO PUERCO RESOURCE AREA - NO ACTION ALTERNATIVE -
MANAGEMENT CATEGORIES FOR SPECIAL MANAGEMENT AREAS
(acreage given in columns 2 and 4)**

OPEN		Double Eagle Airport	1,400
- HIGH-INTENSITY DEV. AREA		Ojito ACEC	
San Luis Cliffs Window	7,680	Las Milpas Gas Storage Area (portion outside WSA)	380
- LOW-INTENSITY DEV. AREA		Querencia Watershed (portion outside WSA)	58
Historic Homesteads SMA	16	Shooting Range State Park	1,697
Ojito East Window	3,000	Village of Milan	480
TOTAL	10,696	Guadalupe Ruin & Community SMA (fenced area)	40
TIMING LIMITATION CONSTRAINT		TOTAL	6,397
- HIGH-INTENSITY DEV. AREA			
San Luis Mesa Raptor Area ACEC (portion outside La Lena WSA)	5,271		
Elk Springs ACEC	9,445		
TOTAL	14,716		
CONTROLLED SURFACE USE CONSTRAINT			
- HIGH-INTENSITY DEV. AREA			
Canon Jarido SMA	1,803	DISCRETIONARY CLOSURE	
Continental Divide Trail SMA	715	- HIGH-INTENSITY DEV. AREA	
Guadalupe Ruin/Community SMA	447	Cabezon Peak ACEC (outside of Cabezon WSA)	110
Headcut Prehist. Comm. SMA	2,274	Elk Springs ACEC	
Ignacio Chavez SMA (portion outside WSA)	4,085	Juana Lopez Res. Nat. Area	40
Torrejon Fossil Fauna ACEC	2,981	Pelon Watershed SMA	858
1870's Wagon Road Trail SMA	630	San Luis Mesa Raptor Area ACEC Empedrado Watershed Study Area	640
- LOW-INTENSITY DEV. AREA			
Ojito ACEC (portion outside WSA)	3,991	- LOW-INTENSITY DEV. AREA	
Petaca Pinta SMA (portion outside WSA)	413	Ball Ranch ACEC	1,278
Pronoun Cave Complex ACEC	1,194	TOTAL	2,926
Tent Rocks SMA	6,400		
Tent Rocks ACEC	5,020		
TOTAL	29,953		
NO SURFACE OCCUPANCY CONSTRAINT			
- HIGH-INTENSITY DEV. AREA			
Azabache Station SMA	80	NON-DISCRETIONARY CLOSURE	
Jones Canyon SMA	649	- HIGH-INTENSITY DEV. AREA	
- LOW-INTENSITY DEV. AREA		Cabezon WSA	8,159
Big Bead Mesa SMA	311	Empedrado WSA	9,007
Bluewater Canyon ACEC	89	Ignacio Chavez SMA	
Canon Tapia ACEC	1,093	(a) Chamisa WSA	10,605
Cuba Airport	120	(b) Ignacio Chavez WSA	32,266
		La Lena WSA	10,438
		- LOW-INTENSITY DEV. AREA	
		El Malpais Nat'l Conserv. Area	
		(a) West Malpais WA	39,600
		(b) Cebolla WA	62,800
		(c) Chain of Craters WSA	18,300
		(d) Conservation Unit	92,900
		Manzano WSA	881
		Ojito ACEC	
		Ojito WSA	10,903
		Petaca Pinta SMA	
		Petaca Pinta WSA	11,668
		TOTAL	307,527

**TABLE A-7. RIO PUERCO RESOURCE AREA - PRODUCTION ALTERNATIVE -
AREAS OPEN TO LEASING AND/OR DEVELOPMENT
UNDER STANDARD LEASE TERMS AND CONDITIONS
(acreage given in columns 2 and 4)**

OPEN			
- HIGH-INTENSITY DEV. AREA			
Azabache Station SMA	80	Querencia Watershed (portion outside WSA)	58
Cabezon Peak ACEC (outside of Cabezon WSA)	110	Ojito East Window	3,000
Canon Jarido SMA	1,803	Petaca Pinta SMA (portion outside WSA)	413
Cont. Divide Trail SMA	715	Pronoun Cave Complex ACEC	1,194
Elk Springs ACEC	9,445	Shooting Range	
Juana Lopez Res. Nat. Area	40	State Park	1,697
Guadalupe Ruin/Community (fenced area)	447 40	Tent Rocks SMA	6,400
Headcut Prehist. Comm. SMA	2,274	Tent Rocks ACEC	5,020
Ignacio Chavez SMA (portion outside WSA)	4,085	Village of Milan	480
Jones Canyon SMA	649	TOTAL	64,688
Pelon Watershed SMA	858	NONDISCRETIONARY CLOSURE	
San Luis Cliffs Window	7,680	- HIGH-INTENSITY DEV. AREA	
San Luis Mesa		Cabezon WSA	8,159
Raptor Area ACEC	5,271	Empedrado WSA	9,007
(portion outside La Lena WSA)		Ignacio Chavez SMA	
Empedrado Watershed Study Area	640	(a) Chamisa WSA	10,605
Torrejon Fossil		(b) Ignacio Chavez WSA	32,266
Fauna ACEC	2,981	La Lena WSA	10,438
1870's Wagon Road Trail SMA	630	- LOW-INTENSITY DEV. AREA	
- LOW-INTENSITY DEV. AREA			
Ball Ranch ACEC	1,278	El Malpais Nat'l Conserv. Area	
Big Bead Mesa SMA	311	(a) West Malpais WA	39,600
Bluewater Canyon ACEC	89	(b) Cebolla WA	62,800
Canon Tapia ACEC	1,093	El Malpais Nat'l Conserv. Area	
Cuba Airport	120	(c) Chain of Craters WSA	18,300
Double Eagle Airport	1,400	(d) Conservation Unit	92,900
Historic Homesteads SMA	16	Manzano WSA	881
Ojito ACEC	3,991	Ojito ACEC	
(portion outside WSA)		Ojito WSA	10,903
Las Milpas Gas Storage Area	380	Petaca Pinta SMA	
(portion outside WSA)		Petaca Pinta WSA	11,668
		TOTAL	307,527

**TABLE A-8. RIO PUERCO RESOURCE AREA - PROPOSED ALTERNATIVE -
MANAGEMENT CATEGORIES FOR SPECIAL MANAGEMENT AREAS
(acres given in columns 2 and 4)**

No Open Category		Ignacio Chavez SMA (portion outside WSA)	4,085
CONTROLLED SURFACE USE CONSTRAINT			
- HIGH-INTENSITY DEV. AREA			
San Luis Cliffs Window	7,680	San Luis Mesa Raptor Area ACEC (portion outside La Lena WSA)	5,271
Continental Divide Trail SMA	715		
Guadalupe Ruin/Community SMA	447	- LOW-INTENSITY DEV. AREA	
Headcut Prehist. Comm. SMA	2,274	Tent Rocks SMA	6,400
Torrejon Fossil Fauna ACEC	2,981	Tent Rocks ACEC	5,020
1870's Wagon Road Trail SMA	630	TOTAL	32,024
- LOW-INTENSITY DEV. AREA			
Historic Homesteads SMA	16	DISCRETIONARY CLOSURE	
Ojito East Window	3,000	- HIGH-INTENSITY DEV. AREA	
Ojito ACEC	3,991	Cabezon Peak ACEC	110
(portion outside WSA)		(outside of Cabezon WSA)	
Petaca Pinta SMA	413	Elk Springs ACEC	
(portion outside WSA)		Juana Lopez Res. Nat. Area	40
Pronoun Cave Complex ACEC	1,194	Guadalupe Ruin & Community SMA (fenced area)	40
TOTAL	23,341	Pelon Watershed SMA	858
NO SURFACE OCCUPANCY CONSTRAINT			
- HIGH-INTENSITY DEV. AREA			
Azabache Station SMA	80	San Luis Mesa Raptor Area ACEC Empedrado Watershed Study Area	640
Jones Canyon SMA	649	- LOW-INTENSITY DEV. AREA	
-LOW-INTENSITY DEV. AREA			
Big Bead Mesa SMA	311	Ball Ranch ACEC	1,278
Bluewater Canyon ACEC	89	TOTAL	2,966
Canon Tapia ACEC	1,093	NONDISCRETIONARY CLOSURE	
Cuba Airport	120	- HIGH-INTENSITY DEV. AREA	
Double Eagle Airport	1,400	Cabezon WSA	8,159
Ojito ACEC		Empedrado WSA	9,007
(portion outside WSA)		Ignacio Chavez SMA	
Las Milpas Gas Storage Area	380	(a) Chamisa WSA	10,605
(portion outside WSA)		(b) Ignacio Chavez WSA	32,266
Querencia Watershed	413	La Lena WSA	10,438
(portion outside WSA)		- LOW-INTENSITY DEV. AREA	
Shooting Range State Park	1,697	El Malpais Nat'l Conserv. Area	
Village of Milan	480	(a) West Malpais WA	39,600
TOTAL	6,712	(b) Cebolla WA	62,800
CONTROLLED SURFACE USE AND TIMING			
LIMITATION CONSTRAINTS			
- HIGH-INTENSITY DEV. AREA			
Canon Jarido SMA	1,803	(c) Chain-of-Craters WSA	18,300
Elk Springs ACEC	9,445	(d) Conservation Unit	92,900
		Manzano WSA	881
		Ojito ACEC	
		Ojito WSA	10,903
		Petaca Pinta SMA	
		Petaca Pinta WSA	11,668
		TOTAL	307,527

**TABLE A-9. SUMMARY OF MANAGEMENT CATEGORIES BY ALTERNATIVE
FOR SPECIAL MANAGEMENT, WILDERNESS STUDY,
AND WILD AND SCENIC AREAS^{1/}**

Concern/Area		Alt. A	Alt. B	Alt. C
RECREATION				
Wild Rivers Rec. Area	11,000 Ac.	4	1	4
(a) Guadalupe Mtn ACEC	1,000 Ac.	4	1	4
(b) Wild Rivers Recreation Area (portion withdrawn from mineral entry)	5,000 Ac.	5	1	5
Racecourse ACEC	1,000 Ac.	4	1	5
Santa Cruz Lake Recreation Area	1,000 Ac.	4	1	4
Fun Valley SMA	17,000 Ac.	3	1	3
Orilla Verde	1,000 Ac.	3	1	3
WILDLIFE				
San Antonio SMA	75,500 Ac.	3	1	3
(a) San Antonio Gorge ACEC	500 Ac.	3	1	4
(b) Winter Range ACEC	7,000 Ac.	2	1	2
San Antonio WSA	7,000 Ac.	6/5	6/1	6/5
Rio Chama SMA	5,200 Ac.	4	1	5
Rio Chama Wild and Scenic	2,000 Ac.	5	1	5
Rio Chama WSA	10,000 Ac.	6/5	6/1	6/5
Warm Springs SMA	9,000 Ac.	3	1	3
(a) Agua Caliente ACEC	500 Ac.	4	1	4
(b) Embudo Canyon ACEC	1,000 Ac.	4	1	4
Sabinoso SMA	16,000 Ac.	3	1	3
Sabinoso WSA	16,000 Ac.	6/5	6/1	6/5
Black Mesa SMA	5,000 Ac.	3	1	3
Riparian/Aquatic Areas (not mapped)		3	1	3
Rio Grande Wild and Scenic				
(a) "Wild" Designation	16,000 Ac.	6	6	6
(b) "Recreation" Designation	1,000 Ac.	5	1	5
CULTURAL AND PALEONTOLOGICAL				
Ojo Caliente ACEC	13,000 Ac.	3	1	3
Sahiu Pueblo SMA	2 Ac.	4	1	4
Ku Pueblo SMA	65 Ac.	4	1	4
Ojo Del Zorro Pueblo SMA	24 Ac.	4	1	4
Pueblo Quemado SMA	119 Ac.	4	1	4
La Caja Pueblo SMA	85 Ac.	4	1	4
Pueblo Sarco SMA	10 Ac.	4	1	4
La Cienega Mesa SMA	1,500 Ac.	4	1	4

TABLE A-9. (concluded)

Concern/Area		Alt. A	Alt. B	Alt. C
San Lazaro SMA	77 Ac.	4	1	4
Lower Embudo SMA	500 Ac.	4	1	4
Sombrillo ACEC	9,000 Ac.	3	1	3

Note: ^{1/}Management categories are as follows:

- 1 - Managed Under Standard Lease Terms and Conditions.
- 2 - Managed Under Timing Limitation (Seasonal) Constraints.
- 3 - Managed Under Controlled Surface Use Constraints.
- 4 - Managed Under No Surface Occupancy Constraints.
- 5 - Closed to New Leasing. RMP decisions to close an area to future leasing will not affect development, uses, or rights on existing leases.
- 6 - Closed to New Leasing Under Congressional Designations and withdrawals.

**TABLE A-10. TAOS RESOURCE AREA - NO ACTION ALTERNATIVE -
MANAGEMENT CATEGORIES FOR
SPECIAL MANAGEMENT, WILDERNESS STUDY, AND WILD AND SCENIC AREAS
(acreage given in column 2)**

TIMING LIMITATION CONSTRAINT	
San Antonio Winter Range ACEC	7,000
TOTAL	7,000
CONTROLLED SURFACE USE CONSTRAINT	
Fun Valley SMA	17,000
Orilla Verde Recreation Area SMA	1,000
San Antonio SMA	75,500
San Antonio Gorge ACEC	500
Warm Springs SMA	9,000
Sabinoso SMA	16,000
Black Mesa SMA	5,000
Riparian/Aquatic Areas (not mapped)	
Ojo Caliente ACEC	13,000
Sombrillo ACEC	9,000
TOTAL	146,000
NO SURFACE OCCUPANCY CONSTRAINT	
Wild Rivers Recreation Area SMA	11,000
Guadalupe Mountain ACEC	1,000
Racecourse ACEC	1,000
Santa Cruz Lake Rec. Area SMA	1,000
Rio Chama SMA	5,200
Agua Caliente ACEC	500
Embudo Canyon ACEC	1,000
Sahiu Pueblo SMA	2
Ku Pueblo SMA	65
Ojo Del Zorro Pueblo SMA	24
Pueblo Quemado SMA	119
La Caja Pueblo SMA	85
Pueblo Sarco SMA	10
La Cienega Mesa SMA	1,500
San Lazaro SMA	77
Lower Embudo SMA	500
TOTAL	23,100
DISCRETIONARY CLOSURE	
Wild Rivers Recreation Area SMA	5,000
Rio Grande Wild & Scenic River (recreation designation)	1,000
TOTAL	6,000
NONDISCRETIONARY CLOSURE	
San Antonio WSA	7,000
Rio Chama WSA	10,000
Sabinoso WSA	16,000
Rio Grande Wild & Scenic River	16,000
Rio Chama Wild and Scenic River	2,000
TOTAL	51,000

**TABLE A-11. TAOS RESOURCE AREA - PRODUCTION ALTERNATIVE -
AREAS OPEN TO LEASING AND/OR DEVELOPMENT
UNDER STANDARD LEASE TERMS AND CONDITIONS
(acreage given in column 2)**

OPEN	
Winter Range ACEC	7,000
Fun Valley SMA	17,000
San Antonio SMA	75,500
Warm Springs SMA	9,000
Sabinoso SMA	16,000
Black Mesa SMA	5,000
Riparian/Aquatic Areas (not mapped)	
Ojo Caliente ACEC	13,000
Sombrillo ACEC	9,000
Wild Rivers Recreation Area SMA	11,000
Guadalupe Mountain ACEC	1,000
Santa Cruz Lake Rec. Area SMA	1,000
Orilla Verde Recreation Area SMA	1,000
San Antonio Gorge ACEC	500
Agua Caliente ACEC	500
Embudo Canyon ACEC	1,000
Sahiu Pueblo SMA	2
Ku Pueblo SMA	65
Ojo Del Zorro Pueblo SMA	24
Pueblo Quemado SMA	119
La Caja Pueblo SMA	85
Pueblo Sarco SMA	10
La Cienega Mesa SMA	1,500
San Lazaro SMA	77
Lower Embudo SMA	500
Racecourse ACEC	1,000
Rio Chama SMA	5,200
Rio Grande Wild & Scenic River (recreation designation)	1,000
TOTAL	177,082
NON-DISCRETIONARY CLOSURE	
San Antonio WSA	7,000
Rio Chama WSA	10,000
Sabinoso WSA	16,000
Rio Grande Wild & Scenic River	16,000
Rio Chama Wild and Scenic River	2,000
TOTAL	51,000

**TABLE A-12. TAOS RESOURCE AREA - PROPOSED ALTERNATIVE -
MANAGEMENT CATEGORIES FOR SPECIAL MANAGEMENT,
WILDERNESS STUDY, AND WILD AND SCENIC AREAS
(acres given in columns 2 and 4)**

TIMING LIMITATION CONSTRAINT		Ojo Del Zorro Pueblo SMA	24
San Antonio Winter Range ACEC	7,000	Pueblo Quemado SMA	119
CONTROLLED SURFACE USE CONSTRAINT		La Caja Pueblo SMA	85
Fun Valley SMA	17,000	Pueblo Sarco SMA	10
San Antonio SMA	75,500	La Cienega Mesa SMA	1,500
Warm Springs SMA	9,000	San Lazaro SMA	77
Sabinoso SMA	16,000	Lower Embudo SMA	500
Black Mesa SMA	5,000	TOTAL	17,382
Riparian/Aquatic Areas (not mapped)		DISCRETIONARY CLOSURE	
Ojo Caliente ACEC	13,000	Wild Rivers Recreation Area SMA	5,000
Sombrillo ACEC	9,000	Racecourse ACEC	1,000
Orilla Verde Recreation Area SMA	1,000	Rio Chama SMA	5,200
TOTAL	145,500	Rio Grande Wild & Scenic River (rec. d.)	2,000
NO SURFACE OCCUPANCY CONSTRAINT		TOTAL	12,200
Wild Rivers Rec. Area SMA	11,000	NONDISCRETIONARY CLOSURE	
Guadalupe Mountain ACEC	1,000	San Antonio WSA	7,000
Santa Cruz Lake Rec. Area SMA	1,000	Rio Chama WSA	10,000
San Antonio Gorge ACEC	500	Sabinoso WSA	16,000
Agua Caliente ACEC	500	Rio Grande Wild & Scenic River	16,000
Embudo Canyon ACEC	1,000	Rio Chama Wild & Scenic River	2,000
Sahiu Pueblo SMA	2	TOTAL	51,000
Ku Pueblo SMA	65		

APPENDIX B

Oil and Gas Leasing

APPENDIX B-1

UNIFORM FORMAT FOR OIL AND GAS LEASE STIPULATIONS AND FORM 3100-11, OFFER TO LEASE AND LEASE FOR OIL AND GAS

Within the Albuquerque District there is considerable variation in how lease stipulations are defined, worded, and formatted. The inconsistency and variation in the application of lease stipulations has resulted, at times, in lease stipulations which are overly restrictive or do not meet the objectives of the intended stipulation. The following Uniform Format for Oil and Gas Lease Stipulations will be implemented in this amendment in an effort to achieve standardization and uniformity. Included for completeness is Form 3100-11, Offer to Lease and Lease for Oil and Gas, which contains standard lease terms and conditions.

A. Seasonal Stipulations

The Timing Limitation (often called seasonal) Stipulation prohibits fluid mineral exploration and development activities for time periods less than year-long. The dates and location(s) limiting

activity are as specific as possible.

A timing limit stipulation is not necessary if the time limitation involves the prohibition of new surface disturbing operations for periods of less than 60 days (43 CFR 3101.1-2).

Timing limitations shorter than 60 days do not require a lease stipulation. The restriction is added directly to the field operation approval as a condition of approval. However, in those cases where two or more time restrictions combine or overlap to form a restriction of more than 60 days, the closure will be attached on the lease as a stipulation.

The Uniform Oil and Gas Lease Stipulation Format, shown below, will be used to append all Timing or Seasonal stipulations to the lease document.

TIMING LIMITATION STIPULATION

No surface use is allowed during the following time period(s). This stipulation does not apply to operation and maintenance of production facilities.

On the lands described below:

For the purpose of (reasons):

Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820).

B. Controlled Surface Use Stipulations

The Controlled Surface Use (CSU) Stipulation is intended to be used when fluid mineral occupancy and use are generally allowed on all or portions of the lease area year-round, but because of special values or resource concerns, some aspects of lease activities must be strictly controlled. The CSU stipulation is used to identify constraints on surface use or operations which may otherwise exceed the mitigation available under Section 6 of the standard

lease terms, regulations, and operating orders. The CSU stipulation is less restrictive than the NSO or TL stipulations, which prohibit all occupancy and use on all or portions of a lease for all or portions of a year. The use of these stipulations should be limited to areas where restrictions or controls are necessary for specific types of activities rather than all activity.

The Uniform Oil and Gas Lease Stipulations format, shown below, will be used to append all CSU stipulations to the lease document.

CONTROLLED SURFACE USE STIPULATION

Surface occupancy or use is subject to the following special constraints.

On the lands described below:

For the purpose of:

Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820).

C. No Surface Occupancy Stipulations

The No Surface Occupancy Stipulation (NSO) is intended for use only when other stipulations are determined insufficient to adequately protect the public interest. The plan amendment analysis shows that less restrictive stipulations are inadequate to protect the resource in question. These resources/values to be protected are also considered

for no leasing areas, but it is determined that no surface occupancy is adequate for resource/value protection. A NSO stipulation is not needed if the desired protection does not require relocation of proposed operations by more than 200 meters (43 CFR 3101.1-2).

The Uniform Oil and Gas Lease Stipulations format, shown below, will be used to append all NSO stipulations to the lease document.

NO SURFACE OCCUPANCY STIPULATION

No Surface Occupancy or use is allowed on the lands described below (legal subdivision or other description).

For the purpose of:

Any change to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820).

OFFER TO LEASE AND LEASE FOR OIL AND GAS

The undersigned (reverse) offers to lease all or any of the lands in item 2 that are available for lease pursuant to the Mineral Leasing Act of 1920 (30 U.S.C. 181 et seq.), the Mineral Leasing Act for Acquired Lands (30 U.S.C. 351-359), the Attorney General's Opinion of April 2, 1941 (40 OP. Atty. Gen. 41), or the

Read Instructions Before Completing

1. Name _____

Street _____

City, State, Zip Code _____

2. This offer/lease is for: (Check Only One) PUBLIC DOMAIN LANDS ACQUIRED LANDS (percent U.S. interest _____)

Surface managing agency if other than BLM: _____ Unit/Project _____

Legal description of land requested:

T. _____ R. _____ Meridian _____ State _____ County _____

Amount remitted: Filing fee \$ _____ Rental fee \$ _____ Total acres applied for _____
Total \$ _____

DO NOT WRITE BELOW THIS LINE

3. Land included in lease:

T. _____ R. _____ Meridian _____ State _____ County _____

Total acres in lease _____

Rental retained \$ _____

In accordance with the above offer, or the previously submitted simultaneous oil and gas lease application or competitive bid, this lease is issued granting the exclusive right to drill for, mine, extract, remove and dispose of all the oil and gas (except helium) in the lands described in item 3 together with the right to build and maintain necessary improvements thereupon for the term indicated below, subject to renewal or extension in accordance with the appropriate leasing authority. Rights granted are subject to applicable laws, the terms, conditions, and attached stipulations of this lease, the Secretary of the Interior's regulations and formal orders in effect as of lease issuance, and to regulations and formal orders hereafter promulgated when not inconsistent with lease rights granted or specific provisions of this lease.

Type and primary term of lease:

THE UNITED STATES OF AMERICA

Simultaneous noncompetitive lease (ten years)

by _____ (Signing Officer)

Regular noncompetitive lease (ten years)

Competitive lease (five years)

(Date) _____ (Date)

Other _____

EFFECTIVE DATE OF LEASE _____

4. (a) Undersigned certifies that (1) offeror is a citizen of the United States; an association of such citizens; a municipality; or a corporation organized under the laws of the United States or of any State or Territory thereof; (2) all parties holding an interest in the offer are in compliance with 43 CFR 3100 and the leasing authorities; (3) offeror's chargeable interests, direct and indirect, in either public domain or acquired lands do not exceed 200,000 acres in oil and gas options or 246,080 acres in options and leases in the same State, or 300,000 acres in leases and 200,000 acres in options in either leasing District in Alaska; and (4) offeror is not considered a minor under the laws of the State in which the lands covered by this offer are located.

(b) Undersigned agrees that signature to this offer constitutes acceptance of this lease, including all terms, conditions, and stipulations of which offeror has been given notice, and any amendment or separate lease that may include any land described in this offer open to leasing at the time this offer was filed but omitted for any reason from this lease. The offeror further agrees that this offer cannot be withdrawn, either in whole or part, unless the withdrawal is received by the BLM State Office before this lease, an amendment to this lease, or a separate lease, whichever covers the land described in the withdrawal, has been signed on behalf of the United States.

This offer will be rejected and will afford offeror no priority if it is not properly completed and executed in accordance with the regulations, or if it is not accompanied by the required payments. 18 U.S.C. Sec. 1001 makes it a crime for any person knowingly and willfully to make to any Department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

Duly executed this _____ day of _____, 19_____.

(Signature of Lessee or Attorney-in-fact)

LEASE TERMS

Sec. 1. Rentals—Rentals shall be paid to proper office of lessor in advance of each lease year. Annual rental rates per acre or fraction thereof are:

- (a) Simultaneous noncompetitive lease, \$1.00 for the first 5 years, thereafter, \$3.00;
- (b) Regular noncompetitive lease, \$1.00;
- (c) Competitive lease, \$2.00; or
- (d) Other, see attachment.

If all or part of a noncompetitive leasehold is determined to be within a known geological structure or a favorable petroleum geological province, annual rental shall become \$2.00, beginning with the lease year following notice of such determination. However, a lease that would otherwise be subject to rental of more than \$2.00 shall continue to be subject to the higher rental.

If this lease or a portion thereof is committed to an approved cooperative or unit plan which includes a well capable of producing leased resources, and the plan contains a provision for allocation of production, royalties shall be paid on the production allocated to this lease. However, annual rentals shall continue to be due at the rate specified in (a), (b), (c), or (d) for those lands not within a participating area.

Failure to pay annual rental, if due, on or before the anniversary date of this lease (or next official working day if office is closed) shall automatically terminate this lease by operation of law. Rentals may be waived, reduced, or suspended by the Secretary upon a sufficient showing by lessee.

Sec. 2. Royalties—Royalties shall be paid to proper office of lessor. Royalties shall be computed in accordance with regulations on production removed or sold. Royalty rates are:

- (a) Simultaneous noncompetitive lease, 12½%;
- (b) Regular noncompetitive lease, 12½%;
- (c) Competitive lease, see attachment; or
- (d) Other, see attachment.

Lessor reserves the right to specify whether royalty is to be paid in value or in kind, and the right to establish reasonable minimum values on products after giving lessee notice and an opportunity to be heard. When paid in value, royalties shall be due and payable on the last day of the month following the month in which production occurred. When paid in kind, production shall be delivered, unless otherwise agreed to by lessor, in merchantable condition on the premises where produced without cost to lessor. Lessee shall not be required to hold such production in storage beyond the last day of the month following the month in which production occurred, nor shall lessee be held liable for loss or destruction of royalty oil or other products in storage from causes beyond the reasonable control of lessee.

Minimum royalty shall be due for any lease year after discovery in which royalty payments aggregate less than \$1.00 per acre. Lessee shall pay such difference at end of lease year. This minimum royalty may be waived, suspended, or reduced, and the above royalty rates may be reduced, for all or portions of this lease if the Secretary determines that such action is necessary to encourage the greatest ultimate recovery of the leased resources, or is otherwise justified.

An interest charge shall be assessed on late royalty payments or underpayments in accordance with the Federal Oil and Gas Royalty Management Act of 1982 (FOGRMA) (96 Stat. 2447). Lessee shall be liable for royalty payments on oil and gas lost or wasted from a lease site when such loss or waste is due to negligence on the part of the operator, or due to the failure to comply with any rule, regulation, order, or citation issued under FOGRMA or the leasing authority.

Sec. 3. Bonds—Lessee shall file and maintain any bond required under regulations.

Sec. 4. Diligence, rate of development, unitization, and drainage—Lessee shall exercise reasonable diligence in developing and producing, and shall prevent unnecessary damage to, loss of, or waste of leased resources. Lessor reserves right to specify rates of development and production in the public interest and to require lessee to subscribe to a cooperative or unit plan, within 30 days of notice, if deemed necessary for proper development and operation of area, field, or pool embracing these leased lands. Lessee shall drill and produce wells necessary to protect leased lands from drainage or pay compensatory royalty for drainage in amount determined by lessor.

Sec. 5. Documents, evidence, and inspection—Lessee shall file with proper office of lessor, not later than 30 days after effective date thereof, any contract or evidence of other arrangement for sale or disposal of production. At such times and in such form as lessor may prescribe, lessee shall furnish detailed statements showing amounts and quality of all products removed and sold, proceeds therefrom, and amount used for production purposes or unavoidably lost. Lessee may be required to provide plats and schematic diagrams showing development work and improvements, and reports with respect to parties in interest, expenditures, and depreciation costs. In the form prescribed by lessor, lessee shall keep a daily drilling record, a log, information on well surveys and tests, and a record of subsurface investigations and furnish copies to lessor when required. Lessee shall keep open at all reasonable times for inspection by any authorized officer of lessor, the leased premises and all wells, improvements, machinery, and fixtures thereon, and all books, accounts, maps, and records relative to operations, surveys, or investigations on or in the leased lands. Lessee shall maintain copies of all contracts, sales agreements, accounting records, and documentation such as billings, invoices, or similar documentation that

supports costs claimed as manufacturing, preparation, and/or transportation costs. All such records shall be maintained in lessee's accounting offices for future audit by lessor. Lessee shall maintain required records for 6 years after they are generated or, if an audit or investigation is underway, until released of the obligation to maintain such records by lessor.

During existence of this lease, information obtained under this section shall be closed to inspection by the public in accordance with the Freedom of Information Act (5 U.S.C. 552).

Sec. 6. Conduct of operations—Lessee shall conduct operations in a manner that minimizes adverse impacts to the land, air, and water, to cultural, biological, visual, and other resources, and to other land uses or users. Lessee shall take reasonable measures deemed necessary by lessor to accomplish the intent of this section. To the extent consistent with lease rights granted, such measures may include, but are not limited to, modification to siting or design of facilities, timing of operations, and specification of interim and final reclamation measures. Lessor reserves the right to continue existing uses and to authorize future uses upon or in the leased lands, including the approval of easements or rights-of-ways. Such uses shall be conditioned so as to prevent unnecessary or unreasonable interference with rights of lessee.

Prior to disturbing the surface of the leased lands, lessee shall contact lessor to be apprised of procedures to be followed and modifications or reclamation measures that may be necessary. Areas to be disturbed may require inventories or special studies to determine the extent of impacts to other resources. Lessee may be required to complete minor inventories or short term special studies under guidelines provided by lessor. If in the conduct of operations, threatened or endangered species, objects of historic or scientific interest, or substantial unanticipated environmental effects are observed, lessee shall immediately contact lessor. Lessee shall cease any operations that would result in the destruction of such species or objects.

Sec. 7. Mining operations—To the extent that impacts from mining operations would be substantially different or greater than those associated with normal drilling operations, lessor reserves the right to deny approval of such operations.

Sec. 8. Extraction of helium—Lessor reserves the option of extracting or having extracted helium from gas production in a manner specified and by means provided by lessor at no expense or loss to lessee or owner of the gas. Lessee shall include in any contract or sale of gas the provisions of this section.

Sec. 9. Damages to property—Lessee shall pay lessor for damage to lessor's improvements, and shall save and hold lessor harmless from all claims for damage or harm to persons or property as a result of lease operations.

Sec. 10. Protection of diverse interests and equal opportunity—Lessee shall: pay when due all taxes legally assessed and levied under laws of the State or the United States; accord all employees complete freedom of purchase; pay all wages at least twice each month in lawful money of the United States; maintain a safe working environment in accordance with standard industry practices; and take measures necessary to protect the health and safety of the public.

Lessor reserves the right to ensure that production is sold at reasonable prices and to prevent monopoly. If lessee operates a pipeline, or owns controlling interest in a pipeline or a company operating a pipeline, which may be operated accessible to oil derived from these leased lands, lessee shall comply with section 28 of the Mineral Leasing Act of 1920.

Lessee shall comply with Executive Order No. 11246 of September 24, 1965, as amended, and regulations and relevant orders of the Secretary of Labor issued pursuant thereto. Neither lessee nor lessee's subcontractors shall maintain segregated facilities.

Sec. 11. Transfer of lease interests and relinquishment of lease—As required by regulations, lessee shall file with lessor any assignment or other transfer of an interest in this lease. Lessee may relinquish this lease or any legal subdivision by filing in the proper office a written relinquishment, which shall be effective as of the date of filing, subject to the continued obligation of the lessee and surety to pay all accrued rentals and royalties.

Sec. 12. Delivery of premises—At such time as all or portions of this lease are returned to lessor, lessee shall place affected wells in condition for suspension or abandonment, reclaim the land as specified by lessor and, within a reasonable period of time, remove equipment and improvements not deemed necessary by lessor for preservation of producible wells.

Sec. 13. Proceedings in case of default—If lessee fails to comply with any provisions of this lease, and the noncompliance continues for 30 days after written notice thereof, this lease shall be subject to cancellation. Lessee shall also be subject to applicable provisions and penalties of FOGRMA (96 Stat. 2447). However, if this lease includes land known to contain valuable deposits of leased resources, it may be cancelled only by judicial proceedings. This provision shall not be construed to prevent the exercise by lessor of any other legal and equitable remedy, including waiver of the default. Any such remedy or waiver shall not prevent later cancellation for the same default occurring at any other time.

Sec. 14. Heirs and successors-in-interest—Each obligation of this lease shall extend to and be binding upon, and every benefit hereof shall inure to the heirs, executors, administrators, successors, beneficiaries, or assignees of the respective parties hereto.

APPENDIX B-2

OIL AND GAS LEASE STIPULATIONS

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BLM LEASE STIPULATIONS UNDER THE PROPOSED ALTERNATIVE

Farmington Resource Area

I. TIMING LIMITATION LEASE STIPULATION (TL)

A. The following SMAs/ACECs or areas of special concern will have a TL stipulation attached to new leases issued within them for the protection of Raptor nesting/roosting areas and big game winter range areas *and big game winter calving and fawning use areas:*

1. Raptor Nesting Areas (March 1 through June 30)
2. Bald Eagle Roosting Areas (November 1 through March 31)
3. Big Game and Antelope Winter Range (December 1 through March 31)
4. *Elk calving and crucial use areas (December 1 through July 15)*
5. *Antelope fawning areas (May 1 through July 15)*

II. CONTROLLED SURFACE USE STIPULATION (CSU)

A. The following SMAs/ACECs or areas of special concern will have a CSU stipulation attached to new leases issued within them for the protection of recreation, scenic values, and wildlife:

1. Angel Peak Recreation Area SMA
2. Carracas Mesa
3. Continental Divide Trail Corridor
4. Glade Run Trail System
5. Hogback ACEC

6. Reese Canyon RNA

7. Simon Canyon Recreation Area/ACEC

8. Thomas Canyon

B. The following Right-of-Way windows provide strategic areas for ROW development:

1. Bettonie Tsosie ROW
2. Continental Divide ROW
3. Escavada ROW

C. The following SMAs/ACECs will have a CSU appended to new leases issued within them for the protection of paleontological and cultural values:

1. Bettonie Tsosie SMA
2. Continental Divide Trail Corridor
3. Torrejon Fossil Fanna ACEC
4. Huerfano Mesa
5. Kutz Canyon SMA
6. San Rafael Canyon ACEC
7. Coal Belt SMA: Protection of coal resource and development.
8. Farmington Lake Watershed SMA: Protection of watershed area from chemical or bacterial contamination.

III. NO SURFACE OCCUPANCY STIPULATION (NSO)

A. Beechatuda Tongue SMA: Protection of the geologic type locality of the Beechatuda Tongue Member of the Cliff House Formation.

B. The following SMA and ACECs will have a NSO stipulation appended to new leases issued within them for the protection of riparian and wetland habitats, and endangered plant species, and bald eagle roosting sites.

1. River Tracts SMA
2. Aztec Gilia ACEC
3. Bald Eagle ACEC

C. The following prehistoric or historic cultural sites will have a NSO stipulation attached to new leases issued within them for the protection of cultural values:

1. Adam's Canyon Site
2. Adolfo Canyon Site
3. Angel Peak ACEC
4. Cagle's Site
5. Canyon View Ruin
6. Casa Mesa Diablo
7. Casamero Community ACEC
8. Christmas Tree Ruin ACEC
9. Compressor Station Ruin
10. Delgadito Pueblito
11. East Side Rincon Site
12. Farmer's Arroyo Site
13. Foothold & Overlook Ruins District
14. Frances Ruin ACEC
15. Gobernador Knob
16. Gomez Canyon Ruin
17. Gomez Point Site

18. Halfway House ACEC
19. Hill Road Ruin
20. Holmes Group
21. Hooded Fireplace & Largo School District ACEC
22. Kin Nizhoni
23. Kin Yazhi
24. Pierre's Site ACEC
25. Pointed Butte Ruin
26. Prieta Mesa Site
27. Rincon Largo District
28. Rincon Rockshelter
29. Romine Canyon Ruin
30. Salt Point ACEC
31. Shepard Site
32. Simon Ruin
33. Tapacito and Split Rock District ACEC
34. Twin Angels ACEC
35. Unreachable Rockshelter

IV. NO LEASE AREAS (NL)

A. This section lists discretionary and non-discretionary closures within the resource area:

1. Carracas Mesa SMA
2. Chacra Mesa Complex and ACEC
3. Crow Canyon District ACEC
4. Huerfano Mesa
5. Negro Canyon

6. Reese Canyon Research Natural Area
7. San Rafael Canyon ACEC
8. Simon Canyon Recreation Area and ACEC
9. The Hogback ACEC
10. Thomas Canyon SMA
11. Angel Peak ACEC
12. Bisti Wilderness
13. De-na-Zin Wilderness
14. Ah-shi-sle-pah WSA
15. Fossil Forest RNA
16. Cities and Towns

Rio Puerco Resource Area

- I. TIMING LIMITATION STIPULATION (TL)^{1/}
 - A. Elk Springs ACEC: Protection of elk and deer winter range, and recreational and scenic values. (November 16 - May 14)
 - B. San Luis Mesa Raptor Area ACEC: Protection of raptor nesting habitat (February 1 - July 1)
 - C. Canon Jarido SMA: Protection of recreational, wildlife and cultural values. (February 1 - July 1)
 - D. Ignacio Chavez SMA: Protection of recreational, scenic, wildlife and forestry values and uses. (November 16 - May 14)
 - E. Tent Rocks SMA: Protection of wildlife values. (November 16 - May 14)

F. Tent Rocks ACEC: Protection of natural, scenic and recreational values and uses.

II. CONTROLLED SURFACE USE STIPULATION (CSU)^{1/}

The following SMAs/ACECs or areas of special concern will have a CSU stipulation attached to leases issued within them for the protection of cultural values:

1. Guadalupe Ruin and Community SMA
2. Headcut Prehistoric Community SMA
3. Pronoun Cave Complex ACEC: Protection of paleontological, cultural and recreational values.
4. Torrejon Fossil Fauna ACEC: Protection of paleontological values.
5. Canon Jarido SMA: Protection of recreational, wildlife and cultural values.
6. Continental Divide Trail SMA: Protection of recreational values.
7. Ignacio Chavez SMA: Protection of recreational, scenic, wildlife and forestry values and uses.
8. Ojito ACEC: Protection of scenic, natural, and cultural values.
9. Petaca Pinta SMA: Protection of recreational, scenic and wildlife values.
10. Tent Rocks SMA: Protection of wildlife values.

^{1/}Several areas may have both the timing limitation and control surface use stipulations applied. These areas are shown in both categories.

11. Tent Rocks ACEC: Protection of natural, scenic and recreational values and uses.

12. 1870's Wagon Road Trail SMA: Protection of recreational values.

13. Historic Homesteads SMA: Protection of recreational and cultural values and uses.

14. San Luis Cliffs Window (ROW): Restrict pipeline, transmission line, and road development within identified corridors or windows.

15. Ojito East Window (ROW): Restrict pipeline, transmission line, and road development within identified corridors or windows.

16. Elk Springs ACEC: Protection of elk and deer winter range and recreational and scenic values.

17. San Luis Mesa Raptor Area ACEC: Protection of raptor nesting habitat.

III. NO SURFACE OCCUPANCY STIPULATION (NSO)

A. The following areas will have NSO stipulations appended to leases issued within them for the protection of cultural resource values:

1. Big Bead Meas SMA: Protection of over 90 cultural sites and features which are located in several clusters. Throughout the SMA. (311a.)

2. Canon Tapia ACEC: Protection of prehistoric rock art sites and natural features. (1093a.)

3. Guadalupe Ruin and Community SMA - Fenced Area:

Protection of prehistoric Chacoan outlier enclosed within a 40-acre fenced area. (40.)

4. Jones Canyon ACEC: Protection of prehistoric Pueblo masonry sites, and riparian and wildlife resources. (649a.)

B. The following areas will have NSO stipulations appended to leases issued within them for the protection of special purpose facilities and uses:

1. Cuba Airport (120a.)

2. Double Eagle Airport (1400a.)

3. Shooting Range State Park (1697a.)

4. Village of Milan (480a.)

5. Azabache Station SMA: Protection of a historical site which offers important rural architecture information of New Mexico's territorial period. (80a.)

6. Querencia Watershed Study Area: Protection of an important watershed area which is part of the Rio Puerco Hydrology Study. (58a.)

7. Bluewater Canyon ACEC: Protection of wildlife, scenic, and recreational values located within and adjacent to a steep-walled canyon system. (89a.)

8. Las Milpas Gas Storage Area

IV. NO LEASE AREAS

This section lists discretionary and non-discretionary closures within the resource area.

1. Cabezón WSA

2. Cabezón Peak ACEC

3. Empedrado WSA

4. Chamisa WSA
5. Ignacio Chavez WSA
6. La Lena WSA
7. Manzano WSA
8. Ojito WSA
9. Petaca Pinta WSA
10. Ball Ranch ACEC
11. Pelon Watershed SMA
12. Juana Lopez Research Natural Area
13. Empedrado Watershed Study Area
14. El Malpais National Conservation Area
 - a. West Malpais WA
 - b. Cebolla WA
 - c. Chain of Craters WSA
 - d. Conservation Unit

- B. Fun Valley SMA: Protection of recreational, paleontological, and cultural resource values.
- C. Warm Springs SMA: Protection of big game winter range, aquatic habitats, and recreational and scenic values.
- D. Sabinoso SMA: Protection of wildlife, riparian, and scenic values.
- E. Black Mesa SMA: Protection of T/E plant species.
- F. Riparian/Aquatic Areas: Protection of riparian and associated watershed areas.
- G. Ojo Caliente ACEC: Protection of prehistoric and historic cultural sites.
- H. Sombrillo ACEC: Protection of paleontological and cultural values.
- I. Orilla Verde Recreation Area: Protection of a developed recreation area.

III. NO SURFACE OCCUPANCY (NSO)

A. The following SMAs/ACECs will have an NSO stipulation attached to leases issued within them for the protection of cultural, wildlife, and recreational values and uses.

1. Wild Rivers Recreation Area SMA: Protection of recreation area adjacent to Rio Grande Wild and Scenic River.^{2/}
2. Guadalupe Mountain ACEC: Protection of wildlife, cultural and scenic values.
3. Santa Cruz Lake Recreation Area SMA: Protection of recreation, cultural, and riparian and aquatic values.

Taos Resource Area

- I. TIMING LIMITATION STIPULATION (TL)

San Antonio Winter Range ACEC: Protection of elk, deer, and pronghorn antelope winter ranges (December 1 - June 15).
- II. CONTROLLED SURFACE USE (CSU)
 - A. San Antonio SMA: Protection of wildlife habitat areas and scenic values.

^{2/}This area is within the boundary of the legislatively proposed Rio Grande del Norte National Conservation Area. This RMP Amendment/EIS does not consider this proposal.

4. San Antonio ACEC:
Protection of wildlife, natural,
and scenic values.

5. Agua Caliente ACEC:
Protection of riparian and
important wildlife habitat areas.

6. Embudo Canyon ACEC:
Protection of scenic, natural, and
recreation resource values.

B. The following SMAs/ACECs will
have an NSO stipulation attached to
leases issued within them for the
protection of cultural values:

1. Embudo Canyon ACEC
2. Sahiu Pueblo SMA
3. Ku Pueblo SMA
4. Ojo Del Zorro Pueblo SMA
5. Pueblo Quemado SMA
6. La Caja Pueblo SMA
7. Pueblo Sarco SMA
8. La Cienega Mesa SMA

9. San Lazaro SMA

10. Lower Embudo SMA

IV. NO LEASE AREAS

This section lists discretionary and
non-discretionary closures within the
resource area.

1. Wild Rivers Recreation Area
(portion withdrawn from mineral
entry)

2. Racecourse ACEC

3. San Antonio WSA

4. Rio Chama SMA

5. Rio Chama Wild & Scenic

6. Rio Chama WSA

7. Sabinoso WSA

8. Rio Grande Wild & Scenic
("Recreation" designation)

**SUMMARY OF
OTHER SURFACE MANAGING AGENCIES'
LEASE STIPULATIONS**

Controlled Surface Use

1. Corps of Engineers, Conchas Dam and Reservoir: Protection of special purpose facilities and uses on 640 ac. COE reserves the right to apply site specific stipulations developed on a case-by-case basis.

2. Department of Army, Fort Wingate: Protection of special purpose facilities and uses on 22, 187 ac. Dept. of Army reserves the right to apply site specific stipulations developed on a case-by-case basis.

3. Bureau of Reclamation, Navajo Dam Project: Protection of special purpose

facilities and uses on 21, 190 ac. BOR reserves the right to apply site specific stipulations in connection with mineral development.

Closed to Leasing

1. Corps of Engineers, Abiquiu Dam, 507 ac.

2. Corps of Engineers, Jemez Dam, 2204 ac.

3. Department of Energy and Department of the Air Force, Sandia Base, 26,201 ac.

**CORPS OF ENGINEERS
SPECIAL STIPULATIONS**

1. There shall be no surface disturbance without prior approval from the District Engineer.

2. The Secretary of the Army or designee reserves the right to require suspension of operations in a national emergency or if the Army needs the lease area for admission that is not compatible with lease operations. Use of this right will have prior MACOM concurrence. On approval from higher authority, the installation commander for military property or the project manager for civil works property will give the lessee written notice, or when time permits, request the BLM to give notice of the requirement to suspend operations. Copies of this notice must be simultaneously provided to the MACOM; HQDA(DAEN-REM), WASH DC 20314; the appropriate district commander; the operator; and the BLM. The lessee and the operator agree to this condition and waive the right to compensation for its exercise.

3. If the installation commander (military or project manager (civil work) finds an imminent danger to safety or security, the installation commander or the project manager may order an immediate stop of such activities. The regional direction of BLM; the MACOM; HQDA (DAEM-REM), WASH DC 20314; the appropriate district commander; and the lessee will be notified immediately. On receipt of the notice, the regional director will review the order and determine the need for other remedial action.

4. The operator will immediately stop work if contamination is found in the operating area and ask the installation commander for help.

5. The lessee shall be required to obtain specific approval from the District Engineer for all drilling and/or seismographic operations and location of any

proposed wells, roads, pipelines, fences or other installations.

6. All areas within 2,000 feet of any major structure, including but not limited to the dam, spillway, or embankment are restricted areas. The lessee, his operators, agents, or employees shall not utilize the surface of restricted areas for any purpose. Drilling operations in, on, or under the restricted areas, including drilling outside of the restricted areas which would cause a bore hole to be under the restricted areas, will not be permitted. The restricted areas are included in the lease for the sole purpose of becoming a part of a drilling unit so that the United States will share in the royalty of the unit.

7. All existing or proposed public use areas, recreation areas, wildlife and waterfowl refuges, historical sites, and hiking and horseback trail areas may be leased for the sole purpose of becoming a part of a drilling unit. The lessee, his operators, agents or employees will not use or enter upon the surface for any purpose. Directional drilling from non-public use areas is permitted if not otherwise restricted.

8. No drilling will be permitted from Government-owned surface where alternate surface use is available within the same drilling unit.

9. The oil and gas lessee will be liable for pollution or other damages, as a result of their operations, to Government-owned lands and property and to the property of the Government's authorized surface user.

10. All storage tanks and slush pits will be protected by dikes of sufficient capacity to protect the reservoir from pollution to flood pool elevation _
_ feet National Geodetic Vertical Datum.

11. That it is understood that this instrument is effective only insofar as the rights of the United States in the said property are concerned; and that the lessee shall obtain such permission as may be necessary on account of any other existing rights. It is further understood that the Government does not warrant title or the accuracy of the descriptions provided in the lease.

12. If oil and gas activity results in the deposition of fill material, i.e., levees, berms, or drilling mud, in a wetland, then a 404 permit must be obtained by the lessee prior to beginning work.

13. The Secretary of the Army or designee reserves the right to require cessation of operations if a national emergency arises or if the Army needs the leased premises for a mission incompatible with lease operations. On approval from higher authority, the Commander will give the Lessee written notice or, if time permits, request the BLM to give notice of the required cessation. The Lessee understands the lease rights granted by this instrument do not include the period of any such

cessations and the United States has no obligation to compensate the Lessee for damages (including contractual losses) resulting from the exercise of this stipulation. The Lessee shall include this stipulation in contracts with third parties to supply oil and gas. This stipulation shall not affect the Lessee's right to seek suspension of the lease term from the BLM. Whether or not a suspension is granted will have no effect on cessation of operations as stipulated herein.

14. If the Commander or the authorized representative discovers an imminent danger to safety or security which allows no time to consult the BLM, that person may order such activities stopped immediately. The authorized officer of the BLM shall review the order and determine the need for further remedial action.

15. If military contamination is found in the operating area, the operator shall immediately stop work, leave the area, notify the Commander, and not return until the Commander advises that it is safe to return.

BUREAU OF RECLAMATION
SPECIAL OIL AND GAS STIPULATIONS

Note: "X" means Stipulation applies.

___ 1. Lessee agrees to provide written notice to the Bureau of Reclamation 15 days prior to any and all intended surface activities in connection with exploration, drilling or any other activity associated with, or leading to, oil and gas production (including seismic activity) on any lands which the Bureau of Reclamation has jurisdiction as the Surface Managing Agency.

___ 2. Lessee agrees that there will be no surface occupancy within 1,500 horizontal feet of _____ Dam. This stipulation is to ensure the integrity of the structure.

___ 3. Lessee agrees that there will be no surface occupancy within 500 horizontal feet of the maximum water surface elevation of _____ Reservoir (maximum water surface elevation is _____ feet above mean sea level). This stipulation is to minimize the possibility of pollution and interference with the operation and maintenance of the Reservoir.

___ 4. Lessee agrees that there will be no surface occupancy within 200 horizontal feet of the centerline of any constructed or proposed Bureau of Reclamation tunnel, canal, aqueduct, pipeline, lateral, drain, transmission lines, telephone lines, and roadways, under the administration or jurisdiction of the Bureau of Reclamation. Also, O&M roads will not be used for access without prior approval of Bureau of Reclamation.

___ 5. Lessee agrees that there will be no surface occupancy within 500 horizontal feet of any improved campground facility.

___ 6. Lessee agrees to locate production facilities so that they will not be seen by the general public using the Reservoir or campground areas.

To insure against the contamination of the waters of the _____ Reservoir, Navajo Unit, Colorado River Storage Project, State of _____, the lessee agrees that the following further conditions shall apply to all drilling and operations on lands covered by this lease, which lie within the flowage or drainage area of the _____ Reservoir, as such, aarea is defined by the Bureau of Reclamation.

1. The drilling sites for any and all wells shall be approved by the Superintendent, Bureau of Reclamation, _____ before drilling begins. Sites for the construction of pipe-line rights-of-way or other authorized facilities shall also be approved by the Superintendent before construction begins.

2. All drilling or operation methods or equipment shall, before their employment, be inspected and approved by the _____, and by the Supervisor of the U.S. Geological Survey having jurisdiction over the area.

NAVAJO AREA, BUREAU OF INDIAN AFFAIRS
STIPULATIONS FOR FEDERAL OIL AND GAS LEASE OFFERING
AUGUST 1990

1. Lessee shall carry on all operations in a good and workmanlike manner in accordance with approved methods and practices.
2. Lessee shall abide by and conform to appropriate provisions of Titles 25, 36, and 43, Code of Federal Regulations, and any and all other applicable regulations and manuals of the Secretary now or hereafter in force relative to surface leasing, rights-of-way and oil and gas leases (including the National Environmental Protection Act, as amended, and National Area Environmental Protection guidelines; the National Historic Preservation Act of 1966, as amended, and Archaeological Resources Protection Act, hereinafter referred to as NEPA, NHPA, ARPA and other applicable laws, 36 CFR 800 and 43 CFR 7.)

a. "Prior to issuing any cultural clearances, the Lessee shall provide the necessary cultural clearances to the BLM after consultation with the Navajo Nation Historic Preservation Department, P.O. Box 2898, Window Rock, AZ 86515, and provide copies of all historic preservation related documents associated with an undertaking. The Navajo Nation contracted under Public Law 93-638 the Navajo Area Archaeology Office."

b. Prior to entry upon the land or the disturbance of the surface thereof for drilling or other purposes, Lessee shall submit a development plan for surface use to the Area Manager, Farmington Resource Area, Bureau of Land Management, 1235 La Plata Highway, Farmington, NM 87401. An Environmental Analysis will be made by the Bureau of Land Management in consultation with the BIA Navajo Area Office for the purpose of ensuring environment and existing improvements, and for assuring timely reclamation of disturbed lands. Upon completion of said environmental analysis, the Oil and Gas District

Management shall notify Lessee of the conditions to which the proposed surface disturbing operations will be subject. (NOTE: *Prior to operations beginning, Lessee shall furnish a copy of its development plan and Bureau of Land Management conditions to the BIA. The BIA reserves the right to require site specific archaeological surveys and environmental reviews on tracts selected for development prior to giving concurrence to proposed action(s). The BIA will consult with the Navajo Nation prior to concurring in such actions.*)

c. The Lessee shall not use or permit to be used any part of said leased land for any unlawful conduct or purpose whatsoever. Lessee will not use or permit to be used any part of said leased land for the manufacture, sale, gift, transportation, or storage of intoxicating liquors, beverages or drugs. In the event any representative of Lessee or its contractor or subcontractor, employed in connection with the operations on the lease premises shall be responsible for any of the unlawful acts described in this clause, Bureau of Land Management shall give Lessee information as to such violation(s) with a copy of the notice to BIA and the Navajo Nation. Lessee shall immediately take steps to cure the violation, including the termination or transfer of such employee (25 CFR 162.5(g)(3); 18 U.S.C. Sections 1151, 1154 and 1156, as amended).

4. Except as otherwise stated herein, copies of correspondence and notices shall be mailed to the Bureau of Indian Affairs in care of the Area Director, Navajo Area Office, Attention: Branch of Real Property Management, Bureau of Indian Affairs, P. O. Box M, Window Rock, Az 87515-0714 and to the Navajo Nation in care of the Chairman, Navajo Tribal Council, Attention: Navajo Tribal Minerals Department, P. O. Box 146, Window Rock, AZ 86515.

NAVAJO NATION STIPULATIONS

1. The surface ownership of lands contained in this lease may be all or partly managed by the Navajo Tribe. Site specific rights-of-way clearances and/or inventories may be required prior to entry upon the surface for operation of the lease holdings. Prior contact with the Navajo Nation will be required prior to operations beginning. All applicable laws of the Navajo Nation shall be complied with by the Lessee.

2. The Navajo Nation requires a copy of complete exploration and development data (drilling logs, seismic data, etc.) obtained by the Lessee on the subject lands. This copy will be provided to the Navajo Nation at no cost. All materials data will be held confidential as described in 43 CFR 3162.8.

3. Navajo grazing rights to the surface of the lands so leased shall be protected, and the Nation's rights respecting the use of water shall be unimpaired.

4. Lessee shall not obtain water for use in drilling from Indian-owed wells, tanks, springs, or stockwater reservoirs without prior written permission from the Navajo Nation. Lessee shall not drill any water wells for its use without prior written consent of the Navajo Nation and the Area Director.

5. Lessee shall compensate the Navajo Nation and its grazing permittees (if any), for all surface

use(s) as well as damages to crops, buildings, and other improvements of surface landowner, including loss of grazing lands, occasioned by the Lessee's operations except that the Lessee shall not be held responsible for casualties occasioned by causes beyond the Lessee's control. Compensation for surface use shall be negotiated by Lessee and the Navajo Nation and will be based upon the duration of activity on the land.

6. Lessee shall not drill any well within 500 feet of any house, structure or reservoir unless other managements are made with the Navajo Nation.

7. Lessee shall bury all pipelines crossing tillable lands below plow depth unless other arrangements are made with the Navajo Nation.

8. Upon the request of the Navajo Nation or if so required by the Area Director or his authorized representative, and under the direction of the District Manager, Bureau of Land Management, the Lessee shall condition any well drilled which does not produce oil or gas in paying quantities, but which is capable of producing water satisfactorily for domestic, agricultural, or livestock use by the Navajo Nation. Otherwise, after the expiration or termination of the lease, the Lessee shall remove all pumping equipment installed by Lessee at any well.

APPENDIX B-3

CONDITIONS OF APPROVAL (COAs)
COMMON TO ALL ALTERNATIVES

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Restrictions applied to oil and gas development activities by Federal regulation are based on applicable laws and Section 6 of Offer to Lease and Lease for Oil and Gas, Form 3100-11b (Appendix A), and are found in Code of Federal Regulations (CFR), Part 43 Subpart 3160. These regulations give the Authorized Officer authority to determine how field operations are conducted. Because Federal regulation makes these requirements mandatory, they are not repeated as lease stipulations. Lease stipulations (addressed in this amendment) are applied to new leases, not to existing leases. Analysis of impacts has taken existing leases into account.

Once impacts from oil and gas development have been identified and mitigative measures developed, mitigation of field operations is accomplished by appending the mitigative requirement to the operational field application

or permit, i.e. Application for Permit to Drill, Right-of-Way Permit or Notice of Intent to Conduct Geophysical Exploration. In this amendment, mitigative requirements are referred to as Conditions of Approval (COAs).

The COAs for post-lease operations listed in this appendix represent post-lease environmental protection to which the BLM is committed as a result of the analysis in this amendment. The mitigative measures apply to all oil and gas exploration and development activities and associated rights-of-way for all alternatives.

The Authorized Officer is not limited to the sample COAs shown here, but may develop others as unforeseen impacts occur so long as the new COAs conform with the limitations of the granted lease rights and the guidance set forth in existing RMPs and this amendment.

I. EXAMPLE OF CONDITIONS OF APPROVAL ATTACHED TO APDs

Operator _____ Well Name _____

Legal Location _____ Sec. ____ T. _____ R. _____

Lease Number _____ Field Inspection Date _____

1. The following conditions of approval apply to this well unless a particular Surface Managing Agency or private surface owner has supplied to the BLM and the operator a contradictory environmental stipulation. The failure of the operator to comply with these requirements may result in assessments of or penalties pursuant to 43 CFR 3163.1. A copy of these conditions or approval shall be present on the location during construction, drilling and reclamation activity.

An agreement between the operator and fee landowner will take precedence over BLM surface stipulations unless (1) the BLM determines that the operator's actions will affect adjacent Federal or Indian surface; or (2) the operator does not maintain the well area and lease premises in a workmanlike manner with due regard for safety, conservation and appearance; or (3) no such agreement exists; or (4) in the event of well abandonment, minimal Federal restoration requirements will be required.

2. The Approval of this action does not grant or imply approval of any off-lease or off-unit action. It is the responsibility of the applicant to obtain any such approvals from the appropriate surface management agency, including BLM, and/or any private landowners.

3. The operator or their contractor will contact the appropriate BLM Resource Area Office, approximately 48 hours prior to construction activities or upon site completion prior to moving on drilling rig.

4. No construction, drilling or completion activities shall be conducted between
_____ November 1 and March 31 because of eagle wintering habitat.
_____ December 1 and March 31 because of deer/elk wintering habitat.
_____ March 1 to June 30 because of active raptor nesting.
_____ May 1 to July 15 because of antelope fawning.

5. A _____ (ft.) tree screen will be let on the _____ sides of the location.

6. The top _____ inches of soil material will be stripped and stock-piled on the _____ side of the location for future reclamation.

7. Pits and/or pad will be constructed long and narrow, or to conform to natural contour of terrain, so as to avoid the _____ and the hazard of pit failure.

8. Pits will be lined with an impervious material at least 8 mil thick.

9. Earthen berm(s) will be placed on the _____ side(s) of the location between the reserve pit and the wash.

10. The _____ corner of the well pad will be rounded off to avoid _____.

11. The wash shall be diverted around the _____ side of the well pad.

12. Diversion ditch(es) will be constructed on the _____ side of the location above/below (circle one) the cut slope, draining to the _____.

13. A culvert of sufficient size (minimum 18") will be placed where the drainage crosses the access road.

14. The proposed access road shall utilize the upgraded 2-track trail approximately _____ (ft. or mi.) as agreed upon during on-site inspection. Remainder of planned access road will follow flagged route.

15. The access road shall be rerouted around the _____ edge of the well pad during construction and drilling activities for safety reasons. Upon completion of drilling and cleanup, the road will be returned to its original alignment.

16. The final cut slope shall not exceed a _____ ratio. The final fill slope shall not exceed a _____ ratio. To obtain this ratio, pits and slopes shall be backsloped into the pad upon completion of drilling and prior to setting production equipment. Construction slopes can be much steeper during drilling, but will be contoured to the above final slopes upon reclamation.

17. Paint color _____ seed mix _____ (seed mix to be inserted here).

Hand seeding with hydro-mulch, excelsior netting and/or mulch with netting

_____ required on _____ slopes. Mulch should be grass or straw spread at 2,000 to 3,000 lbs/acre (or 1-2 inches).

Pure Live Seed (PLS) = Germination X Purity.
Recommended Seed Mixture (PLS) for BLM administered lands is for the hand seeding rate. For drilled seed, the PLS rate may be cut in half.

a. Seed Mix No. 1 -- BLM

Crested Wheatgrass	2
Smooth Brome	1
Fourwing Saltbush (dewinged)	1

Nomad Alfalfa	2
Indian Ricegrass	1
Western Wheatgrass	2

b. Seed Mix No. 2 -- BLM

Crested Wheatgrass	3
Fourwing Saltbush (dewinged)	2
Sand Dropseed*	1/2
Indian Ricegrass	2
Western Wheatgrass	2

*Sand Dropseed should be hand seeded prior to drilling the above mixture.

c. Seed Mix No. 3 -- BLM

Fourwing Saltbush (dewinged)	2
Shadscale	2
Alkali Sacaton*	1
Indian Ricegrass	1

*Alkali Sacaton should be hand seeded prior to drilling the above mixture.

d. Seed Mix No. 4 -- NIIP

Indian Ricegrass	1
Sand Dropseed	1
Galleta	2

e. Seed Mix No. 5 -- NIIP

Alkali Sacaton	1
Sand Dropseed	1
Galleta	2

f. Seed Mix No. 6 -- BIA (Crownpoint)

Crested Wheatgrass	3
Alkali Sacaton	1/2
Sand Dropseed	1/2
Pubescent Wheatgrass	2
Indian Ricegrass	2

g. Seed Mix No. 7 -- Forest Service No. 3

Crested Wheatgrass	4
Pubescent Wheatgrass	6
Burnet	1
Ladak Alfalfa	1
Perennial Rye	2

h. Seed Mix No. 8 -- Forest Service #4

Pubescent Wheatgrass	6
Ladak Alfalfa	1
Perennial Rye	2

Sand Dropseed	1
Indian Ricegrass	½

i. Seed Mix No. 9 -- Forest Service (Cuba)

Pubescent Wheatgrass	6
Burnet	1
Ladak Alfalfa	½
Perennial Rye	2
Western Wheatgrass (Arriba Variety)	4

j. Seed Mix No. 10 -- Forest Service (Cuba)

Pubescent Wheatgrass	
Burnet	
Ladak Alfalfa	
Perennial Rye	
Sand Dropseed	
Indian Ricegrass	
Western Wheatgrass (Arriba Variety)	

k. Seed Mix No. 11 (Jicarilla)

Pubescent Wheatgrass	4
Intermediate Wheatgrass	4
Western Wheatgrass	4
Smooth Brome	2
Yellow Clover	½

18. No hardwood tree with a diameter of ten inches or more at the base or any Ponderosa pine, Douglas-fir or aspen tree is to be removed or damaged without approval from the Authorized Officer.

19. If in the conduct of operations, paleontological materials (fossils) are observed, lessee shall immediately contact the BLM. Lessee shall cease any operations that would result in the destruction of such objects. The results of further investigation will dictate site specific stipulations for avoidance or salvage of any potentially significant paleontological resources.

20. Noise mitigation is required for this site, and will include quiet design mufflers, acoustic covers, acoustically insulated buildings, and muffler discharge direction to the _____.

21. Off-site mitigation will be required, and is attached.

22. No well and/or production equipment within the irrigable fields of the Navajo Indian Irrigation Project will exceed two feet above the natural ground surface elevation, and will be adequately barricaded for safety.

23. Location and Access Road

A. Well area and lease premises will be maintained in a workmanlike manner with due regard to safety, conservation and appearance. All liquid waste, completion fluids and drilling products associated with oil and gas operations will be contained and then buried in place, or removed and deposited in an approved disposal site. Trash cages will be used for all solid waste and removed from the location to an approved solid waste disposal site. No solid waste shall be put in the reserve pit before, during or after drilling operations.

B. Pinon-juniper trees and brush will be uprooted from road rights-of-way and well pad locations and distributed along the rights-of-way and stockpiled beside the well pads for fuel wood salvage. Care will be taken to keep the trees as undamaged as practically possible. Large vegetation such as sagebrush, juniper and pinon will not be incorporated into the pit walls. All uprooted vegetation will be scattered on the reclaimed portion of the location so it does not detract from the natural appearance of the area.

C. Surface disturbance and vehicular traffic will be limited to the approved location and approved access road.

D. Mud pits and blow pits will be constructed so as not to leak, break, or allow discharge of liquids or produced solids. At least half of the capacity of the reserve pit must be in cut. The top of the outside wall of the reserve pit should be

smooth-off with a minimum of one blade of width. The pit should have adequate capacity to maintain 2 feet of free board. Pits are not to be located in natural drainages. Pit walls are to be "walked down" by a crawler-type tractor following construction and prior to usage. Any plastic material used to line pits must be removed to below-ground level before pits are covered. The final grade of the reserve pit (after reclamation) shall allow for drainage away from the pit area.

E. All unguarded pits (reserve, production and blow pits) containing liquids will be fenced with woven wire. Drilling pits will be fenced on three sides and once the rig leaves the location, the fourth side will be fenced. All fencing must be a legal fence in accordance with New Mexico State Law. Liquids in pits will be allowed to evaporate, or be properly disposed of, before pits are filled and recontoured. (This office will be notified 24 hours prior to fluid hauling). Under no circumstances will pits be cut and drained. Aeration of pit fluids must be confined within the pit area.

F. No gravel or other related minerals from new or existing pits on Federal land will be used in construction of roads, well sites, etc., without prior approval from the Surface Managing Agency.

G. Prior to crossing, using or paralleling any improvement on the public land, the operator shall contact the owner of the improvement to obtain mitigating measures to prevent damage to the improvements.

H. All cut fences are to be tied to the braces prior to cutting. The opening will be protected as necessary during construction to prevent the escape of livestock. A temporary closure will be installed on all cut fences the same day the fence is cut. A permanent cattle guard will be installed and maintained in any cut fence unless otherwise stipulated in writing. A twelve-foot gate will be installed adjacent to all new cattle guards.

I. Berms or fire walls will be constructed around all storage facilities sufficient in size to contain the storage capacity of the tanks, or the combined capacity of tanks if a rupture could drain more than one tank.

J. All roads on public land must be maintained in a good passable condition.

K. A proposed use of pesticide, herbicide or other possible hazardous chemical on Bureau of Land Management land shall be cleared for use prior to application.

24. Cultural Resources (Archeology)

A. EMERGENCY DISCOVERY IN THE ABSENCE OF MONITORING: This stipulation applies in emergency discovery situations where monitoring for cultural resources was not being performed because the presence of cultural resources could not have been anticipated. If, in its operations, _____ discovers any historic or prehistoric ruin, monument, or site, or any object of antiquity subject to the Antiquities Act of 1979, and 43 CFR Part 3, then work will be suspended and the discovery promptly reported to the BLM Area Manager. The BLM will then specify what action is to be taken. The BLM will evaluate the discovery, evaluate its significance, and consult with the State Historic Preservation Officer. Minor recordation, stabilization, or data recovery may be performed by the BLM. However, more significant mitigation shall be carried out by a qualified, permitted archeologist. It is BLM's responsibility to ensure that such mitigation is carried out in accordance with 36 CFR Part 800.11. Given the timeframe involved in the BLM's budgeting process, operators are strongly encouraged to fund such required mitigation. Further damage to significant cultural resources and operations in its vicinity will not be allowed until any required mitigation is successfully completed.

B. DISCOVERY OF CULTURAL RESOURCES DURING MONITORING: This stipulation applies to situations where archeological monitoring was taking place because local geologic conditions favored the presence of subsurface archeological sites in the project area. If monitoring confirms the presence of subsurface sites, all work will cease in the site area. The monitor will immediately report this find to the BLM Area Manager. The BLM will specify what further steps must be taken to assess the damage to

the site and to mitigate any adverse effects to it. Monitoring in these circumstances is considered to be a form of inventory and the operator will be responsible for obtaining at his/her expense a qualified permitted archeologist to complete a damage assessment report and to carry out any mitigation required by the BLM.

C. DAMAGE TO PREVIOUSLY IDENTIFIED SITE: This stipulation applies to situations where operations have damaged a previously identified archeologist site that was visible on the surface. If, in its operations, _____ damages, or is found to have damaged, any historic or prehistoric ruin, monument, or site, or any object of antiquity subject to the Antiquities Act of 1906, the Archeological Resource Protection Act of 1979, and 32 CFR Part 3, the grantee will prepare and implement a data recovery plan at his/her expense. The grantee will obtain at his/her expense, a qualified permitted archeologist to carry out the specific instruction of the BLM.

25. Reseeding and Abandonment

A. All surface areas disturbed during drilling activities and not in use for production activities, will be reseeded the first July-September period after the reserve pit has been filled in and/or location abandoned. For producing locations, this should occur in the first 12 months after drilling is completed.

B. After the top soil has been placed on the location, compacted areas of the well pad will be plowed or ripped to a depth of 12" before reseeded. The surface should be left rough to help retain rain fall. All seeding is recommended to be done between July 1 and September 15. Seeding will be done with a disc-type drill with two boxes for various seed sizes. The drill rows will be eight to ten inches apart. The seed will be planted between one-half inch deep and three quarter inch deep. The seeder will be followed with a drag, packer or roller to insure uniform coverage of the seed, and adequate compaction. Drilling of the seed will be done on the contour where possible. Where slopes are too steep for contour drilling a "cyclone" hand-seeder or similar broadcast seeder will be used, after preparation of an adequate seed

bed. Seed will then be covered to a depth described above by whatever means is practical. Mulching, excelsior netting and/or netting may be required on steep slopes.

C. After seeding remaining rocks and vegetation (trees, brush, etc.) should be placed on the seeded areas using back hoes or rubber tired front-end loaders.

D. If, in the opinion of the surface management agency, the seeding is unsuccessful, the lessee/operator may be required to make subsequent seedings.

E. If, upon abandonment of wells, the retention of access road is not considered necessary for the management and multiple use of the natural resources, it will be ripped a minimum of 12" in depth. After ripping, water bars will be installed. All ripped surfaces are to be protected from vehicular travel by construction of a dead-end ditch and earthen barricade at the entrance to these ripped areas. (Reseeding of the affected areas may be required).

26. STIPULATIONS FOR FENCING

A. A 12' gate must be installed between the cattle guard and brace assemblies on whichever side of the cattle guard is most convenient. If the gate is made of wire it must have at least four horizontal strands of barb wire, with at least four 3" diameter vertical wood stays evenly spaced. When the gate is closed the wires must be taut.

B. Cattle guards must be at least 8' wide, the length is left to the discretion of the operator. They must be set on concrete or pressure treated wood bases. All cattle guards must have wings installed on both ends. (If you will install the bases at least 12" above the surrounding contour, and provide drainage through the open area under the cattle guard, you will not have to clean them so often).

C. All cattle guards must have clearly visible identification marks welded into them indicating the ownership, well name and number associated with the cattle guard.

**II. EXAMPLE OF CONDITIONS OF APPROVAL ATTACHED TO
NOTICE OF INTENT TO CONDUCT GEOPHYSICAL EXPLORATION**

**PRACTICES TO BE FOLLOWED DURING GEOPHYSICAL EXPLORATION OPERATIONS
ON PUBLIC LANDS IN NEW MEXICO**

Name of Company Filing the Notice of Intent / Address and Telephone Number

Name and Telephone Number of Seismic Company / Name of Subcontracting Company / Party Chief

1. The operator will furnish a map with the "Notice of Intent" showing approximate line to be used. A map shall be filed with the "Notice of Completion" showing the completed line. The map should be of a minimum scale of one-half (1/2) inch equals one (1) mile.

2. No blading or other dirt work will be allowed without written permission (Permit for Use of Earthmoving Equipment During Geophysical Exploration Operations on Public Lands in New Mexico, Form NM-3045-1) from the Area Manager.

3. All disturbed areas will be reseeded as directed by the Area Manager. Adequate vegetative cover will be established. Adequate cover will be determined through soil testing, vegetative density guides, etc.

4. Reclamation of disturbed areas is to be done concurrent with the geophysical operations insofar as possible. Seeding shall be done as directed by the Area Manager.

5. No trees will be removed or damaged without specific approval from the Area Manager. All merchantable timber shall be purchased by the operator at the total appraised price that is determined by the BLM.

6. Blasting or vibrating within one-eighth (1/8) mile of Federally owned or controlled springs and flowing water wells must be approved in writing by

the Area Manager.

7. The following practices shall be followed to protect cultural resources.

a. All cultural resource surveys must be carried out by a BLM permitted or approved Archeologist.

b. The cultural resource survey report shall be approved by the BLM Area Manager before the seismic operation is carried out. Subsequent mitigation by avoidance or special stipulations may be formulated after the survey report is reviewed and approved by the BLM. The survey report shall be submitted in a timely manner following completion of archeological field work. The BLM will review the submitted cultural resource survey report expeditiously, since applicable geophysical regulations do not provide any set time frame for approval of operations.

c. Site recordation, inventory reports, and any required data recovery reports shall conform to the "New Mexico Bureau of Land Management Standards for Completing Laboratory of anthropology, Museum of New Mexico, Archaeological Site Survey Forms;" "New Mexico Bureau of Land Management Standards for Completing Cultural Resource Inventory Reports;" individual Area or District standards for completing inventory reports; and/or "New Mexico Bureau of Land Management Standards for Data Recovery Projects" as applicable.

d. Where a Class III cultural survey has been determined to be necessary by the Bureau, it will cover 50 feet on either side of the center line or at least 25 feet beyond the limits of vehicular activities/surface disturbance created by projects which affect more than a 100-foot-wide survey area.

e. When it is necessary for vehicles to drive outside the area which received the original archaeological inventory, whether because of topographic obstacles, man-made barriers, or to avoid an archaeological site, the path used to drive around the problem area will also be cleared to the same standards employed during the original archaeological inventory. That is, the route will be cleared to Class III standards 50 feet on either side of the center line or at least 25 feet beyond the limits of vehicular traffic/surface disturbance created by projects which affect more than a 100-foot-mile survey area.

f. A 100-foot-radius survey will be required around shot holes or shot points.

g. A 25-foot-radius survey will be required around the holes or trenches associated with magnetometer operations.

h. Geophysical exploration companies shall check ahead of time with the involved BLM Area Office to determine if the Bureau will require that archaeological surveyors flag each side of the corridor which they have inventoried. This shall only be required when the BLM Area Office has discovered evidence that past seismic exploration activities have not been occurring within corridors which have received archaeological inventories. If archaeological flagging is required, the flags shall be used to mark the boundaries of surveyed corridors, and they shall be placed so that they are clearly visible from any point on the lines. These flags will not be removed by company personnel unless directed to do so by BLM personnel.

i. All rock faces, structural sites, and cliffs will be surveyed and assessed if they are within 500 feet of a shot hole. The presence of fragile

cultural resources within 500 feet of a shot hole will likely require avoidance.

j. A cultural resource monitor (permitted Archaeologist) may be required during operations or reclamation activities if the work is in a particularly sensitive area and/or reclamation was not none immediately following operations. In addition, the BLM may require the permitted Archaeologist to inspect reroutes to determine if cultural sites were successfully avoided. If required, this information shall be included in a monitoring report submitted to the BLM along with an assessment of the damage, if any, to the cultural properties which were to be avoided.

k. Any cultural resources discovered during geophysical operations which were missed by the archaeological survey or which are unearthened during operations shall be avoided. The BLM Area Manager shall immediately be notified if any new sites are encountered. The operator shall take any additional measures requested by the Area Manager. These may require the hiring, at the operator's expense, of a qualified Archaeologist to carry out specific instructions in the BLM.

l. Operators shall work in close coordination with the field Archaeologists whom they hire to conduct the cultural resources survey, since the operator is responsible for.

(1) Knowing the exact location of all cultural resource sites discovered during the course of the survey, and

(2) Avoiding all impacts to these cultural sites.

m. Given the tight time schedules within which geophysical exploration activities occur, avoidance will likely be the only practical means of mitigation should cultural resources be located within the area affected by a project.

n. Employees of the operator and any subcontractors shall be made aware that any collection of artifacts is punishable by law and that

the company is liable under trespass regulations, the Antiquities Act, and the Archaeological Resources Protection Act for fines and possible costs for any cultural resources damaged by vehicular traffic or collection.

o. If any cultural resources will be adversely affected by the operator, the operator shall be held responsible for mitigating the impacts as directed by the BLM.

8. The operator shall avoid any operations when the ground is muddy and/or wet. The Area Manager may prohibit exploration, drilling, or other activities during periods of precipitation.

9. Water for drilling purposes ;will not be obtained from Federally owned or controlled water sources such as reservoirs, and springs unless specific permission is obtained from the Area Manager.

10. Report any available information concerning water sands or artesian flows to the District Office.

11. Drill hole cuttings will be returned to the hole before cementing and any surplus will be scattered so that the pile is less than six (6) inches in height.

12. Powder magazines will be located at least one-quarter (¼) mile from traveled roads. Loaded shot holes will not be left unattended.

13. All trash, flagging, lath, etc., will be removed and hauled to an authorized disposal site. No oil or lubricants shall be drained onto the ground surface.

14. The operator must notify the Area Manager the date reclamation operations commence and are completed.

15. Whenever possible, a portable mud pit shall be used when drilling with fluids.

16. A copy of these practices to be followed will be kept by each seismic crew.

17. The operator shall extinguish, without expense to the Government, all fires on or in the vicinity of the project set or caused by his employees whether set directly or indirectly as a result of operations.

I have been apprised of the practices which should be followed or avoided in the conduct of our geophysical operations. These practices will be explained to all of our subcontractors and they also will be expected to meet all the requirements.

III. EXAMPLE OF CONDITIONS OF APPROVAL ATTACHED TO PIPELINE ROW PERMITS

PIPELINE (RIGHT-OF-WAY) (PERMIT) STIPULATIONS

A. Special Stipulations

B. Construction and Maintenance

1. A copy of these stipulations, including exhibits and the Plan(s) of Development (if required), shall be on the project area and available to persons directing equipment operation.

2. **Emergency Discovery in the Absence of Monitoring.** This stipulation applies in emergency discovery situations where monitoring for cultural resources was not being performed because the presence of cultural resources could not have been anticipated. If, in its operations, the Holder discovers any historic or prehistoric ruin, monument, or site, or any object of antiquity subject to the Antiquities Act of 1979, and 43 CFR Part 3, then work will be suspended and the discovery promptly reported to the BLM Area Manager, telephone (505) 327-5344. The BLM will then specify what action is to be taken. The BLM will evaluate the discovery, evaluate its significance, and consult with the State Historic Preservation Officer. Minor recordation, stabilization or data recovery may be performed by the BLM. However, more significant mitigation shall be carried out by a qualified, permitted archeologist. It is BLM's responsibility to ensure that such mitigation is carried out in accordance with 36 CFR Part 800.11. Given the timeframes involved in the BLM's budgeting process, operators are strongly encouraged to fund such required mitigation. Further damage to significant cultural resources and operations in its vicinity will not be allowed until any required mitigation is successfully completed.

3. **Discovery of Cultural Resources During Monitoring.** This stipulation applies to situations where archeological monitoring was taking place because local geologic conditions favored the presence of subsurface archeological sites in the project

area. The monitor will immediately report this find to the BLM Area Manager. The BLM will specify what further steps must be taken to assess the damage to the site and to mitigate any adverse effects to it. Monitoring in these circumstances is considered to be a form of inventory and the operator will be responsible for obtaining at their expense a qualified permitted archeologist to complete a damage assessment report and to carry out any mitigation required by the BLM.

4. **Damage to Previously Identified Site:** This stipulation applies to situations where operations have damaged a previously identified archeological site that was visible on the surface. If, in its operations, the Holder damages, or is found to have damaged any historic or prehistoric ruin, monument, or site, or any object of antiquity submitted to the Antiquities Act of 1906, the Archeological Resource Protection Act of 1979, and 32 CFR Part 3, the Holder will prepare and implement a data recovery plan at their expense. The holder will obtain, at their expense, a qualified, permitted archeologist to carry out the specific instruction of the BLM.

a. Holder shall indemnify the United States against any liability for damage to life or property arising from the occupancy or use of public lands under this grant. This shall include liability arising from the occupancy or use of public lands under this grant. This shall include liability arising from the release of any hazardous substance or hazardous waste (as these terms are defined in the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 USC 9601, et seq. or the Resource Conservation and Recovery Act, 42 USC 6901, et seq.) on this right-of-way (unless the release or threatened release is wholly unrelated to Holder's activity in this right-of-way), or resulting from the activity of Holder on this right-of-way. This applies without regard to whether a release is caused by the

Holder, their agent, or unrelated third parties.

b. Holder shall comply with all applicable Federal laws and regulations existing or hereafter enacted or promulgated under the Toxic Substance Control Act of 1976 as amended, 15 USC 2601 et seq. (1982). In any event, Holder shall comply with the Toxic Substance Control Act of 1976 as amended with regards to any toxic substances that are used, generated by, or stored on this right-of-way or on facilities authorized under this right-of-way (see 40 CFR 702-799 and especially, provisions on polychlorinated biphenyls, 40 CFR 761.1-761.193). Additionally, any release of toxic substances (leaks, spills, etc.) in excess of the reportable quantity established by 40 CFR 117 shall be reported as required by the Comprehensive Environmental Response, Compensation and Liability Act, Section 102b. A copy of any report required or requested by any Federal agency or state government as a result of reportable release or spill of any toxic substances shall be furnished to the Authorized Officer concurrent with the filing of the reports to the involved Federal agency or state government.

c. Use of pesticides shall comply with the applicable Federal and state laws. Pesticides shall be used only in accordance with their registered uses and within limitations imposed by the Secretary of the Interior. Prior to use of pesticides, the Holder shall obtain from the Authorized Officer written approval of a plan showing the type and quantity of material to be used, pest(s) to be controlled, method of application, location of storage and disposal of containers, and any other information deemed necessary by the Authorized Officer. Emergency use of pesticides shall be approved in writing by the Authorized Officer prior to such use.

d. The Holder shall be responsible for weed control on disturbed areas within the limits of the right-of-way. The Holder is responsible for the consultation with the Authorized Officer and/or local authorities for acceptable weed control methods within

limits imposed in the grant stipulations.

e. The Holder shall contact the Authorized Officer at least three days prior to the anticipated start of the construction and/or any surface disturbing activities (_____ may want to be present). The Authorized Officer may require and schedule a preconstruction conference with the Holder prior to the Holder's commencing construction and/or surface disturbing activities on the right-of-way. The Holder and/or his representatives shall attend this conference. The Holder's contractor, or agents involved with construction and/or any surface disturbing activities associated with the right-of-way, shall also attend this conference to review the stipulations of the grant including the plan(s) of development, as applicable.

f. Construction activities and surface disturbance will be prohibited during the period from

__ (1) November 1 to March 31 for the protection of eagle winter habitat.

__ (2) December 1 to March 31 for the protection of deer and elk winter habitat.

__ (3) December 1 to July 15 for elk calving and crucial use areas.

__ (4) March 1 to June 30 for the protection of an active raptor nest site.

__ (5) May 1 to July 15 for the protection of antelope fawning.

Exceptions to this requirement must have prior written approval from the Authorized Officer.

g. The Holder shall construct, operate and maintain the facilities, improvements, and structures within the right-of-way in strict conformity with the plan(s) of development which was (were) approved and made part of the grant on _____. Any relocation, additional construction, or use that is not in accord with the approved plan(s) of development shall not be initiated without the prior written approval of the

Authorized Officer. A copy of the complete right-of-way grant, including all stipulations and approved plan(s) of development, shall be made available on the right-of-way area during construction, operation, and termination to the Authorized Officer. Non-compliance with the above will be grounds for an immediate temporary suspension of activities if it constitutes a threat to public health and safety or the environment.

h. The Holder shall not initiate any construction or other surface disturbing activities on the right-of-way without the prior written authorization of the Authorized Officer. Such authorization shall be a written Notice to Proceed (Form 2800-15) issued by the Authorized Officer. Any Notice to Proceed shall authorize construction or use only as therein expressly stated and only for the particular location or use therein described.

i. Boundary adjustments in (name and number of O&G unit or lease) shall automatically amend the right-of-way to include that portion of the facility no longer contained within the above described (lease/unit). In the event of an automatic amendment to this right-of-way grant, the prior on-lease/unit conditions of approval of this facility will not be affected even though they would now apply to facilities outside of the lease/unit as a result of a boundary adjustment. Rental fees, if appropriate, shall be recalculated based on the conditions of this grant and the regulations in effect at the time of an automatic amendment.

5. Any cultural and/or paleontological resource (historic or prehistoric site or object) discovered by the Holder, or any person working on his behalf, on public or Federal land shall be immediately reported to the Authorized Officer. Holder shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the Authorized Officer. An evaluation of the discovery will be made by the Authorized Officer to determine appropriate actions to prevent the loss of significant cultural or scientific values. The Holder will be responsible for the cost of evaluation and any decision as to proper mitigation measures will be made by the

Authorized Officer after consulting with the Holder.

6. The Holder shall conduct all activities associated with the construction, operation, and termination of the right-of-way within the authorized limits of the right-of-way.

7. The Holder shall provide for the safety of the public entering the right-of-way. This includes, but is not limited to, barricades for open trenches, flagmen/women with communication systems for single lane roads without inter-visible turnouts, and attended gates for blasting operations.

8. No surface disturbance or construction activities will be allowed within _____ which shall be clearly marked as specified by the Authorized Officer. Any deviation from this requirement shall have the prior written approval of the Authorized Officer.

9. No surface disturbing activities shall take place on the subject right-of-way until the associated APD is approved. The Holder will adhere to special stipulations in the Surface Use Program of the approved APD, relevant to any right-of-way facilities.

10. The Holder shall mark the exterior boundaries of the right-of-way with stake and/or lath at 100 to 200 foot intervals. The intervals may be varied at the time of staking at the discretion of the Authorized Officer. The tops of the stakes and/or laths will be painted and the laths flagged in a distinctive color as determined by the Holder. The survey station numbers will be marked on the boundary stakes and/or laths at the entrance to and the exit from public land. Holder shall maintain all boundary stakes and/or laths in place until final clean-up and restoration is completed and approved by the Authorized Officer. The stakes and/or laths will then be removed at the direction of the Authorized Officer.

11. The Holder shall survey and clearly mark the center line and/or exterior limits of the right-of-way, as determined by the Authorized Officer (set reference markers for all angle stations (P.I.) on both sides of the right-of-way prior to construction activities).

12. When construction activity in connection with the right-of-way breaks or destroys a natural barrier used for livestock control, the gap thus opened shall be fenced to prevent the drift of livestock. The subject natural barrier shall be identified by the Authorized Officer and fenced by the Holder as per instruction of the Authorized Officer.

13. Holder is responsible to contact the grazing lessee(s) named below, prior to crossing any fence on public land or any fence between public and private land and to offer the lessee(s) an opportunity to be present when the fence cut(s) is made so the lessee(s) can be satisfied that the fence is adequately braced and secured.

Lessee _____
Address _____
Phone _____

Lessee _____
Address _____
Phone _____

14. Each fence crossed by this right-of-way shall be braced and secured to prevent slacking of the wire, before cutting the wire. The opening thus created shall be temporarily closed as necessary during construction to prevent passage of livestock.

15. Upon completion of construction

__ a. Fences, gates and brace panels shall be constructed to appropriate Bureau standards and/or specifications as determined by the Authorized Officer.

__ b. Cattle guards shall be __ feet by __ feet and as a minimum meet the _____ standard. They shall be set on (timber, pre-cast concrete, cast-in-place concrete) bases at right angles to the roadway. Backfill around cattle guards shall be thoroughly compacted. A bypass gate shall be build adjacent to each cattle guard structure. Gate materials, dimensions, and construction shall conform to the requirements as specified by the Authorized Officer.

__ c. Install a sixteen (16) foot wide gate (fences crossed by roads that will regularly be travelled) adjacent to the cattle guard. The gate shall conform to requirements specified by the Authorized Officer.

__ d. Install a metal gate, but no cattle guard. The gate shall be constructed to BLM specifications. These can be obtained from the Farmington Resource Area, 1235 La Plata Highway, Farmington, New Mexico 87401 or call (505) 327-5344.

16. No construction or routine maintenance activities shall be performed during periods when the soil is too wet to adequately support construction equipment. If such equipment creates ruts in excess of __ inches deep, the soil shall be deemed too wet to adequately support construction equipment.

17. The Holder shall furnish and apply water or use other means satisfactory to the Authorized Officer for dust control.

18. A buffer strip of vegetation __ feet wide shall be left between areas of surface disturbance and riparian vegetation as determined necessary by the Authorized Officer.

19. Maintain a minimum of ten (10) feet of undisturbed surface between fence lines and roads or pipelines that are constructed parallel to fences.

20. Clearing, grading, and other disturbance of soil and vegetation shall be limited to the minimum area required for construction, and shall include

__ a. A maximum width of ____ feet.

__ b. Trees in pinon-juniper type vegetation, cleared from the right-of-way shall be left for wood gathering activities. The trees shall be moved aside prior to any soil disturbing activities. Do not mix soil with the trees during right-of-way clearing. After reclamation and reseeding, the trees and any rocks removed from the construction area during clearing and/or ditching operations shall be scattered back on the right-of-way in a random arrangement and

not in bunches. Redistributing these materials on the right-of-way during reclamation activities shall be accomplished by using rubber-tired equipment.

__ c. No trees or brush shall be disturbed within ____ feet of the edge of the rimrock at Sta. _____.

__ d. Clearing the right-of-way in vegetative types, other than pinon-juniper types, i.e., sagebrush flats, shall consist of knocking (scalping) off the tops of brush. Do not blade nor remove grass cover of low growth vegetation, except immediately over the ditch line, or in rough or broken terrain.

21. Suitable topsoil material removed in conjunction with clearing and stripping shall be conserved in stockpiles (within the right-of-way, at the following staked locations:) Topsoil shall be stripped to an average depth of ____ inches. A total of ____ cubic yards of topsoil shall be stockpiled.

22. Sidehill cuts of more than three (3) feet are not permitted. Areas requiring cuts greater than this shall be terraced so none are greater than three (3) feet.

23. The pipelines shall be laid above ground from Sta. _____ to Sta. _____ and no blading shall be allowed between these stations.

24. Place the pipeline authorized by this right-of-way in the existing road or within 10 feet of the edge of the existing road (from Sta. _____ to Sta. _____.)

25. Place the pipeline authorized by this right-of-way in the existing road or within 10 feet of the edge of the existing road.

26. Construct this "loop line" within 15 feet of the existing pipeline. Disturbance of soil and vegetation disturbance shall be confined to the previously disturbed areas of the existing pipeline right-of-way plus an additional 15 feet in width. Total soil and vegetation disturbance resulting from construction of this pipeline and the existing pipeline shall not exceed 65 feet in width.

27. Dispose of all liquids produced during operation of this pipeline in an approved manner so it will not impact the air, soil, water, vegetation or animals.

28. Maintain all existing improvements affected by construction and maintenance of this authorized area of disturbance in a serviceable (as good as or better than original) condition.

29. The Holder shall:

__ a. Recontour disturbed areas or designated sections of the right-of-way by grading to restore the site to approximately the original contour of the ground as determined by the Authorized Officer.

__ b. Recontour the disturbed area and obliterate all earth work by removing embankments, backfilling excavations, and grazing to re-establish the approximate original contours of the land in the right-of-way.

__ c. Uniformly spread topsoil over all unoccupied disturbed areas (outside the ditch line, fence line, work area). Spreading shall not be done when the ground or topsoil is frozen or wet.

30. Construct earthen berms that are a minimum of four (4) feet high with a ditch that has a one (1) foot vertical face away from the right-of-way, i.e., towards the direction of potential traffic, cut at the base of the berm. Construct this type berm at each end of the right-of-way where it is separate from the road.

31. The Holder shall construct water bars on all disturbed areas to the spacing and cross sections specified by the Authorized Officer. Water bars are to be constructed to:

a. Stimulate the imaginary contour lines of the slope (ideally with a grade of one or two percent);

b. Drain away from the disturbed area; and

c. Begin and end in vegetation or rock whenever possible.

32. Seed all the disturbed areas using the following designated seed mixture and to the specifications given.

- a. Seed Mixture #1:
 - Crested Wheatgrass
(Agropyron desertorum) - 2 lb.
 - Smooth Brome
(Bromus inermis) - 1 lb.
 - Fourwing Saltbush
(dewinged)
(Atriplex conesens) - 1 lb.
 - Nomad Alfalfa
(Medicago sitiva) - 2 lb.
 - Indian Ricegrass
(Oryzopsis hymenoides) - 1 lb.

- b. Seed Mixture #2:
 - Crested Wheatgrass
(Agropyron desertorum) - 3 lb.
 - Fourwing Saltbush
(dewinged)
(Atriplex conesens) - 2 lb.
 - Sand Dropseed
(Soporbolus cryptandrus) - ½ lb.**
 - Indian Ricegrass
(Oryzopsis hymenoides) - 2 lb.
 - Western Wheatgrass
(Agropyron smithii) - 2 lb.

**Hand seed these species prior to drilling the mixtures.

- c. Seed Mixture #3:
 - Fourwing Saltbush
(dewinged)
(Atriplex conesens) - 2 lb.
 - Alkali Sacaton
(Sporobolus airoides) 1 lb.**
 - Shadscale
(Atriplex convertifolia) - 2 lb.
 - Indian Ricegrass
(Oryzopsis hymenoides) - 2 lb.

**Hand seed these species prior to drilling the mixtures.

- d. Special Seed Mixture
Species shall be planted in pounds of pure live seed per acre:

Percent Pure Live Seed (PLS) =

Purity x Germination/100

Two lots of seed can be compared on the basis of PLS as follows:

Source No. 1 (Poor Quality)

Purity	50%
Germination	40%
Percent PLS	20%

5 lb. bulk seed required to make 1 lb. PLS.

Source No. 2 (Better Quality)

Purity	80%
Germination	63%
Percent PLS	50%

2 lb. bulk seed required to make 1 lb. PLS.

Seeding shall be accomplished between July 1 and September 15 (later date may be extended on a case-by-case basis with Authorized Officer approval). Seed labels from each bag shall be available for inspection while seeding is being accomplished.

Compacted areas shall be ripped to a depth of 12 inches and diced to a depth of six inches before seeding. Seed with a disc-type drill with two boxes for various seed sizes. The drill rows shall be 8-10 inches apart. The seed shall be planted at no less than .5 inch deep or more than one inch deep. The seeder shall be followed with a drag, packer, or roller to ensure uniform coverage of the seed and adequate compaction. Drilling shall be done on the contour where possible, not up and down the slope. The given poundage of seed per acre can be reduced by .5 if it is drill seeded. Where slopes are too steep for contour drilling, a "cyclone" hand seeder or similar broadcast seeder shall be used.

Seed shall then be covered to the depth described above by whatever means is practical, i.e. hand raked.

33. Holder shall mulch disturbed areas designed by the Authorized Officer. The type of mulch shall meet the following requirement(s):

__ a. Straw used for mulching shall be from oats, wheat, rye, or other approved grain crops, and free from noxious weeds or other objectionable material as determined by the Authorized Officer. Straw mulch shall be suitable for placing with mulch blower equipment.

__ b. Hay shall be of approved herbaceous mowings, free from noxious weeds or other objectionable material as determined by the Authorized Officer. Hay shall be suitable for placing with mulch blower equipment.

__ c. Wood cellulose fiber shall be natural or cooked wood cellulose fiber, shall disperse readily in water, and shall be non-toxic. The homogeneous slurry or mixture shall be capable of application with power spray equipment. A colored dye that is non-injurious to plant growth may be used when specified. Wood cellulose fiber shall be packaged in new, labeled containers.

34. All above ground structures not subject to safety requirements shall be painted by the Holder to blend with the natural color of the landscape. A reflective material may be used to reduce hazards that may occur when such structures area near roads; otherwise the paint used shall be a non-glare, non-reflective, non-chalking color of:

__a. Federal 595a-34427 (Juniper Green)

__b. Munsell Soil Color 5Y 6/1 (Slate Gray)

__c. Munsell Soil Color 2.5Y 6/2 (Carlsbad Canyon Brown)

__d. The leg-off will not be painted the above color, but instead shall be left unpainted such that the rusty finish on the pipe would blend in with the surroundings.

35. Upon completion of construction, the Holder shall post as directed by the Authorized Officer, the Bureau serial number assigned to this right-of-way grant at the following location(s):

36. Holder shall maintain the area covered in this authorization to the satisfaction of the BLM, Farmington Resource Area. Maintenance shall include, but not be limited to, soil stabilization.

37. Prior to termination of the right-of-way, the Holder shall contact the Authorized Officer to arrange a pre-termination conference. This conference will be held to review the termination provisions of the grant.

38. Ninety days prior to termination of the right-of-way, the Holder shall contact the Authorized Officer to arrange a joint inspection of the right-of-way. This inspection will be held to agree to an acceptable termination (and rehabilitation) plan. This plan shall include but is not limited to, removal of facilities, drainage structures, or surface material, recontouring, topsoiling, or seeding. The Authorized Officer must approve the plan in writing prior to the Holder's commencement of any termination actions.

39. After complying with all restoration stipulations, submit a "proof of restoration" letter if this pipeline has been approved as a right-of-way. Proof of restoration letters shall be filed with the BLM, Albuquerque District Office, 435 Montano NE, Albuquerque, New Mexico 87107, no later than two (2) years after completion of construction.

40. The Holder of this right-of-way grant or the Holder's successor in interest shall comply with Title VI of the Civil Rights Act of 1964 (42 USC 2000d et seq.) and the regulations of the Secretary of the Interior issued pursuant thereto.

**IV. EXAMPLE OF CONDITIONS OF APPROVAL
ATTACHED TO ROAD ROW PERMITS**

**STANDARD STIPULATIONS FOR ROADS IN THE
ALBUQUERQUE DISTRICT, BLM**

Grantee/permittee agrees to comply with the following stipulations to the satisfaction of the Authorized Officer:

A. GENERAL

1. The grantee/permittee shall minimize disturbance to existing fences and other improvements on public land. The grantee/permittee is required to promptly repair improvements to at least their former state. Functional use of these improvements will be maintained at all times. The grantee/ permittee will contact the owner of any improvements prior to disturbing them. When necessary to pass through a fence line, the fence shall be braced on both sides of the passageway prior to cutting the fence.

B. ROAD GRADE AND WIDTH

1. The road will have a driving surface of 30 feet (all roads shall have a minimum driving surface of 14 feet, unless local conditions dictate a different width). The maximum grade is 10 percent unless the box below is checked. Maximum width of surface disturbance from construction will be 30 feet.

C. CROWNING AND DITCHING

1. Crowning and ditching is required. The road cross-section will conform to the cross section diagrams in figure 1. The crown shall have a grade of approximately 2% (i.e., 2" crown on a 14' wide road).

D. DRAINAGE

1. Drainage control shall be ensured over the entire road through the use of borrow ditches, drainage dips, out-sloping, in-sloping, natural rolling topography, culverts, and/or turn-out (lead-off) ditches. Every drainage dip shall drain water into an adjacent turnout ditch.

a. Unless otherwise approved in writing by the Authorized Officer, drainage dip location for grades over 2% shall be determined by the formula:

$$\text{Spacing Interval} = \frac{400}{\text{road slope \%}} + 100'$$

Example: For a road with a 4% slope:

$$\text{Spacing Interval} = \frac{400}{4\%} + 100' = 200'$$

b. Unless otherwise approved in writing by the Authorized Officer, all turnout ditches shall be graded to drain water with a 1 percent minimum to 3 percent maximum ditch slope. The spacing interval for turnout ditches shall be determined according to the following table, but may be amended depending upon existing soil types and centerline road slope (in %).

**SPACING INTERVAL
FOR TURNOUT DITCHES**

Percent slope	Spacing interval
0 - 4%	150' - 350'
4 - 6%	125' - 250'
6 - 8%	100' - 200'
8 - 10%	75' - 150'

TYPICAL TURNOUT DITCH
1' MINIMUM DEPTH
NATURAL GROUND SURFACE

For this road the spacing interval for turnout ditches shall be:

[X] At locations staked in the field.

2. Culvert pipes shall be used for cross drains where drainage dips or low water crossings are not feasible. The minimum culvert diameter is 18 inches. Any culvert pipe installed shall be of sufficient diameter to pass the anticipated flow of water. Culvert location and required diameter are shown on the attached maps. Their location is also flagged on the ground. (Further details can be obtained from the Albuquerque District Office or the appropriate Resource Area Office.)

E. TURNOUTS

1. Unless otherwise approved by the Authorized Officer, vehicle turnouts will be required. Turnouts will be located at 2000-foot intervals, or the turnouts will be invisible, whichever is less. Turnouts will conform to the diagram in figure 1.

F. SURFACING

1. Surfacing is not required because all weather access is not desired, or all weather access is desired but surfacing materials are not economically available or the soil has the capacity to bear loads when dry as well as when they are wet. Therefore surfacing is not required. The road shall not be used when it is not easily passable with a two wheel pickup, without tire chains, due to wet/mud snow conditions.

G. CATTLE GUARDS

1. All cattle guards grid and foundation designs and construction shall meet the American Association of State Highway and Transportation Officials (AASTHO) load Rating H-20, although AASTHO U-80 rated grids shall be required where heavy loads, (exceeding H-20 loading) are anticipated. (See BLM standard drawings for cattle guards). Cattle guard grid lengths shall not be less than 8 feet and with of not less than 14 feet. A wire gate (16-foot minimum) will be provided on one side of the cattle guard.

H. MAINTENANCE

1. The grantee/permittee shall regularly maintain the road in a safe, usable condition. A regular maintenance program shall include, but not be limited to blading, ditching, culvert installation, culvert cleaning, drainage installation, cattle guard maintenance and surfacing.

2. Failure of the grantee/permittee to share maintenance costs in dollars, equipment, materials, or manpower proportionate to the grantee/permittee's use with other authorized users may be adequate grounds to terminate the right-of-way grant. The determination as to whether this has occurred and the decision to terminate shall rest with the Authorized Officer. Upon request, the Authorized Officer shall be provided with copies of any maintenance agreement entered into.

I. PUBLIC ACCESS

1. Public access along this road will not be restricted by the grantee/permittee without specific written approval being granted by the Authorized Officer. Gates or cattle guards on public lands will not be locked or closed to public use unless specifically determined by the Authorized Officer.

J. SPECIAL STIPULATIONS.

None required.

APPENDIX B-4

REASONABLY FORESEEABLE DEVELOPMENT (RFD)

Introduction

The RFD projections are based on a potential of development analysis which was conducted prior to RMP Amendment preparation. The following information was used in this analysis:

1. Areas available for leasing and development (exclusive of those areas closed to oil and gas leasing and development by law, regulation, Executive Order, and Secretarial decision.)
2. The potential for oil and gas occurrence (potential for occurrence does not imply or refer to the possibility of development, extraction, or economic favorability.)
3. Existing oil and gas practices.
4. Existing leases and related industry exploration and development activities.

The RFD projections are concerned with the total number of oil and gas acres, wells, road-ties, pipelines, and disposal wells projected to be developed during the next 20 years in the Albuquerque District. The RFD projected for the Production Alternative represents the maximum projected acreage and well numbers. RFD projections for the No Action and Preferred Alternatives are based on the amount of acreage that would be available for leasing and/or development under each alternative. Lands excluded from consideration are lands closed to leasing and/or development by land use management decisions and legislative withdrawals.

Assumptions and Procedures

The projected number of wells was determined by using a statistical forecasting program (Lotus 1-2-3). Historical well data used in the program was obtained from New Mexico Oil Conservation Division (NMOCD) and Petroleum Information records. Total projected wells include wells from all categories of mineral estate ownership: Federal, state, Indian, and fee.

In counties with little or no oil and gas

development, well data was either absent or inadequate to determine reasonable forecasts. In an effort to project reasonable development, the RFD projection was based on industry interest and an assessment of oil and gas potential.

In Colfax County, the projection is based on coal-methane gas activity in the Raton Basin. Oil and gas development activities in Sandoval and Rio Arriba counties are divided between the Rio Puerco and Farmington Resource Areas, respectively. The RFD projections for those portions contained in the Rio Puerco and Taos Resource Areas are based on average yearly development activities for the former and exploration interest for the latter.

RFD projections for BLM management decisions consist of Federal wells regardless of surface management or ownership except for Federal wells on Forest Service-administered land.

In determining the Federal portion of the RFD projections, percentages of producing wells by ownership category (i.e., Federal, state, fee) was obtained from NMOCD. The Federal percent of producing wells was determined by county. The total number of wells forecasted was multiplied by the percentage identified for Federal wells to obtain the projected number of Federal wells. In the case of counties where producing well information is not complete or available, it was assumed that future development would occur in areas with limited existing development or areas where development has occurred. For example, in the Rio Puerco Resource Area, development is expected to occur in the northern portion of Sandoval County; in the Taos Resource Area, development is forecasted for portions of Union and Harding Counties.

NMOCD well records do not differentiate between Forest Service and BLM-administered land. The RFD projected Federal wells were prorated between BLM and Forest Service based on a ratio of the amount of BLM- to Forest Service-administered land. BLM ownership was determined from 1:100,000 scale, surface and mineral status map. Forest Service ownership information was provided by U.S. Forest Service, Region 3.

APPENDIX B-5

AVAILABILITY OF LANDS FOR OIL AND GAS LEASING AND DEVELOPMENT RELATIVE TO RESOURCE POTENTIAL

The following tables summarize, by management alternative, the availability of land for leasing and development relative to resource potential. The tables reflect the application of management categories by alternative and their impact to areas of low, moderate, and high oil and gas occurrence potential.

**TABLE B-5-1. Farmington Resource Area
Acres of Federal Oil and Gas in Management Categories
by Resource Potential for Alternative A
(acres rounded to nearest thousand)**

Management Category	Low or No Potential	Moderate Potential	High Potential	Total
CLOSED				
Discretionary ^{2/}	0	0	63,700	63,700
Nondiscretionary ^{3/}	0	0	54,400	54,400
CLOSED TOTAL	0	0	118,100	118,100
OPEN				
With Standard Terms/Cond.	0	0	1,555,000	1,555,000
With Constraints ^{1/}				
Timing Limitation	0	0	584,000	584,000
Controlled Surface Use	0	0	0	0
No Surface Occupancy	0	0	3,000	3,000
CONSTRAINTS TOTAL	0	0	587,000	587,000
OPEN - TOTAL	0	0	2,139,000	2,139,000
GRAND TOTAL	0	0	2,260,100	2,260,100

^{1/}Open to leasing with special stipulations (no surface occupancy, seasonal restriction, or surface operation plan to protect special values, i.e., recreation, cultural, T/E species habitat.)

^{2/} Closed due to planning decisions such as ACEC designations with management prescriptions which require no mineral development.

^{3/} Closed due to law, executive orders, or similar actions.

**TABLE B-5-2. Farmington Resource Area
Acres of Federal Oil and Gas in Management Categories
by Resource Potential for Alternative B
(acres rounded to nearest thousand)**

Management Category	Low or No Potential	Moderate Potential	High Potential	Total
CLOSED				
Discretionary ^{2/}	0	0	0	0
Nondiscretionary ^{3/}	0	0	54,400	54,400
CLOSED TOTAL	0	0	54,400	54,000
OPEN				
With Standard Terms/Cond.	0	0	2,205,700	2,205,700
With Constraints ^{1/}				
Timing Limitation	0	0	0	0
Controlled Surface Use	0	0	0	0
No Surface Occupancy	0	0	0	0
CONSTRAINTS TOTAL	0	0	0	0
OPEN - TOTAL	0	0	2,205,700	2,205,700
GRAND TOTAL	0	0	2,260,100	2,260,100

^{1/} Open to leasing with special stipulations (no surface occupancy, seasonal restriction, or surface operation plan to protect special values, i.e., recreation, cultural, T/E species habitat.)

^{2/} Closed due to planning decisions such as ACEC designations with management prescriptions which require no mineral development.

^{3/} Closed due to law, executive orders, or similar actions.

**TABLE B-5-3. Farmington Resource Area
Acres of Federal Oil and Gas in Management Categories
by Resource Potential For Alternative C
(acres rounded to nearest thousand)**

Management Category	Low or No Potential	Moderate Potential	High Potential	Total
CLOSED				
Discretionary ^{2/}	0	0	46,600	46,600
Nondiscretionary ^{3/}	0	0	54,400	54,400
CLOSED TOTAL	0	0	101,000	101,000
OPEN				
With Standard Terms/Cond.	0	0	1,848,700	1,848,700
With Constraints ^{1/}				
Timing Limitation	0	0	126,500	126,500
Controlled Surface Use	0	0	132,100	132,100
No Surface Occupancy	0	0	51,800	51,800
CONSTRAINTS TOTAL	0	0	310,400	310,400
OPEN - TOTAL	0	0	2,159,100	2,159,100
GRAND TOTAL	0	0	2,260,100	2,260,100

^{1/} Open to leasing with special stipulations (no surface occupancy, seasonal restriction, or surface operation plan to protect special values, i.e., recreation, cultural, T/E species habitat.)

^{2/} Closed due to planning decisions such as ACEC designations with management prescriptions which require no mineral development.

^{3/} Closed due to law, executive orders, or similar actions.

**TABLE B-5-4. Rio Puerco Resource Area
Acres of Federal Oil and Gas in Management Categories
by Resource Potential For Alternative A
(acres rounded to nearest thousand)**

Management Category	Low Potential	Moderate Potential	High Potential	Total
CLOSED				
Discretionary ^{2/}	0	0	3,000	3,000
Nondiscretionary ^{3/}	58,000	167,000	82,500	307,500
CLOSED TOTAL	58,000	167,000	85,500	310,500
OPEN				
With Standard Terms/Cond.	253,000	106,000	1,152,900	1,511,900
With Constraints ^{1/}				
Timing Limitation	0	0	14,700	14,700
Controlled Surface Use	0	2,000	28,000	30,000
No Surface Occupancy	(<1)	0	6,700	6,700
CONSTRAINTS TOTAL	0	2,000	49,400	51,400
OPEN - TOTAL	253,000	108,000	1,202,300	1,563,300
GRAND TOTAL	311,000	275,000	1,287,800	1,873,800

^{1/} Open to leasing with special stipulations (no surface occupancy, seasonal restriction, or surface operation plan to protect special values, i.e., recreation, cultural, T/E species habitat.)

^{2/} Closed due to planning decisions such as ACEC designations with management prescriptions which require no mineral development.

^{3/} Closed due to law, executive orders, or similar actions.

**TABLE B-5-5. Rio Puerco Resource Area
Acres of Federal Oil and Gas in Management Categories
by Resource Potential For Alternative B
(acres rounded to nearest thousand)**

Management Category	Low or No Potential	Moderate Potential	High Potential	Total
CLOSED				
Discretionary ^{2/}	0	0	0	0
Nondiscretionary ^{3/}	58,000	167,000	82,500	307,500
CLOSED TOTAL	58,000	167,000	82,500	307,500
OPEN				
With Standard Terms/Cond.	278,885	127,380	1,160,035	1,566,300
With Constraints ^{1/}				
Timing Limitation	0	0	0	0
Controlled Surface Use	0	0	0	0
No Surface Occupancy	0	0	0	0
CONSTRAINTS TOTAL	0	0	0	0
OPEN - TOTAL	278,885	127,380	1,160,035	1,566,300
GRAND TOTAL	336,885	294,380	1,242,535	1,873,800

^{1/} Open to leasing with special stipulations (no surface occupancy, seasonal restriction, or surface operation plan to protect special values, i.e., recreation, cultural, T/E species habitat.)

^{2/} Closed due to planning decisions such as ACEC designations with management prescriptions which require no mineral development.

^{3/} Closed due to law, executive orders, or similar actions.

TABLE B-5-6. Rio Puerco Resource Area
Acres of Federal Oil and Gas in Management Categories
by Resource Potential For Alternative C
(acres rounded to nearest thousand)

Management Category	Low or No Potential	Moderate Potential	High Potential	Total
CLOSED				
Discretionary ^{2/}	0	0	3,000	3,000
Nondiscretionary ^{3/}	58,000	167,000	82,500	307,500
CLOSED TOTAL	58,000	167,000	85,500	310,500
OPEN				
With Standard Terms/Cond.	253,000	106,000	1,153,000	1,512,000
With Constraints ^{1/}				
Timing Limitation	0	0	0	0
Controlled Surface Use	0	2,000	10,600	12,600
No Surface Occupancy	(< 1)	0	6,700	6,700
Timing & Controlled	0	0	32,000	32,000
CONSTRAINTS TOTAL	0	2,000	49,300	51,300
OPEN - TOTAL	253,000	108,000	1,202,300	1,563,300
GRAND TOTAL	311,000	275,000	1,287,800	1,873,800

^{1/} Open to leasing with special stipulations (no surface occupancy, seasonal restriction, or surface operation plan to protect special values, i.e., recreation, cultural, T/E species habitat.)

^{2/} Closed due to planning decisions such as ACEC designations with management prescriptions which require no mineral development.

^{3/} Closed due to law, executive orders, or similar actions.

**TABLE B-5-7. Taos Resource Area
Acres of Federal Oil and Gas in Management Categories
by Resource Potential For Alternative A
(acres rounded to nearest thousand)**

Management Category	Low or No Potential	Moderate Potential	High Potential	Total
CLOSED				
Discretionary ^{2/}	0	0	6,000	6,000
Nondiscretionary ^{3/}	12,000	0	39,000	51,000
CLOSED TOTAL	12,000	0	45,000	57,000
OPEN				
With Standard Terms/Cond.	210,000	0	1,030,500	1,240,500
With Constraints ^{1/}				
Timing Limitation	0	0	7,000	7,000
Controlled Surface Use	49,000	0	97,000	146,000
No Surface Occupancy	6,700	0	16,400	23,100
CONSTRAINTS TOTAL	55,700	0	120,400	176,100
OPEN - TOTAL	265,700	0	1,150,900	1,416,600
GRAND TOTAL	277,700	0	1,195,900	1,473,600

^{1/} Open to leasing with special stipulations (no surface occupancy, seasonal restriction, or surface operation plan to protect special values, i.e., recreation, cultural, T/E species habitat.)

^{2/} Closed due to planning decisions such as ACEC designations with management prescriptions which require no mineral development.

^{3/} Closed due to law, executive orders, or similar actions.

**TABLE B-5-8. Taos Resource Area
Acres of Federal Oil and Gas in Management Categories
by Resource Potential For Alternative B
(acres rounded to nearest thousand)**

Management Category	Low or No Potential	Moderate Potential	High Potential	Total
CLOSED				
Discretionary ^{2/}	0	0	0	0
Nondiscretionary ^{3/}	12,000	0	39,000	51,000
CLOSED TOTAL	12,000	0	39,000	51,000
OPEN				
With Standard Terms/Cond.	210,000	0	1,212,600	1,422,600
With Constraints ^{1/}				
Timing Limitation	0	0	0	0
Controlled Surface Use	0	0	0	0
No Surface Occupancy	0	0	0	0
CONSTRAINTS TOTAL	0	0	0	0
OPEN - TOTAL	210,000	0	1,212,600	1,422,600
GRAND TOTAL	222,000	0	1,251,600	1,473,600

^{1/} Open to leasing with special stipulations (no surface occupancy, seasonal restriction, or surface operation plan to protect special values, i.e., recreation, cultural, T/E species habitat.)

^{2/} Closed due to planning decisions such as ACEC designations with management prescriptions which require no mineral development.

^{3/} Closed due to law, executive orders, or similar actions.

**TABLE B-5-9. Taos Resource Area
Acres of Federal Oil and Gas in Management Categories
by Resource Potential For Alternative C
(acres rounded to nearest thousand)**

Management Category	Low or No Potential	Moderate Potential	High Potential	Total
CLOSED				
Discretionary ^{2/}	4,000	0	8,000	12,000
Nondiscretionary ^{3/}	12,000	0	39,000	51,000
CLOSED TOTAL	16,000	0	47,000	63,000
OPEN				
With Standard Terms/Cond. With Constraints ^{1/}	210,000	0	1,030,500	1,240,500
Timing Limitation	0	0	7,000	7,000
Controlled Surface Use	49,000	0	95,500	144,500
No Surface Occupancy	1,500	0	16,900	18,400
CONSTRAINTS TOTAL	50,500	0	119,400	169,900
OPEN - TOTAL	260,500	0	1,149,900	1,410,400
GRAND TOTAL	276,500	0	1,196,900	1,473,400

^{1/} Open to leasing with special stipulations (no surface occupancy, seasonal restriction, or surface operation plan to protect special values, i.e., recreation, cultural, T/E species habitat.)

^{2/} Closed due to planning decisions such as ACEC designations with management prescriptions which require no mineral development.

^{3/} Closed due to law, executive orders, or similar actions.

APPENDIX B-6

SOIL AND WATER CONSERVATION PRACTICES

The following are examples of BLM soil and water management practices found in COAs, and ROWs - both road and pipeline. These examples are followed by a brief narrative which describes how these mitigation requirements benefit soils and water quality.

Soil and Water Benefits

Watershed/Water Quality Benefits

Topsoiling an abandoned well pad or road

- Provides an acceptable growth medium for plants
- Provides better infiltration and less surface run-off of water, hence, less erosion.

Surface contouring of well pads and roads

- The macro- and microtopography of disturbed areas can be modified to increase depression storage, reduce slope length or eliminate unwanted ponding of water.

Mulching requirements

- Mulches can be used to: reduce evaporation, allowing water to remain near the surface for a longer time, thus enhancing the opportunity for seedling survival during revegetation; intercept raindrops, thus protecting surfaces from puddling and splashing; reduce the velocity of surface runoff, and thus surface erosion; and, increase the infiltration time on newly restored surfaces.

Vegetation cover

- The amount and kind of vegetation cover protecting rehabbed well pads and roads is an important determinant of the infiltration, surface runoff, and erosion behavior of rehabbed lands, as well as hydraulic resistance of the surface to overland flow.

Road design standards in crowning, ditching, drainage, slope, and culvert placement

- Sediment ponds below large fills or points where road ditch discharge is dumped prevents erosion in terms of detention time.
- Breaking up drainage off roads by installing several drainage points so that volumes of water coming off at any one point are not great enough to create headcutting or accelerated erosion.

Road cuts and fills

- Proper placement of road cuts and fills minimize sediment loss caused by sheet and rill erosion flows.

Conditions of Approval (COAs), are defined as site specific operational requirements attached to permitted actions. These requirements are developed by staff specialists who periodically review and revise requirements to reflect changing regulations and technology. The following are examples of mitigation requirements found in COAs, Appendix B-3, that benefit, directly or indirectly, soils and water quality:

<u>Management Constraint</u>	<u>Item #</u>	<u>Page #</u>	<u>Watershed/Water Quality Benefit</u>
COAs attached to APDs	6	B-21	WS
	7	B-21	WS,WQ
	8	B-21	WQ
	9	B-21	WQ
	11	B-22	WQ
	12	B-22	WS,WQ
	13	B-22	WQ
	16	B-22	WS,WQ
	17	B-22	WS
	18	B-23	WS
	23-D	B-23	WQ
	23-E	B-24	WQ
	23-I	B-24	WQ
	23-K	B-24	WQ
	25-A	B-25	WS
	25-B	B-25	WS
	25-C	B-25	WS
	25-D	B-25	WS
	25-E	B-25	WS,WQ
	COAs attached to Notices of Intent to Conduct Geophysical Exploration	2	B-26
3		B-26	WS
4		B-26	WS
5		B-26	WS
6		B-26	WQ
8		B-28	WS
9		B-28	WQ
10		B-28	WQ
13		B-28	WQ
14		B-28	WQ
15	B-28	WQ	
COAs attached to pipeline ROWs	4b	B-30	WQ
	4c	B-30	WQ
	9	B-31	WS
	16	B-32	WS
	17	B-32	WS
	18	B-32	WS, WQ
	20	B-32	WS
	21	B-33	WS, WQ
	22	B-33	WS, WQ
	23	B-33	WS, WQ
25	B-33	WS	

<u>Management Constraint</u>	<u>Item #</u>	<u>Page #</u>	<u>Watershed/Water Quality Benefit</u>
	26	B-33	WS
	27	B-33	WS, WQ
	29	B-33	WS
	31	B-33	WS, WQ
	32	B-34	WS
	33	B-35	WS, WQ
COAs attached to pipeline	38	B-35	WS, WQ
ROWs (continued)	39	B-35	WS, WQ
COAs attached to road	B	B-36	WS
ROWs	C	B-36	WS, WQ
	D	B-36	WS, WQ
	F	B-37	WS
	H	B-37	WS, WQ

APPENDIX B-7: PROPOSED FY 92 FARMINGTON OIL AND GAS
INSPECTION AND ENFORCEMENT STRATEGY

A. High Priority Drilling Standard

The inspection item (drilling well) is located in an area where operations, if conducted in noncompliance with special lease stipulations or conditions of approval included in the operating plan, could have the potential for adverse impacts to the environment, public health and safety, or subsurface resources (useable water aquifers, coal seams, other minerals, etc.), or the authorized officer determines that other factors, such as past operator/contractor compliance history, indicate the need for an inspection. In most cases, the priority will be recommended by the engineer processing the Application for Permit to Drill.

INSPECTION ACCOMPLISHMENT GOALS

Drilling Inspections

1. Conduct all High Priority Drilling inspections, or
2. Conduct inspections on 27 percent of all drilling operations with the provision that all High Priority inspections will be included in this percentage.

B. High Priority FOGRMA Standard

Production Standard -

Potential for substantial revenue losses because of significant production levels:

12,000 BOPM
120,000 MCFPM

In determining the priority rating for a communitization agreement or a participating area (for either a Federal or API type unit) inspection item, and leases with fractional interest, the total average production should be based on the total production of that inspection item multiplied by the percentage of Federal or Indian interest.

Compliance Standard -

Potential for noncompliance, as demonstrated by the operator's past compliance history:

An inspection item that has had at least two major or six minor FOGRMA-related violations within the preceding 24-month period will be considered High Priority due to noncompliance.

If an inspection item meets this FOGRMA standard, it must, at a minimum, be inspected for the type of noncompliance previously cited.

INSPECTION ACCOMPLISHMENT GOALS

1. Conduct a Detailed Production Accountability Inspection on 18 percent of all producing inspection items. Balance these inspections between Federal and Indian producing inspection items, and
2. Conduct an Independent Measurement Handling Inspection on at least 26 percent of the remaining producing Inspection Items provided that all remaining FOGRMA High and Indian producing leases will be inspected, regardless of the percentage.

C. High Priority Workover Standard

1. The inspection item (workover operation) is located in an area where operations, if conducted in noncompliance with special lease stipulations or conditions of approval included in the operating plan, could have the potential for adverse impacts to the environment, public health and safety, or subsurface resources (e.g., useable water aquifers, coal seams, other minerals, etc.); or
2. The authorized officer determines that other factors such as past operator/contractor compliance history, indicate the need for an inspection. In most cases, local office knowledge will be utilized to determine workover priority.

INSPECTION ACCOMPLISHMENT GOALS

Conduct all High Priority workover inspections.

D. High Priority Abandonment Standard

1. The inspection item (abandonment operation) is located in an area where operations, if conducted in noncompliance with special lease stipulations or conditions of approval included in the abandonment plan, could have the potential for significant adverse impacts to the environment or subsurface resources (useable water aquifers, coal seams, other minerals, etc.); or
2. The authorized officer determines that other factors, such as past operator/contractor compliance history, indicate the need for an inspection. In most cases, the priority will be recommended by the engineer for processing the approval for the Sundry Notice

application.

INSPECTION ACCOMPLISHMENT GOALS

1. Conduct all high priority abandonment inspections, or
2. Conduct 22 percent of all abandonment operations with the provision that all priority abandonment inspections will be included in this percentage.

E. High Priority Environmental Standard

1. The operations on an inspection item are located in or adjacent to an area of special environmental sensitivity (designated wilderness area, wilderness study area, Rare II area, area of critical environmental concern, wetlands, threatened and endangered species habitat, historic landmarks, etc.), and the operations, if conducted in noncompliance with special lease stipulations or conditions of approval included in the operating plan, could adversely impact those areas; or
2. The operations occur in other areas which, if conducted in noncompliance with special lease stipulations or conditions of approval included in the operating plan, could have a significant adverse impact on the environment; or
3. The environmental compliance history of the inspection item during the previous 24 months included one major violation or five minor violations.

INSPECTION ACCOMPLISHMENT GOALS

1. Inspect all high priority environmental items,
2. Conduct 27 percent of all other environmental inspections, and
3. Personnel from the other appropriate resource programs or, if applicable, surface managing agencies, shall be utilized to conduct some of these types of inspections. Many of these inspections, however, will be coincidental to and included in the course of other required field inspections.

F. High Priority Public Health and Safety Standard

The inspection item is located in an area where operations, if conducted in noncompliance with special lease stipulations or conditions of approval included in the operating plan, could pose a serious risk to public health and safety or where such noncompliance could result in a major undesirable event, as

defined by BLM Manual 74-CDM642.3, Reporting of Undesirable Events.

INSPECTION ACCOMPLISHMENT GOALS

Conduct all high priority public health and safety inspections.

G. High Priority Legal and Other Standard

The inspection item requires an inspection to comply with existing agreements, memoranda of understanding, laws, or regulations.

An inspection is requested by another agency such as the Minerals Management Service, the Bureau of Indian Affairs, FS, tribes, etc.

An inspection is requested by BLM Law Enforcement, Courts, or other judicial body.

INSPECTION ACCOMPLISHMENT GOALS

Conduct all high priority legal and other inspections.

H. Special Consideration Items

a. Environmental Emphasis

In order to accomplish our environmental protection goals, all production inspections will routinely include observations for environmental protection. In addition, we will utilize personnel resources from other resource programs as appropriate to conduct environmental and public health and safety inspections. Finally, in order to most efficiently utilize and maximize BLM field presence, each resource program will ensure that all field personnel make and report observations, as time allows, in support to other programs with activities in those field areas.

b. Identification and Follow up on Suspected Theft

Emphasize the need to be alert for indications of suspected product theft, mishandling, mismeasurement, or misreporting.

Follow up immediately on any identified or reported instances of suspected criminal activity through coordination with Law Enforcement (LE) personnel.

Ensure that appropriate cross training is conducted between I&E and LE personnel as required by IM No. 90-150.

Ensure that all I&E personnel are familiar with the theft reporting format and procedures described in IM No. 90-193.

c. Sharing of Inspection Resources

In order to more efficiently utilize I&E resources, initiate, where feasible, cooperative arrangements between field offices and even across State boundaries where possible to share I&E personnel and resources in the accomplishment of I&E goals.

d. Use of Overtime and Other Workhour (WK) Tools

The effective oversight of oil and gas operations often requires onsite presence at irregular hours of the day or night and many times with very short notice. These are very real and important differences from some of the other BLM programs. Use of overtime is of essential importance especially when the budget increase has been provided for, but the Fulltime Employee (FTE) has not yet been increased to the level and/or appropriate compensation, including overtime or compensatory leave as appropriate, should be judiciously utilized. Efficient use of workhour tools can significantly increase inspection accomplishment while minimizing FTE requirements. Ensure that such flexibility and/or compensation is provided and planned for in the budget process.

Farmington Resource Area
1235 LaPlata Highway
Farmington, NM 87401

Dear Sir:

The following surface rehabilitation stipulations must be complied with as applicable before the # _____ well located _____' F__L and _____' F__L, sec. ____, T. ____, R. ____, lease No. _____, can be approved for final abandonment (see 43 CFR 3162.3-4):

1. A permanent monument must be cemented in the wellbore. It must be labeled with the operators name, well name and number, legal location, and lease number (see 43 CFR 3162.6).
2. All fences, production equipment, purchaser's equipment, concrete slabs, "deadman" anchors, flowlines, risers, debris and trash must be removed from the location.
3. Any oily soil or fluids must be properly disposed of in an approved disposal area.
4. Pits must be filled-in and the edges of the pads shaped to conform to the natural terrain.
5. Pads must be leveled, "dressed" by a maintainer, ripped and disked.
6. Access roads must be leveled, water-barred, disked and blocked off with earthen berms at the junction with the main road and at the entrance to the well pad. Waterbars should be dpaced as shown below:

<u>% Slope</u>	<u>Spacing Interval</u>
Less than 2%	200'
2 to 5%	150'
6 to 9%	100'
10 to 15%	50'
Greater than 15%	30'

All waterbars should divert water to the downhill side of the road.
7. All disturbed areas will be seeded between July 1 and Sept. 15

with the prescribed seed mix. (Reseeding may be required).

8. Notify Surface Managing Agency seven (7) days prior to seeding so they may be present for that operation.

Other Surface Managing Agencies (SMAs) may vary slightly in their restoration requirements. It is your responsibility, as the operator, to obtain surface restoration requirements from other SMAs. We need to be provided with a copy of these requirements. Any problems concerning stipulations received from other SMAs should be brought to us.

On private land, we should be provided with a letter from the fee owner stating that the surface restoration is satisfactory.

If the rehabilitation has not been completed, notify us by Sundry Notice upon completion. We will schedule an inspection to check the well site after we receive notice from you that the vegetation has become established.

If you have any questions, please contact the Environmental Protection Staff at (505) 327-5344.

Sincerely,

Area Manager

The above mentioned well has been abandoned and the required surface restoration stipulations completed.

Signed

Date

COOPERATIVE AGREEMENT FOR THE PROTECTION OF ENVIRONMENTAL RESOURCES AND ENERGY DEVELOPMENT

I. INTRODUCTION

This agreement establishes a commitment between all signatory entities to protect sensitive surface resources while allowing for the development of important energy resources. A coordinated approach to energy development and public use within the San Juan Basin through interagency and industry cooperation is essential due to the intensity of energy development and the importance of all resources. Established in this document are the resource concerns of all participating entities. These concerns have been balanced with existing and potential energy development to establish areas requiring special management and specific mitigating measures.

Planned energy development which protects sensitive surface resources and allows for timely oil and gas recovery, is essential within the San Juan Basin. It is the intent of this agreement to benefit the resources managed by all agencies and industry through this coordinated planning approach.

The purpose of the agreement is to consolidate under one master document the environmental concerns and mitigating measures of land managing agencies and to provide an opportunity for operators to participate in the process. Recommendations made in this agreement are based on approved land-use plans and standard operating practices that have been existence for many years.

This agreement recognizes the statutory mandates of both Federal and State involved and that each agency must continue to manage their respective program to comply with the statutes and regulations promulgated under them.

This agreement includes resources management goals, special management areas and associated mitigating measures. Section II identifies management goals, specific recommendations, and mitigating measures applicable to the New Mexico portion of the San Juan Basin and all agencies concerned. Implementation of these stipulations will maintain energy development while managing for established surface resource management goals. Each land management agency will be responsible for implementing and supporting this agreement within their respective areas of responsibility.

Appendix 1 describes management goals, specific recommendations and mitigating measures by unit. Modification of standard mineral development procedures is recommended in some cases. The achievement of management goals represents a multi-resource approach to planned energy development within each Unit. Mitigating measures approved by industry and the signatory agencies represent the commitment to these management goals. These measures will provide specific guidance for existing and future energy development in the designated areas.

II. SAN JUAN BASIN MANAGEMENT GOALS AND DIRECTIVES

A. Management Goals for Resource Protection in the San Juan Basin of New Mexico.

Given that the San Juan Basin contains vast amounts of gas resources and this is an important national resources, the following management guidelines apply:

1. Subject to valid existing rights, implement land use management planning decisions in accordance with agency guidelines.

2. Participating agencies recognize that there are conflicts between resources uses in the San Juan Basin and that a balance between resource uses needs to be developed. Balance is achieved by the application of professional science to intrinsic and extrinsic resource values determined by legislation, economics, short term and long term human needs, resource management policies, and binding contracts. Resource managers accept that in balancing resource use not all resources may be used or developed to their full potential within desirable time limits.
3. Changes in surface resource use and importance, as well as improvement in development and reclamation technologies may eventually allow additional development in areas currently listed as sensitive or presently have seasonal closures. Modifications will be evaluated based on land management agency monitoring studies as necessary.
4. Areas containing sensitive surface resources will be developed with the least amount of resource damage possible.
5. New development should be designed to minimize habitat fragmentation and cumulative impacts to the greatest extent possible. New disturbance should be kept to a minimum and associated with existing disturbance where possible.
6. Resource values to be protected include: (listed alphabetically)
 - a. Cultural Resources
 - b. Developed Recreation Areas
 - c. Natural Gas and Oil
 - d. Recreation Opportunities
 - e. Structural Integrity of Navajo Dam and Appurtenant Structures.
 - f. Threatened and Endangered Species
 - g. Timber
 - h. Water Quality of Ground Water, Lakes, Rivers and Associated Tributaries
 - i. Waterfowl, Migratory Fowl and Sensitive Wildlife Habitat
 - j. Wetlands/Riparian Areas
7. A road management plan for lands within the San Juan Basin shall be developed along with the necessary land-use plans. This plan shall be developed with all necessary public input.
8. Ground water contamination is a concern with all involved agencies. Presently, this issue is beyond the scope of this document and it is the recommendation that an additonsl group be developed to address this issue.
9. Work cooperatively with industry to determine volumes of oil and gas within sensitive areas.
10. On an annual basis meeting with industry and agency personnel to evaluate procedures and concerns.

B. Specific Recommendations and Mitigating Measures

1. To protect resources in areas of special concern; no surface disturbance or no additional surface disturbance may be indicated (SMA's and ACEC's).
2. Make every effort to locate new facilities outside of special areas by considering feasibility of directional drilling, unorthodox locations, and rerouting of pipelines and powerlines.
3. "Twin" new well locations by considering options of directional drilling, unorthodox locations, recompletions, multiple completions and centralized locations for multiple wells where at all possible. Utilize existing roads and pipeline corridors where possible.
4. Require unit operators to submit and follow a master plan of development, which includes considerations for sensitive environmental resources and encouraged to prepare more comprehensive long term plans covering 3 to 5 years.
5. Encourage operator to unitize in areas of heavy development that are not presently unitized to increase management efficiency and facilitate operations in sensitive areas.
6. Planning/approval of wells in non-standard and/or unorthodox locations should become more acceptable by NMOCD and operators through coordinated resource planning outlined in this document.
7. Wildlife monitoring and studies, as well as off-site mitigation and/or habitat replacement may be indicated in conjunction with development in crucial areas. Some of the potential mitigative measures are outlined in the existing Cooperative Agreement for the Mitigation and Enhancement of Wildlife Habitat in the Farmington Resource Area, other measures will be developed as need. Proposals for mitigation will be mutually developed by the land management agency and energy company involved.
8. Minimize impacts of development by continuing and expanding existing stipulations including (but not limited to):
 - a. Road closures
 - b. Seasonal closures
 - c. Project planning by operators to minimize disturbance degree, extent and time
 - d. Reduction in visual impacts
 - e. Reduction in noise levels
 - f. Rehabilitation/reclamation of all areas not needed for production.

III. RECOMMENDATION AND MITIGATING MEASURES BY OPERATING UNIT

Text of these mitigating measures are contained in Appendix 1.

A. Carracas Canyon Unit

Mitigation Measures

1, 2, 3, 4, 5, 7, 8, 10, 11, 13, 14, 15, 16, 17, 22, 23, 24,29.

B. San Juan 32-5 Unit

Mitigation Measures

1, 2, 3, 4, 5, 8, 9, 11, 13, 14, 15, 16, 17, 20, 22, 23, 24,29.

C. Allison Unit

Mitigation Measures

4, 5, 8, 9, 12, 13, 14, 15, 16, 17, 19, 20, 23,29.

D. San Juan 32-7

Mitigation Measures

1A, 2, 3, 4, 5, 8, 9, 12, 13, 14, 14, 15, 16, 17, 19, 20, 23, 25, 26, 29.

E. San Juan 32-8 Unit

Mitigation Measures

4, 5, 8, 12, 13, 14, 15, 16, 17, 23, 25, 26, 27,29.

F. San Juan 32-9 Unit

Mitigation Measures

1A, 2, 4, 5, 8, 12, 13, 14, 15, 16, 17, 23,29.

G. Rosa Unit

Mitigation Measures

1, 2, 3, 4, 5, 8, 9, 10, 11, 13, 14, 15, 16, 17, 19,20, 22, 23, 24,29.

H. San Juan 31-6

Mitigation Measures

1A, 2, 3, 4, 5, 8, 9, 12, 13, 14, 15, 16, 17, 19, 20, 23,29.

I. Northeast Blanco Unit

Mitigation Measures

1A, 2, 3, 4, 5, 8, 9, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 28,29.

J. San Juan 30-4 Unit

Mitigation Measures

1, 2, 3, 4, 5, 8, 10, 11, 13, 14, 15, 16, 17, 23,29.

K. San Juan 30-5 Unit

Mitigation Measures

1, 2, 3, 4, 5, 8, 10, 11, 13, 14, 15, 16, 17, 23,29.

L. San Juan 30-6 Unit

Mitigation Measures

1A, 2, 3, 4, 5, 8, 9, 12, 13, 14, 15, 16, 17, 19, 23,20,29.

M. San Juan 29-4 Unit

Mitigation Measures

1, 2, 3, 4, 5, 8, 10, 11, 13, 14, 15, 16, 17, 23,29

N. San Juan 29-5 Unit

Mitigation Measures

1, 2, 3, 4, 5, 8, 10, 11, 13, 14, 15, 16, 17, 23,29.

O. San Juan 29-6 Unit

Mitigation Measures

4, 5, 8, 12, 13, 14, 15, 16, 17, 23,29.

P. San Juan 29-7

Mitigation Measures

4, 8, 12, 13, 14, 15, 16, 17, 23,29.

Q. Valencia Canyon Unit

Mitigation Measures

4, 5, 8, 10, 11, 13, 14, 15, 16, 17, 23,29.

R. San Juan 28-4 Unit

Mitigation Measures

1, 2, 3, 4, 5, 8, 10, 11, 13, 14, 15, 16, 17, 23,29.

S. San Juan 28-5 Unit

Mitigation Measures

4, 5, 8, 12, 13, 14, 15, 16, 17, 23,29.

T. San Juan 28-6 Unit

Mitigation Measures

4, 6, 8, 12, 13, 14, 15, 16, 17, 23,29.

U. San Juan 28-7 Unit

Mitigation Measures

4, 6, 8, 12, 13, 14, 15, 16, 17, 23,29.

V. San Juan 27-4 Unit

Mitigation Measures

1, 2, 3, 4, 5, 8, 10, 11, 13, 14, 15, 16, 17, 23,29.

W. San Juan 27-4 Unit

Mitigation Measures

1, 2, 3, 4, 5, 8, 10, 11, 13, 14, 15, 16, 17, 23,29.

X. Rincon Unit

Mitigation Measures

4, 6, 8, 12, 13, 14, 15, 16, 17, 23,29.

IV. SIGNATURE PAGE

As stated in the introduction, this agreement establishes a voluntary commitment by its signatures recognizing development of oil and gas resources within the San Juan Basin in a coordinated manner with the land and wildlife managing agencies mandates. It is also recognized that to achieve the goals and directives identified under Part III of this agreement it will be necessary to adhere to the recommendations and mitigating measures identified herein. The agreement will become effective upon signature for respective agency with addition of other approval signatures as necessary.

Government (Approved)

Larry L. Washburn 10-7-91
Bureau of Land Management Date

Alan Eaves 10/7/91
New Mexico Game & Fish Date

Philip R. Settles 10/7/91
Carson National Forest Date
Jicarilla Ranger Dist.

William Henry 10/7/91
NM Oil Cons. Division Date

Jim Bata 10/7/91
NM State Land Office Date

Appendix B-9 Cont.

APPENDIX 1

MITIGATION MEASURES

1. No surface disturbance shall be permitted in bald eagle essential habitat (core areas, see map). For locations on the Carson National Forest, consult the District Biologist. This is a year long stipulation.
2. No construction activities shall be conducted between November 1 to March 31 in bald eagle buffer zones, unless approved on a case-by-case basis.
3. Areas of potential suitable habitat for bald eagle will be inventoried prior to approval of any action. This area shall include a one-half mile strip around Navajo Lake. If the presence of a bald eagle is confirmed, restrictions on development will be imposed and actions may be authorized on a case-by-case basis. USF&WS and affected agency shall be involved in Section 7 consultation, if necessary.
4. All proposed actions within unsurveyed suitable habitat for any proposed threatened/endangered (State or Federal) species will require surveys according to the responsible agencies protocol. Restrictions will be placed on surface disturbing activities in suitable habitat until these inventories are complete. The absence of any threatened/endangered species must be confirmed prior to approval of any surface disturbing action which may affect the habitat. If presence of a threatened/endangered species is found, restrictions on new development will be imposed and actions may be authorized on a case-by-case basis.
5. To avoid disturbance in elk and deer crucial winter range, no construction or drilling activities shall be permitted between December 1 to March 31. All drilling, completion and pipeline activities should be concluded prior to December 1. Exceptions to this stipulation will be considered on a case-by-case basis.
6. Antelope Habitat - In order to protect important seasonal antelope habitat, exploration, drilling and other development activity will be allowed only during the period from July 1 through November 30. This limitation does not apply to maintenance and operation of producing wells. Exception to this limitation may be specifically authorized in writing by the Authorized Officer of the Federal surface management agency.
7. Elk Calving Habitat - In order to protect important seasonal wildlife habitat (elk calving range), exploration, drilling and other development activity will be allowed only during the period from July 15 through November 30. This limitation does not apply to maintenance and operation of producing wells. Exception to this limitation may be specifically authorized in writing by the Authorized Officer of the Federal surface management agency.
8. "Off-site mitigation" measures will be mutually developed by the land management agency and energy company involved. This shall include on-the-ground improvements for wildlife habitat and initiation of monitoring studies. Details are outlined in the existing Cooperative Agreement for the Mitigation and Enhancement of Wildlife Habitat in the Farmington Resource Area. Other mitigating measures may be developed as needed on a case-by-case basis.

9. No development activity or surface occupancy shall be permitted in wetland areas (as defined in the Federal Manual for Identifying and Delineating Jurisdictional Wetlands). Exceptions may be requested on a case-by-case basis. Any wetland acreage destroyed shall be mitigated by the acreage ratio as prescribed by the U.S. Fish and Wildlife service. Seasonal closure(s) for waterfowl nesting and bald eagle wintering may apply.
10. Vehicle use shall be restricted to authorized roads and pads. Exception may be requested on a case-by-case basis.
11. Comprehensive road management plans for units will be developed jointly with land management agencies, unit operators and the public. Actions to be considered in these plans will include road closures for non-authorized activities, agency enforcement responsibilities, public participation, and maintenance for roads.
12. Those portions of units under the USFS administration shall maintain an open road density of approximately 1.0 mile/square mile. This shall be achieved by gating of existing roads and limiting new road construction as determined by a road management plan.
13. New development, when feasible, will be twinned to existing well locations. Options to be considered include directional drilling, recompletions, multiple completions, centralizing of locations and unorthodox locations.
14. Permanent or temporary pipelines for water disposal will be installed as early as possible to eliminate excessive truck traffic in sensitive wildlife areas. Exceptions may be considered on a case-by-case basis.
15. All new pipelines and powerlines shall be restricted to existing roads and corridors. Exceptions may be requested on a case-by-case basis.
16. Existing requirements on rehabilitation and reclamation shall continue to apply in areas that contain visual scars and/or severe erosion. Operators will submit a plan of reclamation to the surface management agency.
17. The unit operator will submit a plan of development which represents a 3-5 year development scenario. The purpose of this plan is to make more informed resource decisions recognizing the land management agencies requirements to mitigate sensitive resources and development concerns of the operator.
18. No surface occupancy shall be allowed within developed recreation areas without proper NEPA compliance.
19. Prior to approval of a well location within 500 horizontal feet of the high water line of Navajo Reservoir (elevation 6085 feet), it must be examined by BOR and the potential impacts to water quality determined.
20. Minerals under areas of critical concern along the San Juan River, and under or close to Navajo Lake, shall be developed using no surface occupancy and directional drilling (see map). Exceptions may be granted on a case-by-case basis in consultation with necessary agencies. Any exception to surface occupancy shall have strict mitigating measures attached. Seasonal closure(s) for waterfowl and bald eagle wintering may also apply (see map).
21. Restrict drilling within 1,000 horizontal feet of Navajo Dam and appurtenant structures. This includes the foundation of the dam which extends 1,320 feet upstream and 1,260 feet downstream from the dam axis (see map) (T. 30 N., R. 7 W., Sec. 18: S2, Sec. 19: N2, N2SW4, N2N2SE4).

22. Areas of extremely high density archeological sites may limit any ground disturbance activity. Development will be considered on a case-by-case basis.
23. Development will be restricted in areas that have special topographical (steep or broken and/or on benches) and soil concerns. Development will be considered on a case-by-case basis and will contain strict mitigation stipulations.
24. Those areas within the unit that are also contained within the Carracas Mesa SMA shall have the following requirements:
 - a. Restrict vehicles to designated routes and seasonal closures.
 - b. Major right-of-ways shall be located outside of the SMA boundary. This does not include individual well ties.
 - c. VRM Class II objectives shall apply to all development. The management objectives of this class are to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color and texture found in the predominant natural features of the characteristic landscape.
 - d. Visual, wildlife and recreation clearances will be required for all new development activity.
 - e. No surface disturbance on slopes greater than 20 percent.
25. Those areas within the unit that are within the Reese Canyon Research Natural Area shall have the following requirements:
 - a. Restrict vehicles to designated routes and seasonal closures.
 - b. Major right-of-ways shall be located outside the RNA boundary. This does not include individual well ties.
 - c. New wells in the RNA should be twinned off existing well pads except where other constraints (e.g. T/E) exist.
 - d. No surface disturbance on benches or slopes greater than 20 percent.
 - e. No surface occupancy will be allowed in occupied and potential habitat for Federal or State listed threatened and endangered species. These areas should be excluded from any surface disturbing activities unless those activities are completely confined to areas of existing disturbance and the proposed activity is fully evaluated or its potential impacts to recovery of the endangered plant species.
26. Those areas within the unit that are also within the Negro Canyon SMA shall have the following requirements:
 - a. Restrict vehicles to designated routes and seasonal closures.
 - b. Major right-of-ways shall be located outside of the SMA boundary. This does not include individual well ties.

- c. VRM Class II objectives shall apply to all development. The management objectives of this class are to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color and texture found in the predominant natural features of the characteristic landscape.
 - d. Visual, wildlife and recreation clearance will be required for all new development activity.
 - e. No surface disturbance on slopes greater than 20 percent.
27. Those areas within the Simon Canyon Area of Critical Environmental Concern shall have the following requirements:
- a. Restrict vehicles to designated routes.
 - b. Major right-of-ways shall be located outside the ACEC boundary. This does not include individual well ties.
 - c. VRM Class II objectives shall apply to all development. The management objectives of this class are to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color and texture found in the predominant natural features of the characteristic landscape.
 - d. Visual, wildlife and recreation clearances will be required for all new development activity.
 - e. No development shall be allowed in the canyon bottom.
 - f. No development shall be allowed on the canyon rim that is visible from the canyon bottom.
28. Undrilled areas which may be difficult to drill because they are under water.
- | | |
|---|--|
| <p>T. 30 N., R. 7 W.:</p> <ul style="list-style-type: none"> Sec. 4: SW4 Sec. 5: SE4 Sec. 7: NW4, S2 Sec. 8: N2 Sec. 17: NW4 Sec. 18: N2NW4, NE4 S2 Sec. 19: All except SW4SW4 Sec. 20: NW4 | <p>T. 30 N., R. 8 W.:</p> <ul style="list-style-type: none"> Sec. 13: NW4, SE4 <p>T. 31 N., R. 7 W.:</p> <ul style="list-style-type: none"> Sec. 25: SW4 Sec. 34: SW4, N2SE4 Sec. 35: SE4 Sec. 36: N2 |
|---|--|
29. Emergency repairs needed for human safety and environmental contamination will not require prior written authorization. Emergency repairs include a break in a gas or waterline, repairs of tank battery facilities, well head repairs.

APPENDIX C

Oil and Gas Operations

APPENDIX C

OIL AND GAS OPERATIONS

Geophysical Exploration

Oil and gas can be discovered by either direct or indirect exploration methods such as the mapping of rock outcrops, seeps, borehole data, and remote sensing data. In many cases indirect methods, such as seismic, gravity, and magnetic surveys are required to delineate subsurface features which may contain oil and gas.

Gravity Surveys

Gravitational prospecting detects micro-variations in gravitational attraction caused by the differences in the density of various types of rock. Data derived from gravity surveys are used to generate anomaly maps from which faults and general structural trends can be interpreted. Gravity surveys are generally not considered definitive due to the many data corrections required (e.g., terrain, elevation, latitude, etc.) and the poor resolution of complex subsurface structures. The instrument used for gravity surveys is a small portable device called a gravimeter. Several types of gravimeters have been developed and virtually all can be easily carried by an individual. Generally measurements are taken at many points along a linear transect and the gravimeter is transported either by backpack, helicopter, or off-road vehicle (ORV). The only surface disturbance associated with the gravity prospecting is that caused by the ORV, if used.

Geomatic Surveys

Magnetic prospecting is most commonly used for locating metallic ore bodies but is used to a limited extent in oil and gas exploration. Magnetic surveyors use an instrument called a magnetometer to detect small magnetic anomalies caused by mineral and lithologic variations in the earth's crust. Magnetic surveys can detect large trends or lineaments in basement rocks and the approximate depth to those basement rocks, but in general magnetic surveys provide little specific data to aid in petroleum exploration. Again,

many data corrections are required to obtain reliable information and maps generated from magnetic data lack resolution and are considered preliminary. Magnetometers vary greatly in size and complexity and in general most magnetic surveys are conducted from the air by suspending a magnetometer under an airplane. Magnetic surveys conducted on the ground are nearly identical to gravity surveys and surface disturbance is minimal to non-existent.

Seismic Reflection Surveys

Seismic prospecting is the best and most popular indirect method currently utilized for locating subsurface structures which may contain oil and/or gases. Seismic energy (shock waves) is induced into the earth using one of several methods. As these waves travel downward and outward they encounter various strata, each having a different seismic velocity. As the wave energy encounters the velocity interface between stratigraphic layers where the lower stratum is of lower velocity, some of the seismic energy is reflected upward. Sensing devices commonly called geophones are placed on the surface to detect these reflections. The geophones are connected to a data recording truck which stores data on magnetic tape. The time required for the shock waves to travel from the shot point down to a given reflector and back to the geophones can be related to depth by multiplying velocity by one half the travel time. The average velocity for the section between the surface and a given reflector must be estimated if no bore hole seismic data is available. This velocity estimation is the source of many errors in the seismic interpretation of wildcat areas. There are many methods available today which an explorationist can use to induce the initial seismic energy into the earth. All methods require preliminary surveying and laying of geophones.

The thumper and vibrator methods pound or vibrate the earth to create a shock wave. Usually four large trucks are used, each equipped with

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vibrator pads (about four feet square). The pads are lowered to the ground and vibrators on all trucks are triggered electronically from the recording truck. Information is recorded and then the trucks move forward a short distance and the process is repeated. Less than 50 square feet of surface area is required to operate the equipment at each test site.

The drilling method utilizes truck-mounted drills which drill small diameter holes to depths of 100 to 200 feet. Four to 12 holes are drilled per mile of line. Usually, a 50-pound charge of explosives is placed in the hole, covered, and detonated. The detonated explosives send energy waves below the earth's surface which are reflected back to the surface from various subsurface rock layers. The holes are drilled in a linear fashion, forming a line that can be many miles in length. In rugged topography, a portable drill is sometimes carried in by helicopter. Charges are placed in the hole as in a truck-mounted operation. Another portable technique is to carry the charges in a helicopter and place the charges on wooden sticks, or lath, three feet or so above the ground. Charges used are either 2.5 or five pounds. Usually, 10 charges in a line on the ground are detonated at once. In remove areas where there is little known subsurface data, a series of short seismic lines may be required to determine the regional dip and strike of subsurface formations. After this, seismic lines will be aligned relative to the regional structure to make seismic interpretation more accurate. The seismic sensors and energy source are located along lines on a one to two mile grid. Although alignment may be fairly critical, spacing of the lines can often be changed one quarter mile on an one mile grid before the results will significantly affect the investigation program.

A typical drilling seismic operation may utilize 10 to 15 men operating five to seven trucks. Under normal conditions, three to five miles of line can be surveyed each day using the explosive methods. The vehicles used for a drilling program include several heavy truck-mounted drill rigs, water trucks, a computer recording truck, and several light pickups for the surveyors, shot hole crew, geophone crew, permit man, and party chief. Public roads and existing private roads and trails are used. Off-road cross-country travel is also

necessary. Motor graders and/or dozers may be required to provide access to remove areas. Several trips a day are made along a seismograph line; this usually establishes a well defined two-track trail. Drilling water, when needed, is usually obtained from private landowners or other local sources.

Geophysical Management (Permitting Process)

Geophysical operations on and off an oil and gas lease are reviewed by the federal surface management agency.

The responsibilities of the geophysical operator and the BLM during geophysical operations are as follows:

1. **Geophysical Operator:** The operator is required to file, in person or by mail, a "Notice of Intent to Conduct Oil and Gas Exploration Operations" for all operations on public lands administered by BLM. Standard forms for this purpose are available in all BLM Offices. The notice includes maps showing the location of the line and all access routes, and must be filed in the BLM Office before operations begin.

The operator is also required to be bonded. A copy of the bond or other evidence of satisfactory bonding shall accompany the "Notice of Intent." Proper bonding can include a nationwide or statewide oil and gas bond with a rider for geophysical exploration or a \$5,000 individual surety bond.

Once the Notice of Intent has been filed, a prework conference or field inspection (if required) is conducted. Any special written instructions, orders, or approvals that may be given by the BLM at this prework conference must be complied with by the operator.

Surface-disturbing activities, such as bulldozing, require written approval by the BLM. Operators may be required to submit an archeological survey if dirt work is contemplated. The operator is required to comply with all applicable federal, state, and local laws such as the Federal Land Policy and Management Act of 1976, Historic

Preservation Act of 1966, and the Endangered Species Act.

Any changes in the original Notice of Intent must be submitted in writing to the BLM. Written approval must be secured before activities proceed.

When operations are completed, the operator is required to file a Notice of Completion of Geophysical Exploration, after any required rehabilitation work is completed.

2. BLM: The BLM is required to contact the operator immediately after the Notice of Intent is filed and explain the terms of the Notice, including the operating procedures to be followed, all current laws, and all BLM administrative requirements. A prework conference or field inspection is conducted and written instructions or orders given to the operator. The BLM is responsible for the examination of resource values and the development of appropriate surface protection and reclamation measures.

Final inspection following filing of the Notice of Completion is also required of the BLM.

Mitigation

Seasonal restrictions are imposed to reduce conflicts with wildlife, watershed damage, and hunting activity.

The most critical management practice is compliance monitoring during and after seismic activity. Compliance inspections during the operation ensure that stipulations are being followed. Compliance inspections upon completion of work ensure that the lines are clean and the drill holes are properly plugged.

OIL AND GAS LEASING

The BLM issues two types of oil and gas leases for oil and gas exploration and development on land owned or controlled by the federal government, competitive and non-competitive. Competitive leases are issued for a 5-year period and non-competitive leases are issued for a 10-year period. Both types continue for as long

thereafter as oil or gas are produced in paying quantities.

The maximum competitive lease size is 2,560 acres in the lower 48 states and 5,760 acres in Alaska. The maximum non-competitive lease size in all states is 10,240 acres.

Congress passed the federal Onshore Oil and Gas Leasing Reform Act of 1987 to require that all public lands that are available for oil and gas leasing be offered first by competitive leasing. Non-competitive oil and gas leases may be issued only after the lands have been offered competitively at an oral auction and not received a bid.

Competitive Leasing Process

Oral auctions of oil and gas leases are conducted by BLM State Offices at least quarterly when parcels are available. A Notice of Competitive Lease Sale, which lists lease parcels to be offered at the auction, will be published by each BLM State Office at least 45 days before the auction is held. Lease stipulations applicable to each parcel are specified in the Sale Notice.

Lands included in the Sale Notice come primarily from two sources:

1. Existing leases that have expired, terminated, or been canceled or relinquished;
2. Parcels identified by informal expressions of interest from the public, or by BLM for management reasons.

Each Sale Notice may be obtained for a nominal fee from the appropriate BLM State Office having jurisdiction over the lands, as listed at the end of this appendix.

All auctions are conducted with oral bidding. Bidders must attend the auction to obtain a competitive lease, or provide for someone to represent them. No sealed or mailed bids are accepted.

On the day of the auction, the successful bidder must submit a properly executed lease bid form which constitutes a legally binding lease offer and

pay a share of the sale costs (\$75 per lease); a year's advance rental (\$1.50 per acre); and not less than the \$2.00 per acre minimum bonus. The balance of the bonus bid must be received within 10 working days of the auction. Those bidders who fail to submit the balance of the bonus on time will forfeit their deposited money.

Remittances may be by personal check, cashier's check, certified check, or money order, made out to the Department of the Interior - BLM. Cash is not accepted.

Non-Competitive Leasing Process

Non-competitive leases may be issued only for parcels that have been offered competitively and failed to receive a bid.

The lands in expired, terminated, relinquished or canceled leases will not be available for re-leasing until they have been offered competitively in a Sale Notice for an auction, and cannot be filed on non-competitively for one year after expiration, termination, relinquishment, or cancellation.

Following an auction, all the lands that were offered competitively but received no bids will be available for non-competitive lease issuance for two years, beginning the first business day following the last day of the auction, as specified in the Sale Notice.

For non-competitive leasing each offer must be submitted on a separate lease offer form, and from the first business day following the auction through the last day of the same month, lands must be identified only by the parcel identification number as specified in the Sale Notice. Thereafter, and until the end of the two years of non-competitive availability, offers must use legal land descriptions and are not limited to the parcel configurations offered at the auction.

Offers must be made on a BLM-approved form and must include payment of a \$75.00 non-refundable filing fee, and the first year's advance rental of \$1.50 per acre.

All non-competitive lease offers filed on the first business day following the auction will be considered as having been filed simultaneously.

The priority among any multiple offers received on this day for the same parcel will be determined by drawings open to the public. Offers received on subsequent days will receive priority according to the time of filing; for example, an offer filed at 10:15 a.m. will have priority over an offer filed at 10:16 a.m.

Drilling Permit Process

A federal lessee or operator is governed by procedures set forth by the Onshore Oil and Gas Order No. 1, "Approval of Operations on Onshore federal and Indian Oil and Gas Leases," issued under 43 CFR 3164. Operating Order No. 1 lists the following as pertinent points to be followed by the lessee or operator: notice of staking (NOS); application for permit to drill (APD), which includes a multi-point surface use and operations plan; approval of subsequent operations; well abandonment; water well conversion; responsibilities on privately owned surface; and reports and activities required after well completion.

1. Notice of Staking (NOS) - After the company makes the decision to drill a well, they must decide whether to submit an NOS or an APD. The NOS consists of an outline of what the company intends to do including a location map and sketched site plan. The NOS is then used as a document to review any conflicts with known critical resource values, and also used at the on-site inspection to provide the preliminary data to assess what additional items are necessary to complete the APD.
2. Application for Permit to Drill (APD) - The operator or lessee may submit a completed APD in lieu of notice of staking, but in either case no surface activity is conducted in conjunction with the drilling until the APD is approved by the BLM.

If the APD option is used, an APD is submitted to the BLM and a field inspection is held with the operator and any other interested party. The purpose of the pre-drill field inspection is to evaluate the operator's plan, to assess the situation for possible impacts (surface and subsurface), and to

formulate resource protection stipulations. To lessen environmental impacts, a proposed site may be moved, reoriented, or re-dimensioned, within certain limits, at the pre-site inspection. The proposed access road may also be rerouted. If necessary, site-specific mitigations are added to the APD for protection of surface and (or) subsurface resource values in the vicinity of the proposed activity.

The BLM is responsible for preparing environmental documentation necessary to satisfy the National Environmental Policy Act requirements and provide any mitigation measures needed to protect the affected resource values.

When final approval is given by the BLM, the operator may commence construction and drilling operations. Approval of an APD is valid for one year. If construction does not begin within one year, the stipulations must be reviewed prior to approving another APD.

Surface Disturbance Associated with Exploratory Drilling

Upon receiving approval to drill the proposed well, the operator moves construction equipment over existing roads to the point where the access road will begin. Generally, the types of equipment include dozers (track-mounted and rubber-tired), scrapers and motor-graders. Moving equipment to the construction site requires moving several loads (some overweight and over-width) over public and private roads. Existing roads and trails are improved in places and occasionally culverts and cattleguards are installed.

The length of the access road varies. Generally the shortest feasible route is selected to reduce the haul distance and construction costs. Environmental factors or the landowner's wishes may dictate a longer route. In rough terrain the type of construction is sidecasting (using material taken from the cut portion of the road to construct the fill portion), where slightly less than one-half of the road bed is on a cut area and the remainder is on a fill area.

Roads are usually constructed with an 18 foot wide running surface (in relatively level terrain). Soil texture, steepness of the topography, and moisture conditions may dictate surfacing the access road in some places but generally not for the entire length. The total acreage disturbed for each mile of access road constructed varies significantly with the steepness of the slope.

Well locations are constructed by one of three different general types of construction, but in every case, all soil material suitable for plant growth is first removed from areas to be disturbed and stockpiled in a designated area. Sites on flat terrain usually require little more than removing the topsoil material and vegetation.

Drilling sites on ridge tops and hillsides are constructed by cutting and filling portions of the location. The majority of the excess cut material is stockpiled in an area that will allow it to be easily recovered for rehabilitation. It is important to confine extra cut material in stockpile rather than cast it down hillsides and drainages where it cannot be recovered for rehabilitation.

The amount of level surface required for safely assembling and operating a drilling rig varies with the type of rig, but averages 300 feet by 350 feet. At least 25 feet is normally required to be on an area of cut instead, between the drill point and the outer edge of the drilling platform. This ensures that the foundation of the drilling derrick is on solid ground and prevents it from leaning or toppling due to settling of uncompacted soil.

In addition to the drilling platform, a reserve pit is constructed, usually square or oblong, but sometimes in another shape to accommodate topography. Generally, the reserve pit is 8 to 12 feet deep, but may be deeper to compensate for smaller length and width or deeper drilling depths.

Depending on the relation of the location to natural drainages, it may be necessary to construct water bars or diversions. The area disturbed for construction and the potential for successful revegetation depends largely on the steepness of the slope.

Usually drilling activities begin within a week or two after the location and access road have been constructed. The drilling rig and associated equipment are moved to the location and erected. Moving a drilling rig requires moving 10 to 25 truck loads of equipment over public highways and private roads. The derrick when erected is approximately 160 feet high.

Water for drilling is hauled to the rig storage tanks or transported by surface pipeline. Water sources are usually rivers, wells, or reservoirs. Occasionally, water supply wells are drilled on or close to the site. The operator must obtain a permit from the New Mexico State Engineer for the use of surface or subsurface water for drilling. When BLM holds the water permits for surface water (stock ponds), BLM must also approve such use. When drilling commences, and as long as it progresses, water is continually transported to the rig location. Approximately 40,000 barrels or 1,680,000 gallons of water are required to drill an oil or gas well to the depth of 9,000 feet.

Issuance of Rights-of-Way

Rights-of-way are required for all facilities, tank batteries, pipelines, truck depots, powerlines, and access roads that occupy federally owned land outside the lease or unit boundary. When a third party (someone other than the lessee/operator or the federal government) constructs a facility or installation on or off the lease, a right-of-way is also required. The right-of-way is issued by BLM.

Drilling Operations

Rotary Drilling

Starting to drill is called "spudding in" the well. Initially, drilling usually proceeds rapidly due to the incompetent nature of shallow formations. Drilling is accomplished by rotating special bits under pressure. While drilling, the rig derrick and associated hoisting equipment support the drill string's weight. The combination of rotary motion and weight on the bit causes rock to be chipped away at the bottom of the hole.

The rotary motion is created by a square or hexagonal rod, called a kelly, which fits through a square or hexagonal hole in a large turntable,

called a rotary table. The rotary table sits on the drilling rig floor and as the hole advances, the kelly slides down through it. When the kelly has gone as deep as it can, it is raised, and a joint of drill pipe about 30 feet in length is attached in its place. The drill pipe is then lowered, the kelly is attached to the top of it, and drilling recommences. By adding more and more drill pipe, the hole can steadily penetrate deeper.

Drilling mud is circulated through the drill pipe to the bottom of the hole, through the bit, up the annulus of the well, through a screen which separates the rock chips, and into holding tanks from which it is pumped back into the well. The mud is maintained at a specific weight and thickness to cool the bit, reduce the drag of the drill pipe on the sides of the well hole, seal off any porous zones, contain formation fluids to prevent a blowout or loss of drilling fluid, and bring the rock chips to the surface for disposal.

Various additives are used in maintaining the drill mud at the appropriate viscosity and weight. Some of the additives are caustic, toxic, or acidic, but these hazardous additives are used in relatively small amounts during drilling operations and generally in very weak or low concentrations after being mixed with the drilling fluids.

Eventually, the bit becomes worn and must be replaced. To change bits, the entire string of drill pipe must be pulled from the hole, in sections or stands usually about 60-90 feet long, until the bit is out. The bit is replaced and then the drill string is reassembled and lowered into the hole, section by section, and drilling is started again. The process of removing and reinserting the drilling string uses much of the time required in drilling.

Drilling operations are continuous, 24 hours a day and 7 days a week. The crews usually work three 8-hour shifts or two 12-hour shifts a day. Pickups or cars are used for workers' transportation to and from the site.

Upon completion of the drilling, the well is evaluated by running seismic/electric logs to determine formation potential, and if results indicate commercial quantities, steel casing is run to or near total depth and cemented in the hole.

Cementing is accomplished by pumping cement slurry down the drill string and up the outside of the casing in the annulus between casing and wells of the hole.

The cement is required to be circulated back to the surface or at least back to at least 100 feet into the next larger size casing. If oil or gas is not discovered in commercial quantities, the well is considered dry. The operator is then required to follow state and BLM policy procedures for plugging a dry hole. The drill site and access road are rehabilitated in accordance with the stipulations attached to the approved APD.

Casing

Various types of casing are placed in the drilled hole to enhance hole integrity and to anchor both surface and subsurface drilling and production equipment. Casing is a string of steel pipe which is comprised of many lengths (about 40 feet long) of individual pipe which are (screwed" together. Casing is cemented into the well to protect against fluids or rock entering the well bore.

Surface casing which is properly set and cemented also protects surface aquifers from being contaminated by drilling and production operations. Surface casing generally is set to a depth greater than the deepest fresh water aquifer which could reasonably be developed.

Production casing is perforated in the zone or structure containing the oil or gas. Equipment installed on the casing of a producing well consists of various valves, pressure regulators and artificial lift equipment used to control the flow of oil or gas to production facilities.

Pipeline quality gas at the wellhead requires a minimum of processing equipment. As the quality of gas decreases with the increased presence of water, dissolved solids, or liquid hydrocarbons, the amount of processing equipment increases. Water or liquid hydrocarbons in the gas are removed before the gas is mixed with other gas, usually at the wellhead. If liquid hydrocarbons are present, storage facilities (tank batteries) are required for the liquids until they accumulate in sufficient quantities to be hauled out by large trucks.

Oil wells can be completed as flowing (those wells with sufficient reservoir pressure to raise the oil to the surface) or if the pressure is inadequate, they are completed with the installation of pumps, usually pumpjacks. Pumpjacks come in a variety of sizes, the larger ones reaching a height of 30 to 40 feet. Pumps are powered by internal combustion engines or electric motors. Fuel for the engines may be casinghead or propane.

New Mexico law and BLM regulations (NTL-4A/Onshore Order #5) prohibit the flaring or venting of natural gas. Exceptions allowed by the NMOCD and BLM are allowed during testing of a new well, when the amount of gas produced with the oil is so small that pipeline construction is not practical, or in emergency situations. Otherwise, if a well produces both oil and gas, provisions for transporting the gas must be made before oil production can continue.

The production equipment [heater-treater, holding facility for production water (if any is present), and tank battery] are either placed on a portion of the location (on cut rather than fill) or located a short distance from the well head along the access road.

Oil and Gas Exploratory Units

Surface use in an oil or gas field may be affected by unitization of the leaseholds. In areas of federally owned minerals, an exploratory unit is formed before a wildcat exploratory well is drilled. The boundary of the unit is based on geologic data. The developers of the unit can enter into an agreement to develop and operate as a unit, without regard to separate lease ownerships. Costs and benefits are allocated according to agreed-upon terms.

Unitization reduces the surface use requirements because all wells are operated as though on a single lease. Duplication of field processing facilities is minimized, because development and operations are planned and conducted by a single operator. Often powerlines are distributed throughout the unit and diesel engines are converted to electric motors. Unitizations may also involve wider spacing than usual, resulting in fewer wells.

Plugging and Abandonment of Wells

The purpose of plugging and abandoning (P&A) a well is to prevent fluids migration between zones, to protect subsurface resources from damage, and to restore the surface area. Each well has to be handled individually due to a combination of factors, including geology, well design limitations, well history and completion methods, and specific rehabilitation concerns. Therefore, only minimum requirements can be established, then modified for the individual well.

The first step in the P&A process is the filing of the Notice of Intent to Abandon (NIA). This will be reviewed by both the Surface Management Agency (SMA) and the BLM Resource Area or District Office. The NIA must be filed and approved prior to plugging an exhausted producer. Verbal plugging instructions can be given for plugging currently drilling operations, but an NIA must be filed within 24 hours. If useable fresh water was encountered while the well was being drilled, the SMA will be allowed, if interested, to assume future responsibility for the well and the operator will be reimbursed for the attendant costs.

The operator's plan for securing the hole is reviewed. The minimum requirements are as follows: In open hole situations, cement plugs must extend at least 50 feet above the below zones with fluid which has the potential to

migrate, zones of lost circulation (this type of zone may require an alternate method to isolate), and zones of potentially valuable minerals. Thick zones may be isolated using 100-foot plugs across the top and bottom of the zone.

In the absence of productive zones and minerals, long sections of open hole may be plugged with 150-foot plugs placed every 2,500 feet. In cased holes, cement plugs must be placed opposite perforations and extending 50 feet above and below except where limited by plug back depth. In the absence of cement behind the casing, the BLM requires the Operator to perforate and squeeze cement behind the pipe.

A permanent abandonment marker is required on all wells unless otherwise requested by the SMA. This marker pipe is usually at least four inches in diameter, 10 feet long, four feet above the ground, and embedded in cement or welded to the top of the casing. The pipe must be capped with the well name, number, lease number, operator and location permanently inscribed, either by welded bead or plainly stamped with metal stamps that are clearly visible.

The SMA is responsible for establishing and approving methods for surface rehabilitation and determining when this rehabilitation has been satisfactorily accomplished. At this point, a Subsequent Report of Abandonment can be approved.

APPENDIX D

Fruitland Formation Produced Water Disposal

APPENDIX D-1

FRUITLAND FORMATION PRODUCED WATER DISPOSAL

PERMITTING AGENCIES/PROCESS

Approval, authorization, and permits for produced water disposal wells are required by the BLM and the State of New Mexico [New Mexico Oil and Gas Conservation Division (NMOCD)]. Federal authority regulating the disposal of produced water is found in the Notice to Lessees and Operators of Federal and Indian Oil and Gas Leases (NTL-2B), Disposal of Produced Water.

All produced water from federal and Indian leases, except where otherwise provided, must be disposed of by injection into the subsurface, discharge into pits, or other acceptable methods approved by the BLM. Injection, however, is the preferred method of disposal. The approval of the Environmental Protection Agency (EPA), state, or tribe is not considered as granting of approval to dispose of produced water from leased federal or Indian lands until and unless BLM approval is obtained.

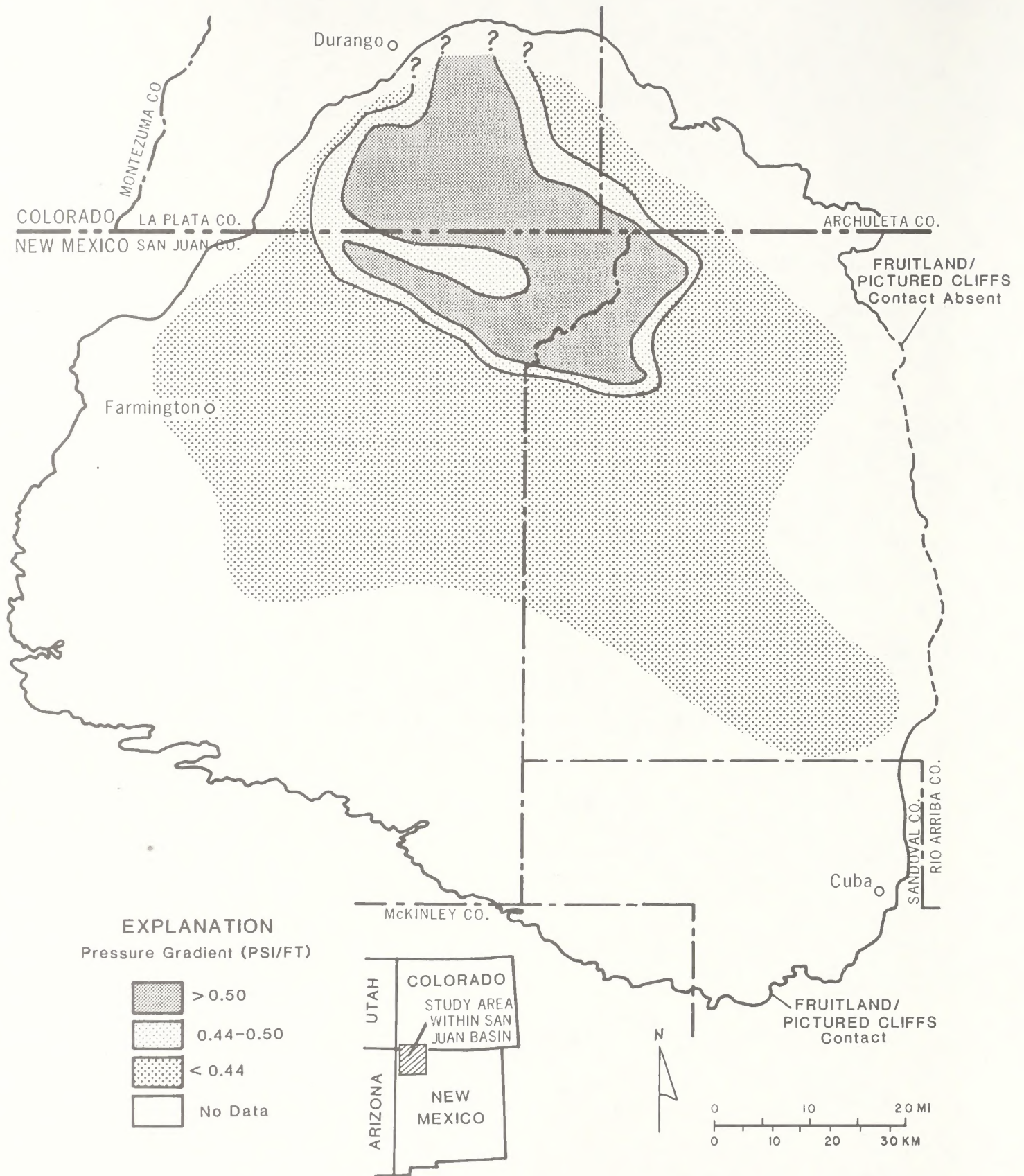
For disposal wells proposed on federal and Indian leases, an Underground Injection Control (UIC) permit is required from the EPA, or from the state or tribe where the state or tribe has achieved primacy, as listed in 43 CFR Part 147. In addition to meeting the UIC permit requirements, the well must be designed and drilled or conditioned in accordance with the requirements and standards found in 43 CFR 3160, Onshore Oil and Gas Order No. 1 - Approval of Operations; Onshore Oil and Gas Order No. 2 - Drilling Operations; and NTL-2B - Disposal of Produced Water.

The permitting and regulatory control of the Federal Safe Drinking Water Act's UIC program was delegated (by the EPA) to the State of New Mexico. Under this program, injection wells (and operations) are

divided into five classes with specific provisions for permitting, monitoring, and reporting of each class. Produced water disposal wells are Class II wells. These wells are "wells which inject fluids... which are brought to the surface in connection with natural gas storage operations, or conventional oil or natural gas production..."[40 CFR 144.6(b)(1)]. The UIC program is administered by the NMOCD. Under this program, the size, holding capacity, and potential of water to migrate from the formation proposed for injection is evaluated prior to permit issuance. In addition to BLM staff, NMOCD staff are present during the drilling and completion of these wells. Pressure and injection volumes of disposal wells are limited in each permit to assure injection fluids do not fracture or "part" the injection formation and cause migration of injected fluids. Additionally, inspections and periodic checks are made to ensure (operating) injection pressures are within allowable, approved limits for pumping water into the specified formation.

WATER PRESSURE AND QUALITY

Relative to the normal fresh water hydrostatic gradient of .433 pounds per square inch per foot (psi/ft), the Fruitland (coal) Formation is overpressured (0.44 to >0.5 psi/ft gradient) in the northern portion (Colorado/New Mexico) of the San Juan basin. It is underpressured (<.44 psi/ft gradient) in the southern portion (New Mexico) of the basin (Buys and Associates, 1990). Based on the thickness and extent of the coal formation and amount of water produced from wells in the San Juan 30-6 and Northeast Blanco well field units (New Mexico), water (and gas) production appears heaviest in the overpressured coal gas zone. Therefore, most Fruitland coal development,



MAP D-1
FRUITLAND FORMATION PRESSURE-GRADIENT MAP
 (AFTER AYERS AND OTHERS), 1988)

dissolved solids (TDS), sodium, bicarbonate HCO_3 , and chloride.

Sodium- (Na-) bearing (produced) water is found primarily in the northern (Colorado/New Mexico) overpressured portion of the San Juan Basin. Produced water high in Na-HCO_3 is located primarily in the north-central (Colorado/New Mexico) overpressured portion of the basin. Chloride-rich water is found primarily in the southern (New Mexico) underpressured portion of the basin. TDS for water in the northern portion of the basin ranges from 2,000 to 30,000+ milligrams per liter (mg/l), with a chloride content of 18,000 to 26,000 mg/l.

DISPOSAL WELLS

Water is separated from the gas at the well site and transported by flow lines or truck to a central treatment facility. It is then transported by flow lines to the produced water disposal (injection) facility. The water goes through an extensive filtering process to remove coal fragments and larger TDS particles. It is then pumped into and stored in holding tanks until such time as the water, by gravity and under pressure (pumping), is injected into the well. Because of the high cost of drilling these wells (\$1,000,000+ per well), extensive filtering systems are used and strict operating procedures followed to insure the full operational life (and integrity) of these wells.

The design and proposed construction of a proposed injection well is considered during the review of the operator's permit application. The BLM and the NMOCD reviews focus on the geologic and engineering parameters for the proposed well. Emphasis is also placed on evaluating procedures used to ensure that hydrocarbon-bearing zones, mineralized sections, or freshwater aquifers are properly isolated from the well bore. This is generally accomplished by circulating and placing cement between the well casing and bore-hole wall. Impacts to nearby wells and adjacent geology are also considered.

Injection pressure is maintained according to rates and pressures established, specified, and monitored under the permit issued by the BLM and the NMOCD. Routine pressure tests are conducted to check the integrity of the casing and

tubing strings of the injection wells. An operator may also be required to run a radioactive tracer survey to ensure that injection fluids are properly exiting the well bore and are contained within the disposal formation (USDI, BLM 1989).

Currently there are approximately 100 disposal wells in the San Juan Basin (New Mexico). Based on RFD projections, another 40 wells would be drilled in New Mexico during the next 20 years. At this time, all disposal wells are in operation. However, operational indicators show water injection is approaching the maximum allowable storage capacity at some older wells.

When the system is considered to be full (approaching maximum formation pressure), the operator can no longer inject disposal fluids at approved rates and pressures into the well bore. Without approval to increase injection pressures (by step rate tests), the company operating the facility is then required to plug and abandon the well. Other disposal wells would then be drilled and operated, as needed.

INJECTION FORMATION

Dewatering of the Fruitland Formation at the well head(s) is essential in the recovery of the gas produced from Fruitland coal. There is a direct correlation between the rate of dewatering and gas production. As water production decreases at the well(s), gas production increases.

Although dewatering will occur at well locations, draw down of water from overlying formations is not likely to occur. Kirtland Shale, between Fruitland coal and overlying formations, is an impermeable barrier to the movement of water between formations (Stone, et. al 1983). Although the (1) possibility of fractures in the Kirtland Shale and/or (2) potential movement of water along these cracks has been inferred or suggested, there is (currently) no evidence that water is moving between formations. The presence (replacement) of better quality water in the coal beds, originating from shallow aquifers, has not been observed. For this reason, Rice and others (1988) have concluded that there is "no groundwater communication between shallow aquifers and the coal beds across the Kirtland Shale" (USDI, BLM 1989).

Volume displacement as the result of removing water and gas may result in gas expansion, coal expansion, and formation compression. Disruption of the previous equilibrium (balance) would allow the gas, coal, and surrounding rock to expand, i.e. similar to the foam that forms after the contents are released from a can of shaving cream. Data is not available as to the percentage or extent that any of these factors contribute to the overall replacement of water and gas (USDI, BLM 1989). However, it is felt that with a lack of water replacement in the coal beds, these processes are the primary means for reestablishing equilibrium in the areas where water and gas are removed.

Many of the shallower formations are productive of hydrocarbons. Therefore, produced water (from conventional and Fruitland wells) is generally injected into a formation deeper than the producing formation. Under BLM and NMOCD requirements, produced water may be injected into a formation with the same or lesser water quality than the produced water. For these reasons, Fruitland water is currently being injected into the Entrada Sandstone, which is located at depths ranging from @7,000 to @9,000 feet. The Fruitland Formation (north central portion of the San Juan Basin) is approximately @2,500 feet deep.

The propagation of fractures in any zone, due to injecting produced water, should not occur because of the pressure limits that are set on these wells by the BLM and the NMOCD (personal communication with Ernie Busch of NMOCD 1990). Discharge of water from this formation, at some point further downgradient where it outcrops at the surface (near Thoreau, New Mexico), is also not considered likely. These determinations are based primarily on the physical properties of rock and water, which would result in a "pressuring up" of the system before overpressurization or downgradient flows would occur. Once the available pore space within the rock is filled, back pressuring or a reversal in pressure gradients would occur in the system. At

that point, water could not be pumped into the formation.

Although the storage capacity of the Entrada Sandstone is not known, it is thought that this formation is large enough to hold the water produced from Fruitland wells (personal communication with Ernie Busch of NMOCD 1990). If, at a future date, it appears that water injection is approaching the upper limits of the available holding capacity of the formation, other formations would be considered for water disposal.

Based on the relatively short time in which produced water injection has occurred in the San Juan Basin, there is a lack of data about the holding capacity of the Entrada and the effects, if any, of injecting produced water into this formation. Without this information, the effects (short- and long-term) of produced water disposal would be purely speculative.

Although information is not available about injection water into the Entrada, produced water disposal is and has been occurring in the southern part of the state for a number of years. Injection of produced water from well fields in southeast New Mexico continues to be an ongoing, standard operation for well field operations in that area. This method of disposal is also used throughout other locations in the United States. No long-term problems associated with hydraulic fractures and pressure-up effects have been identified in these areas.

Based on the points presented in this section, it is assumed that the system would "pressure up" before downgradient flows, fracturing, and/or cracking would occur in the formation. In addition to the depth of this formation, shale formations above (Summerville Formation) and below (Chinle Formation) the Entrada also serve as impermeable barriers between water in the Entrada and other water-bearing formations.

APPENDIX D-2: OIL AND GAS SPILL PREVENTION PLAN REQUIREMENTS
AND RECLAMATION PROCEDURES FOR PRODUCED WATER SPILLS
FROM FRUITLAND COAL WELLS

I. Oil and Gas

The Federal Water Pollution Control Act Amendments of 1972 require the Administrator of the Environmental Protection Agency (EPA), with other Federal, State, and interstate agencies, to enter into programs designed to prevent, reduce, or eliminate pollution of the navigable waters of the United States. The term "navigable waters" is defined in 40 CFR, Part 112, Section 112.2 (k). Generally speaking, every body of water or continuous stream should be considered as navigable. The definition includes the following:

- (1) waters that are navigable in fact;
- (2) waters declared navigable by a Federal agency or court;
- (3) tributaries of navigable waters;
- (4) interstate waters; and
- (5) intrastate lakes, rivers, and streams
 - (a) from which fish or shellfish are taken and sold in interstate commerce, or
 - (b) which are utilized by interstate travelers for recreational or other purposes.

On December 11, 1973 the EPA published regulations for the prevention of pollution of waters of the United States by oil emanating from non-transportation related onshore and offshore facilities. The regulations are identified as Title 40, Code of Federal Regulations, Part 112 (40 CFR, Part 112), "Oil Pollution Prevention-Non-transportation Related Onshore and Offshore Facilities".

These regulations require the preparation and implementation of a Spill Prevention Control and Countermeasure (SPCC) Plan for all non-transportation related facilities (onshore and offshore) which have discharged or could reasonably be expected to discharge oil into the navigable waters of the United States or the adjoining shorelines. Non-transportation related production facilities include, but are not limited to, oil production lease facilities, mobile or portable drilling or workover rigs

operating in a fixed mode, portable fueling facilities, and gas processing plants. Gas treating and compression operations integrally associated with oil production operations or gas processing plants are to be considered a part of the production lease or plant facility.

Individual SPCC Plans must be prepared by the owner or operator of each mobile or portable drilling or workover rig. These plans will apply from location to location and need not be redone each time the rig moves. Well and lease service operations such as paraffin and scale removal, etc., are to be covered by the SPCC Plan prepared for the lease production facility.

SPCC Plans are to be prepared and maintained at an appropriate place near or at the facility. Operators are to implement the SPCC Plans as soon as possible after preparation, but no later than one year after date of first operation.

Each SPCC Plan must be reviewed and certified by a Registered Professional Engineer.

The operator of a facility for which a SPCC Plan is required must maintain a complete copy of the Plan at the facility, if manned at least 8 hours per day, or at the nearest field office if unmanned. The Plan must be made available to EPA personnel for on-site review anytime during normal working hours.

Owners or operators of facilities who violate the requirements of the regulations relating to the preparation, implementation, and amendments to SPCC Plans are liable for a civil penalty of not more than \$5,000 for each day that such violation continues. The EPA Regional Administrator may assess and compromise such civil penalty. No penalty will be assessed until the owner or operator has been given notice and an opportunity for hearing.

II. Reclamation Procedures - Fruitland Coal Wells

The following are excerpts from a report prepared for Meridian Oil Incorporated and ARCO Oil and Gas Company. The report addresses reclamation procedures for produced water spills from Fruitland Coal gas wells. The complete report is available for review in the Farmington Resource Area office.

INTRODUCTION

A recent development in the San Juan Basin has been the drilling and completion of natural gas wells in the Fruitland Coal Formation. A Fruitland Coal well usually produces much more water than a typical San Juan Basin gas well. Water produced from Fruitland Coal wells can adversely affect soil and vegetation when spilled.

Meridian Oil Inc. (Meridian), Blackwood & Nichols Co., Ltd. (Blackwood & Nichols) and ARCO Oil and Gas Company (ARCO) are aggressively developing well fields in this Fruitland Coal Play. The Meridian well fields are the San Juan 30-6, San Juan 32-9, Pump Canyon, Cedar Hill and Middle Mesa. The Blackwood & Nichols well fields are the Middle Mesa, Pump Mesa, Sims Mesa and La Jara. The ARCO well fields are the Atlantic and Pump Canyon. Several water disposal wells have been drilled and more are anticipated to handle the increased volumes of water produced by Fruitland Coal gas wells. Water is separated from the gas at the well site and is then transported by flow lines or truck to a central facility. From there it is again transported by flow lines to the salt water disposal well for injection. Produced water is transported by truck to disposal wells where gathering systems are not yet complete.

Produced water gathering systems for coal gas wells are very extensive and will continue to expand. The bulk of the gathering system for the Meridian San Juan 30-6 and San Juan 31-6 is currently in place. Construction of gathering systems for the Meridian Pump Canyon and Cedar Hill are currently being designed. The gathering systems for the Meridian Middle Mesa and San Juan 32-9, all four Blackwood & Nichols and both ARCO fields are currently in the design stage. Spills and leaks of water produced from coal gas wells have occurred from reserve pits and pipeline breaks on property managed by the Bureau of Land Management (BLM). The BLM has required that Meridian, Blackwood & Nichols and ARCO produce a contingency plan which addresses the environmental effects of produced water spills on soil and vegetation. Buys and Associates collected the data and developed the contingency plan for Meridian and ARCO. The report defines the quality of produced water, characterizes the soil and vegetation, evaluates the effects of produced water on soil and vegetation, and recommends specific clean-up and reclamation procedures for spills and reserve pits for the Meridian, Blackwood & Nichols and ARCO coal gas fields.

RECOMMENDATIONS

Active, in-place reclamation is recommended to remediate saline-sodic soils created by produced water spills. The procedure to be followed is described below and outlined in Tables 9.1 and 9.2. Reclamation procedures for produced water spills will also be useful for reserve pits.

The threshold volume of spilled water at which further action should occur for all soil types in all well fields is 10 barrels. The impact of salt water is cumulative. Further action should occur when total volumes spilled through time in one location reach this recommended threshold volume. A system of record keeping should be implemented by Meridian, Blackwood & Nichols and ARCO to record locations, volumes, and dates of produced water spills and types of soils impacted by these spills.

Once spills and leaks exceed the threshold limit of 10 barrels, soil samples should be collected at one location within the spill site the day after the spill occurs. These samples will be analyzed to determine whether saline or sodic conditions are present. Samples should be analyzed by the same laboratory utilized for this study (Core Laboratories of Aurora, Colorado) to ensure uniformity. The sampling methodology employed should also be the same as was used for this study with one exception. Three samples should be collected from one borehole. The three samples should be composited from depths of 0 to 1, 1 to 2, and 2 to 3 foot. The same ten parameters used to characterize baseline soil properties and determine the effects of produced water spills on soil should be used to determine further actions at spill sites. No background samples are required since background soil chemistry is presented in Tables 4.4, 4.5 and 4.6.

Reclamation will be required if any of the three soil samples collected at a spill site are saline or sodic. Further action is not necessary if none of the three soil samples are saline or sodic. Additional spills of any volume at sites that did not previously require further action necessitate resampling in the manner described above.

Reclamation should be conducted promptly after the soil condition is determined to minimize deterioration of the soil structure. To facilitate the reclamation process and ensure prompt response to spills, suppliers for the gypsum amendments and organic additives and seeds which will be required for standard spill sites should be identified. Each of the suppliers must be able to provide these materials on short notice. Supplies of gypsum and organic amendments should ideally be stockpiled for immediate use.

The recommended amendments are gypsum and native grass mulch or aged manure. Gypsum is preferred because of cost and ease of application. The gypsum should be as fine a grade as is

available. A rate of 7 tons per acre of soil disked to 1 foot is recommended for thick clay loams. Somewhat less (4 to 6 tons per acre) is recommended for thin sandy and clay loams (Table 9.2). Although these rates are approximately 40 percent less than those recommended by Richards (1954), they are consistent with the rate which produced the beneficial results within 5 months at the Meridian San Juan 30-6 Unit #434 spill site. Native grass mulch is preferred to manure. Either of these organic materials is preferred to straw or hay. Fertilizers are not recommended for use. Native grass mulch should be applied at the rate of 2 to 2.5 tons per acre. Manure should be applied at a rate of 75 pounds per 100 square feet (10 to 20 tons per acre). The amendments should be disked into the soil if the topography is suitable, otherwise they may be applied and worked into the soil manually.

Leaching with water should immediately follow the application of amendments. The amount of water applied should equal the thickness of the soil profile present at the spill site up to a maximum amount of 60 inches (Table 9.2). The water should be applied in as few separate stages as is practical. It should be impounded over the spill site, if the topography is suitable, by flooding.

Hillsides with gentle to moderate slopes may be terraced before following the standard reclamation procedures described above. On steeper slopes, hydromulching techniques may be employed to apply the standard amendment mixtures.

Salt-tolerant grasses and shrubs (Alkali sacaton, Western wheatgrass, Fourwing saltbush and Indian ricegrass) should be reseeded during the period of July 1 to September 15. This is the period of greatest precipitation of the year. A seed mixture of 25 percent of each species should be applied at a rate of 4.5 pounds pure live seed (PLS) per acre. The methods of seeding should be the same as are required by the BLM for plugged and abandoned well sites. Desert or Inland saltgrass sprigs or sets may also be transplanted from other areas. Transplanting may be necessary in areas of rugged topography. The organic matter mixed into the soil with the amendments will provide the necessary nutrients for successful seed germination and growth. Seeded sites will require fencing if large populations of wildlife or livestock graze in the area.

A system of verification sampling is recommended to help evaluate the success of reclamation. Soil samples from within each spill site should be collected at two specific intervals of time after amendments are applied. The slow rate of reclamation and the analytical results from sampling at the Meridian San Juan 30-6 Units #400, #412, and #434 suggest that the first post-amendment verification sample be collected 6 months after the amendments are first applied. No background samples are required since background soil chemistry is presented in Tables 4.4, 4.5 and 4.6. The parameters to be analyzed should be the same ten

discussed in Appendix B. These samples should also be analyzed by CORE Laboratories of Aurora, Colorado to ensure uniformity. Sampling methodology employed should also be the same as was used for this study (Appendix B) with one exception. Three samples should be collected from one borehole. The three samples should be composited from depths of 0 to 1, 1 to 2, and 2 to 3 foot. A second post-amendment verification sample should be collected with the same procedures after another 6-month interval (1 year after amendments are first applied). A second stage of soil reclamation and verification sampling is recommended if any of the second post-amendment verification samples remain saline or sodic. The success of the revegetation program should be checked when the verification samples are collected.

Reclamation can be considered complete when soils are no longer saline (electrical conductivity less than 4 mmhos/cm) or sodic (exchangeable sodium percentage less than 15) and the reseeded vegetation has become established. Vegetation will be considered restored according to the same discretionary standard the BLM uses for plugged and abandoned well sites.

Table 4.4
Measured Chemical Properties of
Soil Types of Western Rio Arriba County

Soil Associations & Map Symbol	n	pH	EC (mmhos/cm)	SAR	CEC (meq/100g)	ES (meq/100g)	ESP (%)	Calcium (mg/l)	Magnesium (mg/l)	Sodium (mg/l)	Chloride (mg/l)
31 (yellow)											
- Gobernador	2	7.80-7.90	0.183-0.205	0.64-0.78	16.30-17.00	0.01-0.02	0.10	25.00-27.00	2.65-2.73	12.60-15.80	2.00-3.00
- Orlie	6	7.90-8.45	0.168-0.267	0.19-1.45	14.70-18.80	0.04-0.21	0.30-1.14	15.00-36.00	3.51-10.30	3.90-27.00	1.00-5.00
103,90,32(purple)											
- Orlie	6	7.90-8.45	0.168-0.267	0.19-1.45	14.70-18.80	0.04-0.21	0.30-1.14	15.00-36.00	3.51-10.30	3.90-27.00	1.00-5.00
220 (green)											
- rock outcrop	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
- Vessilla	5	7.90-8.97	0.158-0.282	0.05-0.37	10.10-26.90	0.01-0.07	0.09-0.30	25.00-62.00	2.05-6.33	1.40-8.00	2.00-31.80
- Menefee	3	8.20-8.50	0.179-0.224	0.07-1.78	17.10-32.10	0.01-0.35	0.06-1.10	14.60-31.00	2.38-5.20	1.60-30.00	1.80-6.00
30 (blue)											
- San Mateo	2	8.00-8.05	0.118-0.285	0.26-0.39	11.40-18.50	0.04-0.06	0.20-0.53	9.89-43.00	3.14-5.25	5.50-6.70	3.30-5.00
110 (pink)											
- Vessilla	5	7.90-8.97	0.158-0.282	0.05-0.37	10.10-26.90	0.01-0.07	0.09-0.30	25.00-62.00	2.05-6.33	1.40-8.00	2.00-31.80
- Menefee	3	8.20-8.50	0.179-0.224	0.07-1.78	17.10-32.10	0.01-0.35	0.06-1.10	14.60-31.00	2.38-5.20	1.60-30.00	1.80-6.00
- Orlie	6	7.90-8.45	0.168-0.267	0.19-1.45	14.70-18.80	0.04-0.21	0.30-1.14	15.00-36.00	3.51-10.30	3.90-27.00	1.00-5.00
119 (white)											
-Roques	1	8.25	0.190	0.18	24.8	<0.01	<0.01	32.0	3.51	4.1	3.7
-Nusmag	1	8.41	0.244	0.08	15.4	0.01	0.06	41.0	5.47	2.0	3.5

n = number of samples

EC = Electrical Conductivity

SAR = Sodium Adsorption Ratio

CEC = Cation Exchange Capacity

ES = Exchangeable Sodium

ESP = Exchangeable Sodium Percentage

NA = Not Analyzed

Table 4.5
Measured Chemical Properties of
Predominant Soil Types of Eastern San Juan County

Soil Associations & Map Symbol	n	pH	EC (mmhos/cm)	SAR	CEC (meq/100g)	ES (meq/100g)	ESP (%)	Calcium (mg/l)	Magnesium (mg/l)	Sodium (mg/l)	Chloride (mg/l)
BT (yellow)											
- Blancot	2	8.40-8.50	0.253-0.278	0.12-0.19	13.00-13.50	0.05	0.40	40.00-42.00	5.96-6.31	3.20-4.90	1.00-2.00
- Notal	2	7.90-8.14	0.152-0.362	0.78-1.10	18.80-28.70	0.07-0.19	0.37-0.70	15.30-33.00	3.32-5.50	12.90-26.00	2.00-41.40
RT (pink)*											
- Rock outcrop	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
- Travessilla	3	7.40-7.97	0.066-0.867	0.22-1.93	4.24-7.50	0.01-0.09	0.67-2.12	7.79-49.0	1.01-4.80	2.50-53.0	3.00-158.0
- Weska	2	8.10-8.56	0.100-1.710	3.37-3.63	21.10-35.20	0.31-0.97	1.47-2.80	1.64-62.0	0.41-68.0	18.60-174.0	1.00-468.0
TA (green)*											
- Travessilla	3	7.40-7.97	0.066-0.860	0.22-1.93	4.24-7.50	0.01-0.09	0.67-2.12	7.79-49.0	1.01-4.80	2.50-53.0	3.00-158.0
- Weska	2	8.10-8.56	0.100-1.710	3.37-3.63	21.10-35.20	0.31-0.97	1.47-2.80	1.64-62.0	0.41-68.0	18.60-174.0	1.00-468.0
- Rock outcrop	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PO (purple)**											
- Penistaja	2	7.70-7.93	0.126-1.900	1.14-3.03	21.00-38.8	0.17-0.52	0.80-1.34	9.18-130.0	2.76-34.0	15.30-150.0	2.00-513.0
PP (light blue)**											
- Penistaja	2	7.70-7.93	0.126-1.900	1.14-3.03	21.00-38.8	0.17-0.52	0.80-1.34	9.18-130.0	2.76-34.0	15.30-150.0	2.00-513.0
- Buckle	3	7.48-8.10	0.176-1.340	0.16-2.64	15.70-15.90	<0.01-0.05	<0.01-0.30	28.00-117.0	4.39-11.9	3.50-112.0	1.00-387.0

*Soil associations RT and TA are relatively similar

**Soil associations PO and PP are relatively similar

n = number of samples

EC = Electrical Conductivity

SAR = Sodium Adsorption Ratio

CEC = Cation Exchange Capacity

ES = Exchangeable Sodium

ESP = Exchangeable Sodium Percentage

NA = Not Analyzed

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Table 4.6
Measured Chemical Properties of
Minor Soil Types of Eastern San Juan County

Soil Associations & Map Symbol	n	pH	EC (mmhos/cm)	SAR	CEC (meq/100g)	ES (meq/100g)	ESP (%)	Calcium (mg/l)	Magnesium (mg/l)	Sodium (mg/l)	Chloride (mg/l)
BA (dark green) - Badland	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BR (gray)* - Blancot - Fruitland	2 2	8.40-8.50 8.18-8.40	0.253-0.278 0.132-1.190	0.12-0.19 0.25-4.67	13.00-13.50 8.92-9.90	0.05 0.05-0.07	0.40 0.60-0.71	40.00-42.00 18.90-63.0	5.96-6.31 2.61-6.21	3.20-4.90 4.30-145.0	1.00-2.00 1.00-345.0
SW (white)* - Stumble - Fruitland	1 2	7.50 8.18-8.40	0.089 0.132-1.190	0.09 0.25-4.67	8.05 8.92-9.90	0.02 0.05-0.07	0.30 0.60-0.71	13.40 18.90-63.0	0.47 2.61-6.21	1.23 4.30-145.0	1.00 1.00-345.0
BU (orange)** - Buckle	3	7.48-8.10	0.176-1.340	0.16-2.64	15.70-15.90	<0.01-0.05	<0.01-0.30	28.00-117.0	4.39-11.9	3.50-112.0	1.00-387.0
DN (royal blue)** - Doak - Avalon	2 2	8.48-8.50 8.13-9.60	0.188-0.221 0.430-3.620	0.16-1.03 2.62-11.10	10.90-19.50 9.03-13.50	0.04-0.24 <0.01-1.54	0.37-1.20 <0.01-11.40	23.00-27.00 5.83-620.0	5.10-5.17 0.98-143.0	3.40-21.00 110.00-278.0	2.00-2.70 3.00-37.2
FA (dark red) - Farb - Persayo - Rock outcrop	2 2 0	8.00-8.69 7.94-8.90 NA	0.099-0.279 0.108-0.287 NA	0.07-0.24 2.05-4.37 NA	6.09-13.50 18.20-29.60 NA	0.01-0.02 0.44-1.11 NA	0.10-0.33 1.49-6.10 NA	8.11-65.00 3.46-9.92 NA	1.38-4.37 1.03-1.81 NA	2.10-2.80 16.90-57.00 NA	2.50-6.00 1.70-2.00 NA

*Soil associations RT and TA are relatively similar

**Soil associations PO and PP are relatively similar

n = number of samples

EC = Electrical Conductivity

SAR = Sodium Adsorption Ratio

CEC = Cation Exchange Capacity

ES = Exchangeable Sodium

ESP = Exchangeable Sodium Percentage

NA = Not Analyzed

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Table 4.6 (continued)
 Measured Chemical Properties of
 Minor Soil Types of San Juan County

Soil Associations & Map Symbol	n	pH	EC (mmhos/cm)	SAR	CEC (meq/100g)	ES (meq/100g)	ESP (%)	Calcium (mg/l)	Magnesium (mg/l)	Sodium (mg/l)	Chloride (mg/l)
HA (dark blue)	2	7.40-8.07	0.226-0.601	0.06-0.25	9.13-9.68	0.01	0.10	28.00-33.00	2.88-5.97	1.85-5.50	2.00-4.00
- Haplargids	2	8.00-8.38	0.248-0.297	0.07-0.12	14.40-25.00	0.01	0.07-0.10	42.00-50.00	2.39-3.23	1.66-3.30	2.00-4.90
- Blackston	1	8.10	0.256	0.14	25.30	0.03	0.10	46.00	4.63	3.60	3.00
- Torriorthents											
PX (white)	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
- pits											
RA (red)	1	8.21	0.456	1.68	6.85	0.04	0.58	39	5.06	42	51.1
- riverwash											
TW (dark orange)	2	8.30	0.294-0.424	0.12-0.46	24.10-39.60	<0.01-0.03	<0.01-0.10	51.00-89.00	5.06-16.60	4.70-12.80	5.60-12.00
- Twick	3	7.70-8.36	0.229-0.263	0.07-0.18	25.00-25.60	0.02-0.03	0.08-0.12	39.00-49.00	4.47-7.53	1.89-4.50	3.00-3.80
- Silver											

n = number of samples
 EC = Electrical Conductivity
 SAR = Sodium Absorption Ratio
 CEC = Cation Exchange Capacity

ES = Exchangeable Sodium
 ESP = Exchangeable Sodium Percentage
 NA = Not Analyzed

TABLE 9.1
RECLAMATION PROCEDURES

- Identify vendors of materials; stockpile materials where appropriate.
- Collect soil sample when threshold volume of 10 barrels is reached.
- Begin reclamation if soil is saline or sodic. None of the further action described below is required if soil is neither saline nor sodic.
- Additional spills of any volume at sites that did not previously require further action necessitate resampling.
- Identify soil present. Soils underlying wells and gathering systems are identified on the following maps:
 - Meridian San Juan 30-6: Plate 4-1
 - Meridian San Juan 31-6: Plate 4-2
 - Blackwood & Nichols La Jara, Sims Mesa, Middle Mesa and Pump Mesa: Plate 4-3
 - Meridian San Juan 32-9: Plate 4-4
 - Meridian Pump Canyon: Plate 4-5
 - Meridian Cedar Hill: Plate 4-6
 - Meridian Middle Mesa: Plate 4-7
 - ARCO Atlantic: Plate 4-8
 - ARCO Pump Canyon: Plate 4-9
- Apply gypsum amendments and native grass mulch or aged manure. Amendment rate is specified in Table 9-2. Apply native grass mulch at the rate of 2 to 2.5 tons per acre or aged manure at the rate of 10 to 20 tons per acre. Disk or manually apply amendments to 1 foot or bedrock, whichever is shallower.
- Promptly leach with water. Amounts are specified in Table 9-2. Impound water where practical.
- Seed area with salt-tolerant grasses and shrubs during the period of July 1 to September 15. Plant species are Alkali sacaton, Western wheatgrass, Fourwing saltbush and Indian ricegrass. Use a seed mixture of 25% of each at a rate of 4.5 pounds PLS per acre. The methods of seeding should be the same as are required by the BLM for plugged and abandoned well sites. Desert or Inland saltgrass sprigs or sets may also be transplanted from other areas.

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TABLE 9.1 (continued)
RECLAMATION PROCEDURES

- Fence seeded site if large populations of wildlife or livestock graze in the area.
- Collect verification samples from spill site 6 months after amendments are applied. Follow sampling methodology described in Appendix B. Ship samples to CORE Laboratories of Aurora, Colorado. Analyze soils for pH, electrical conductivity (EC), sodium adsorption ratio (SAR), cation exchange capacity (CEC), exchangeable sodium (ES), exchangeable sodium percentage (ESP), calcium, magnesium, sodium and chloride. Use values listed in Tables 4.4, 4.5 and 4.6 for background soil chemistry.
- Collect a second post-amendment sample 6 months after the first sample is collected. Follow the procedures described above.
- Reclamation complete if soils no longer saline (EC less than 4 mmhos/cm) or sodic (ESP less than 15) and vegetation restored according to the same discretionary standard the BLM uses for plugged and abandoned well sites.

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TABLE 9.2
Soil Reclamation
Western Rio Arriba County
Meridian Well Fields: San Juan 30-6, San Juan 31-6
Blackwood & Nichols Well Fields: La Jara, Sims Mesa

Soil Association/ Type & Map Symbol	Texture (USDA)	Threshold Volume (Barrels)	Amendment Rate ¹	Water (inches)
31 (yellow) - Gobernador - Orlie	silty clay loam to clay clay loam	10 10	7 7	60 60
103,90,32 (purple) - Orlie	clay loam	10	7	60
220 (green) - rock outcrop - Vessilla - Menefee	sandstone sandy loam clay loam	No Action 10 10	None 4.5 6	None 10 10
30 (blue) - San Mateo	sandy loam	10	5	60
110 (pink) - Vessilla - Menefee - Orlie	sandy loam clay loam clay loam	10 10 10	5 6 7	15 10 60
119 (white) - Roques - Nusmag	clay loam to clay clay loam to clay	10 10	7 7	60 60

¹Tons per acre, disked to 1 foot or top of bedrock

TABLE 9-2 (continued)
 Soil Reclamation, Eastern San Juan County
 Meridian Well Fields: San Juan 32-9, Pump Canyon, Cedar Hill and Middle Mesa
 Blackwood & Nichols Wells Fields: Middle Mesa, Pump Mesa and Sims Mesa
 ARCO Well Fields: Atlantic and Pump Canyon

Soil Association/ Type & Map Symbol	Texture (USDA)	Threshold Volume (Barrels)	Amendment Rate	Water (inches)
BT (yellow) - Blancot - Notal	loam (CL-ML, ML) silty clay loam (CL, ML)	10 10	7 7	60 60
RT (pink) - rock outcrop - Travessilla - Weska	sandstone sandy loam (SM-SC) silty clay loam (CL)	No Action 10 10	None 4 4	None 9 7
IA (green) - Travessilla - Weska - rock outcrop	sandy loam (SM-SC) silty clay loam (CL) sandstone	10 10 No action	5 5.5 None	12 9 None
PO (purple) - Penistaja	loam (ML), sandy clay loam (CL-ML)	10	7	60
PP (light blue) - Penistaja	loam (ML), sandy clay loam (CL-ML), silt loam (CL-ML) clay loam (CL)	10 10	7 7	60 60
- Buckle				

¹Tons per acre, disked to 1 foot or top of bedrock

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TABLE 9-2 (continued)
 Soil Reclamation, Eastern San Juan County
 Meridian Well Fields: San Juan 32-9, Pump Canyon, Cedar Hill and Middle Mesa
 Blackwood & Nichols Wells Fields: Middle Mesa, Pump Mesa and Sims Mesa
 ARCO Well Fields: Atlantic and Pump Canyon

Soil Association/ Type & Map Symbol	Texture (USDA)	Threshold Volume (Barrels)	Amendment Rate	Water (inches)
BA (dark green) - Badland	barren shale uplands	No action	None	None
BR (gray) - Blancot - Fruitland	loam (CL-ML, ML) sandy loam (SM)	10 10	7 5	60 60
SW (white) - Stubble - Fruitland	loamy sand (SM) sandy loam (SM)	10 10	5 5	60 60
BU (orange) - Buckle	silt loam (CL-ML) clay loam (CL)	10	7	60
DN (royal blue) - Doak - Avalon	loam (ML) loam (CL-ML)	10 10	7 7	60 60
FA (dark red) - Farb - Persayo - rock outcrop	fine sandy loam (SM) clay loam (CL) sandstone	10 10 No action	4.5 7 None	10 15 None

¹ Tons per acre, disked to 1 foot or top of bedrock

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TABLE 9-2 (continued)

Soil Reclamation, Eastern San Juan County
 Meridian Well Fields: San Juan 32-9, Pump Canyon, Cedar Hill and Middle Mesa
 Blackwood & Nichols Wells Fields: Middle Mesa, Pump Mesa and Sims Mesa
 ARCO Well Fields: Atlantic and Pump Canyon

Soil Association/ Type & Map Symbol	Texture (USDA)	Threshold Volume (Barrels)	Amendment Rate	Water (inches)
HA (dark blue) - Haplargids - Blackston	vaqried gravelly loam (SM, SM-SC) varied	10	5	60
- Torriorthenents		10	5	60
PX (white) - pits	gravel & borrow pits	No action	None	None
RA (red) - riverwash	varied	No action	None	None
TW (dark orange) - Twick	cobbly silty clay loam (CL, ML) clay loam (MH) cobbly silty clay loam (CL), clay (CL)	10	7	17
- silver		10	7	60
BC (white) - Badlands - rock outcrop - Persayo	barren shale uplands shale clay loam (CL)	No action No action 10	None None 7	None None 15

¹Tons per acre, disked to 1 foot or top of bedrock

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APPENDIX E

Two Mechanisms for the Migration of Thermogenic Gas

TWO MECHANISMS FOR THE MIGRATION OF THERMOGENIC GAS

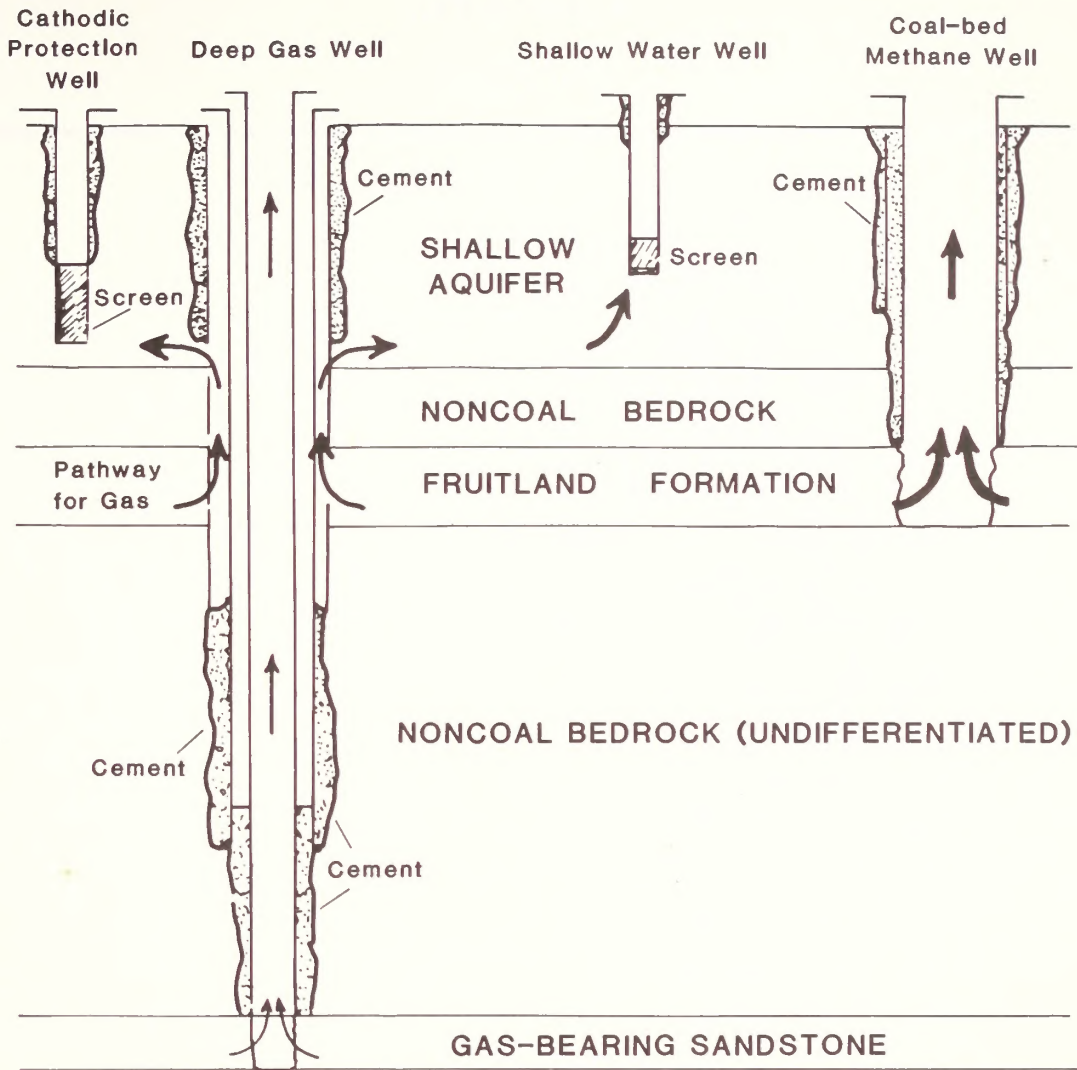


Diagram shows two mechanisms for the migration of thermogenic gas to a shallow water well and to a cathodic protection hole. The thick arrows indicate how natural gas escapes the coal formation via the uncemented portion of a deep gas well that penetrates the coal seam. The thin arrows show how gas might migrate into the shallow alluvial aquifer from leaks in the casing of the deep gas well. Vertical scale is exaggerated from actual depths. (Diagram courtesy of Southwest Research and Information Center.)

APPENDIX F

Wildlife Data

APPENDIX F

TABLE F-1. REGIONAL WILDLIFE HABITAT TYPES

Kuchler Code	Kuchler Category	Kuchler Type	Dominant Genera	Occurrence by Resource Area			Index of Rarity ^{1/}
				Farmington/Rio Puerco/Taos	Area		
17	Needleleaf Forests	Pine-Douglas Fir Forest	<u>Pinus</u> - <u>Pseudotsuga</u>	X	X	X	100
20	Needleleaf Forests	Southwestern Spruce-Fir Forest	<u>Picea</u> - <u>Abies</u>	X			63
21	Needleleaf Forests	Juniper-Pinyon Woodland	<u>Juniperus</u> - <u>Pinus</u>	X	X	X	128
32	Shrub	Great Basin Sagebrush	<u>Artemisia</u>	X	X	X	119
34	Shrub	Saltbush-Greasewood	<u>Atriplex</u> - <u>Sarcobatus</u>		X	X	118
46	Grassland	Fescue-Mountain Muhly Prairie	<u>Festuca</u> - <u>Muhlenbergia</u>			X	26
47	Grassland	Grama-Galleta Steppe	<u>Bouteloua</u> - <u>Hilaria</u>	X	X	X	101
58	Grassland	Grama-Bufferalo Grass	<u>Bouteloua</u> - <u>Buchloe</u>			X	130
64	Grassland	Shinnery	<u>Quercus</u> - <u>Andropogon</u>			X	65

Source: Based on Kuchler, 1985.

Note: ^{1/}Index scale 1 = most rare, 135 = most common.

APPENDIX F (concluded)

TABLE F-2. WILDLIFE SPECIES OCCURRENCE BY REGIONAL HABITAT TYPE

Kuchler Code	Kuchler Category	Kuchler Type	Dominant Genera	Amphibians/Birds/Mammals/Reptiles ^{1/}
17	Needleleaf Forests	Pine-Douglas Fir Forest	<u>Pinus</u> - <u>Pseudotsuga</u>	5 193 61 12
20	Needleleaf Forests	Southwestern Spruce-Fir Forest	<u>Picea</u> - <u>Abies</u>	4 105 41 1
21	Needleleaf Forests	Juniper-Pinyon Woodland	<u>Juniperus</u> - <u>Pinus</u>	9 182 61 18
32	Shrub	Great Basin Sagebrush	<u>Artemisia</u>	4 170 41 18
34	Shrub	Saltbush-Greasewood	<u>Atriplex</u> - <u>Sarcobatus</u>	7 160 46 20
46	Grassland	Fescue-Mountain Muhly Prairie	<u>Festuca</u> - <u>Muhlenbergia</u>	4 138 37 6
47	Grassland	Grama-Galleta Steppe	<u>Bouteloua</u> - <u>Hilaria</u>	4 79 25 12
58	Grassland	Grama-Bufferalo Grass	<u>Bouteloua</u> - <u>Buchloe</u>	15 277 60 34
64	Grassland	Shinnery	<u>Quercus</u> - <u>Andropogon</u>	Data not available

Note: ^{1/}Source of estimates is BISON-M (NMDG&F, 1990).

APPENDIX G

BLM Policy Summary for the Mexican Spotted Owl

APPENDIX G

BLM Policy Summary for the Mexican Spotted Owl

The BLM Albuquerque District has identified 119,000 acres of suitable habitat for the Mexican spotted owl (in the Farmington Resource Area 9,400 acres; in Rio Puerco 91,000 acres; and in Taos 18,600 acres). Inventory is needed to carry out the BLM's policy to avoid actions that will contribute to the need to list a species as endangered or threatened, and to better determine the status of this animal on BLM- managed lands. The BLM has begun an inventory and implemented guidelines for the management of both uninventoried suitable and confirmed occupied habitat.

The BLM's management goals are to (a) avoid adverse effects to the structure and quality of habitat; (b) avoid disruption of the reproductive effort (breeding season lasts from February 1 through July 31); (c) avoid habitat fragmentation; (d) avoid cumulative impacts to Mexican spotted owls and their habitat; and (e) maintain viable populations of owls where they are found. The Environmental Assessment process or other applicable environmental screening and documentation processes (such as that done for APDs) will be used to evaluate all impacts. All known past, current, and proposed activities will be included when analyzing cumulative effects.

Uninventoried suitable habitat must undergo 2 full years of inventory to establish absence. Uninventoried suitable habitat will be managed in the interim using the following guidelines:

1. Evaluate all surface-disturbing activities proposed in suitable habitat for consistency with management goals. Permit activities determined to be consistent with management goals with appropriate restrictions and stipulations. Reject or defer other activities until sufficient inventory data are available.
2. Allow maintenance of facilities at any time as long as such activity is consistent with management goals.
3. Initiate inventory during the appropriate

season. Conduct a second year of inventory in areas where no owls are found and where a single or a pair were inferred during the first year of inventory, as discussed below.

Areas in which a confirmed single, a confirmed pair, or an inferred pair are found will be managed according to the following guidelines:

1. Designate a Core Area and Management Territory. Size of Core Areas and Territories is based on Mexican spotted owl research in the Southwest.

a. The Core Area is an area of contiguous suitable nesting and roosting habitat containing known or suspected nest and roost sites for a single owl or pair. Establish 300 to 450 acres as the Core Area in the configuration of the habitat. Less acreage may be designated only with adequate biological justification, such as insufficient suitable habitat.

b. A Territory is an area representing the average area used by a single or pair of Mexican spotted owls during the year, and includes the Core Area. A Territory may consist of suitable and potential habitat. Potential habitat is habitat not suitable at present but that can be made suitable in the future through treatments or natural processes. Designate Territories of 1,684 acres for single birds and 2,200 acres for pairs in the configuration of the habitat. Less acreage may be designated only with adequate biological justification, such as insufficient suitable habitat.

2. Prohibit surface-disturbing activities inside Core Areas at any time.
3. Evaluate all surface-disturbing activities proposed in a Territory for consistency with management goals. Permit activities consistent with these goals with appropriate restrictions, and prohibit all others.
4. Allow maintenance of existing oil and gas facilities in a Core Area or Territory at any time.

APPENDIX H

Threatened and Endangered, Candidate, and Special Status Species Lists

APPENDIX H

THREATENED AND ENDANGERED SPECIES LIST

The following list of species are known, suspected or have historic occurrence within the Northern half of New Mexico. However, many of these species occur only in a few site specific locations that are not associated with lands administered by the BLM (1), are rare vagrants where regular occurrence is unlikely (2), or because of the lack of substantiated documentation they are presently not considered to occur in Northern New Mexico (3). The BLM is actively inventorying, monitoring and/or has established ACECs and SMAs for the protection of those species highlighted in bold type.

FEDERAL ENDANGERED

Common Name	Genus	Species	Sub.
Bald Eagle	Haliaeetus	leucocephalus	
2 Brown Pelican	Pelecanus	occidentalis	
2 Least Tern	Sterna	antillarum	anthlassos
Aplomado Falcon	Falco	femoralis	
Peregrine Falcon	Falco	peregrinus	anatum
2 Peregrine Falcon	Falco	peregrinus	tundrius
2 Whooping Crane	Grus	american	
Long-nosed bat	Leptonycteris	nivalis	
Long-nosed bat	Leptonycteris	sanborni	
Colorado Squawfish	Ptychocheilus	lucius	
3 Black-footed Ferret	Mustela	nigripes	
3 Mexican Gray Wolf	Canis	lupus	baileyi
Knowlton's Cactus	Pediocactus	knowltonii	
1 Mancos Milk-Vetch	Astragalus	humillimus	

FEDERAL THREATENED

2 Piping Plover	Charadrius	melodus	
3 Bluntnose shiner	Notropis	simus	
Beautiful shiner	Notropis	formosus	
Zuni Fleabane	Erigeron	rhizomatus	
Mesa Verde Cactus	Sclerocactus	mesae-verdae	

FEDERAL CANDIDATE

1 Jemez Mtn. Salamander	Plethodon	neomexicanus	
1 Western Toad, Boreal	Bufo	boreas	boreas
Ferruginous Hawk	Buteo	regalis	
2 Mountain Plover	Charadrius	montanus	
2 Snowy Plover, Western	Charadrius	alexandrinus	
Spotted Owl, Southern	Strix	occidentalis	
2 White-faced Ibis	Plegadis	Chihi	
Willow Flycatcher, SW	Empidonax	traillii	
Northern Goshawk	Accipiter	gentilis	apache
Northern Gray Hawk	Buteo	nitidus	maximus

FEDERAL CANDIDATE
(continued)

Common Name	Genus	Species	Sub.
Long-billed Curlew	Numenius	americanus	
Gila Roundtail Chub	Gila	robusta	grahami
1 Rio Grande Shiner	Notropis	jemezianus	
1 Arkansas River Shinner	Notropis	girardi	
3 Razorback Sucker	Xyrauchen	texanus	
1 Zuni Mtn/Bluehead Sucker	Catostomus	discobolus	
Goat Peak Pika	Ochotona	princeps	nigrescens
NM Meadow Jumping Mouse	Zapus	hudsonius	luteus
Occult Little Brown Bat	Myotis	lucifugus	occultus
1 Otter, Southwestern	Lutra	canadensis	sonorae
Spotted Bat	Euderma	maculatum	
Swift Fox	Vulpes	velox	
1 Sangre De Cristo PeaClam	Pisidium	sanguinichristi	
Texas Horned Lizard	Phrynosoma	cornutum	
San Juan Milkweed	Asclepias	sanjuaensis	
Acoma Fleabane	Erigeron	acomanus	
1 Small-Headed Goldenweed	Haplopappus	microcephalus	
1 Pecos Sunflower	Helianthus	paradoxus	
1 Lost Sunflower	Helianthus	praetermissus	
1 Gilia Groundsel	Senecio	quaerens	
1 Santa Fe Cholla	Opuntia	viridiflora	
Gramma Grass Cactus	Pediocactus	papyracantha	
Hard Wall Cactus	Scleroactus	whipplei	Var. Heilii
Mancos Saltplant	Atriplex	pleiantha	
Knight's Milk-Vetch	Astragalus	knightii	
Monument Valley Milk-V	Astragalus	monumentalis	
1 Nauria Milk-Vetch	Astragalus	naturitensis	
Ripley Milk-Vetch	Astragalus	ripleyi	
Parish's Alkali Grass	Puccinellia	parishii	
Aztec Gilia	Gilia	formosa	
Cimarron Wild Buckwheat	Eriogonum	aliquantum	

STATE SENSISTIVE STATUS

Boreal Owl	Aegolius	funereus	
Arizona Sparrow	Ammodramus	savannarum	
Screech Owl	Otus	trichopsis	
2 Baird's Sparrow	Ammodramus	bairdii	
1 Brooks Stickleback	Culaea	inconstans	
1 Rio Grande Minnow	Hybognathus	amarus	
1 Roundtail Chub	Gila	robusta	
Southern Redbelly Dace	Phoxinus	erythrogaster	
1 Suckermouth Minnow	Phenacobius	mirabilis	
Gila Topminnow	Poeciliopsis	occidentalis	
3 Bighorn Sheep, Desert	Ovis	canadensis	mexicana
1 Pine Martin	Martes	american	

STATE SENSITIVE STATUS

(continued)

Common Name	Genus	Species	Sub.
1 Least Shrew	Cryptotis	parva	
Montane Vole	Microtus	montanus	
1 Circular Pea-Clam	Musculium	partumeium	
1 Lilljeborg's Pea-Clam	Pisidium	lilljeborgii	
1 Linnaeus Ramshorn Snail	Gyraulus	crista	
1 Papershell Mussell	Anodonta	imbecillis	
1 Raymonds Pea-Clam	Musculium	raymondi	
Say's Pond Snail	Lymnaea	caperata	
1 Wide Pea-Clam	Musculium	transversum	
1 Western Ribbon Snake	Thamnophis	proximus	
Chorus Frog	Pseudacris	clarkii	
Sessil false carrot	Aletes	sessiliflorus	
Wright's Fishhook Cactus	Mammillaria	wrightii	
White-Flowered Visnagita	Neoloydia	intertexta	
Small-Devil Claw Cactus	Sclerocactus	parviflorus	
Chaco Milk-Vetch	Astragalus	micromerius	
Checker/Leopard Lily	Fritillaria	atropurpurea	
Mountain Lily	Lilium	umbellatum	
Golden Lady's Slipper	Cypripedium	calceolus	pubescens
Bog Orchid	Habenaria	dilatata	dilatata
	Cryptantha	paradoxa	
	Eriogonum	scabrellum	
	Phacelia	splendens	

APPENDIX I

Threatened and Endangered Species Program

APPENDIX I

THREATENED AND ENDANGERED SPECIES PROGRAM

Policy, Program, and Operational Procedures

Statements concerning the Bureaus policy, manual guidance, and standard operating procedures, for any action proposed in an area where there are T&E species, are presented in chapter 2. District and resource area staff (1) follow this policy and guidance and (2) use these procedures on a daily basis. The policy, manual guidance, and operational procedures used by these staff people are included as part of the response to this comment.

"The staff must...identify and manage rare or representative wildlife habitats, plant communities, and ecosystems. The need to manage these habitats, communities, and ecosystems has led to management decisions in existing RMPs to protect T&E or rare species through the protection of populations and environments that encourage population growth (bold type and underlining added for emphasis). A survey is currently underway to determine if the Mexican spotted owl exists in the District.

The BLM has a complex set of responsibilities for managing the habitat of special status animals and plants (bold type and underlining added for emphasis). Special status species are those plants and animals that (1) are listed as endangered or threatened under the Endangered Species Act (ESA); (2) are proposed for listing as endangered or threatened under ESA; (3) are under review or qualify for listing as endangered or threatened (Category 1 and 2 candidates); (4) have been designated by the BLM State Director as sensitive; or (5) have been listed by the state government as endangered or threatened (state listed). Section 7 of the ESA and regulations in 50 CFR Parts 17 and 402 specifically require all federal

agencies to use their authorities in furtherance of ESA to carry out programs for the conservation of listed species, and to ensure that any agency action will not jeopardize the continued existence of a listed species or adversely modify critical habitat (bold type and underlining added for emphasis).

BLM Manual Section 6840 contains policy and guidance for all special status species. It established that species proposed for federal listing be managed at the same level of protection as listed species. For Category 1 and 2 candidate species, Manual Section 6840 requires the BLM to carry out management, consistent with the principles of multiple use, for the conservation of the species and their habitats, and to ensure that actions authorized, funded, or carried out do not contribute to the need to list any of these species as threatened or endangered (bold type and underlining added for emphasis).

It is also BLM policy to carry out management for the conservation of state listed plants and animals. State laws protecting these species apply to all BLM programs and actions to the extent that they are consistent with FLPMA and other federal laws. Where the state government has designated species in categories that imply local rarity, endangerment, extirpation, or extinction, the BLM State Director develops policies to assist the state in achieving its management objectives for those species.

All BLM actions are evaluated for potential impacts to special status species (bold type and underlining added for emphasis). If the evaluation indicates a "may affect" situation (includes both beneficial and adverse impacts) on a federally listed or proposed species, and the

adverse impacts cannot be eliminated, a Section 7 consultation with the Fish and Wildlife Service (FWS) must be conducted. If an evaluation indicates a "may affect" on a candidate species and the adverse impacts cannot be eliminated, an informal conference will be conducted with the FWS.

After initiation of formal consultation on a federally listed species, BLM cannot, in accordance with Section 7 (d) of the ESA, make any irreversible or irretrievable commitment of resources that would preclude the formulation and execution of reasonable alternatives to resolve the conflict. **It is the BLM's responsibility to manage all programs for the conservation of endangered species to the extent that a jeopardy opinion need never be issued by the FWS** (*bold type and underlining added for emphasis*). BLM responsibilities to BLM sensitive and candidate species are to preclude the need for listing. The BLM consults with the New Mexico State Forestry Department or the Department of Game and Fish when adverse impacts to state-listed species are anticipated." (USDI, BLM 1991b).

Endangered Species Act Compliance

As is noted above, BLMs compliance with the Endangered Species Act is mandatory for all (proposed) actions authorized, funded, or carried out by the BLM, regardless of when planning, review and/or implementation began.

The BLM uses a four point approach in reviewing actions proposed on Bureau lands or programs.

(1) Screen all proposed actions to determine if T&E species or their habitat may be affected.

(2) Initiate consultation with the FWS/NMFS for actions that may affect T&E species or their habitat.

(3) Until consultation is completed and a final decision reached, BLM will not carry out

or authorize any action that would irreversibly or irretrievably result in a commitment of resources or reduce the management options for the species involved.

(4) Ensure that no BLM action or authorization will adversely affect the likelihood of recovery of any T&E species.

In the processing and permitting process for mineral development, BLM also authorizes actions on split estate i.e., private surface over federal subsurface. For this reason, surface disturbance of non-federal (surface) land is subject to the provisions of the ESA, when a project depends on BLM authorization on lands or programs administered by the BLM.

Section 7 Consultation

As is required by the Endangered Species Act of 1973, the US Fish and Wildlife Service was consulted on proposed Fruitland development in 1988. As was noted in the previous section, the area considered for Fruitland development is @75 to 80 percent of the high-intensity oil and gas development area considered in the Farmington Resource Area. It is noted in the Fruitland EA

"the primary concern expressed by USFWS was the potential impact on the Bald Eagle ACEC. Based on a review of a draft biological assessment prepared by BLM a meeting was held on October 18, 1988 to discuss the ACEC area. As a result of this meeting, the USFWS agreed that, provided surface disturbing activities were not allowed in the core areas of the ACEC and seasonal restrictions were maintained in buffer areas, there should be no adverse impacts to bald eagles." (USDI, BLM 1988b).

The BLM has initiated Section 7 consultation, with the USFWS, for the oil and gas development proposed in this EIS. Once the Section 7 process is complete BLM will do whatever is necessary to ensure that T&E species are not affected by this action.

Special Management Areas

In addition to continued consultation and coordination with the USFWS, areas requiring special management, over other public lands in the Farmington Resource Area, were designated for threatened and endangered species in 1988 (USDI, BLM 1988c). A summary description of the SMA, management of T&E species, and the management goals and prescriptions for SMAs in Farmington and Rio Puerco's high-intensity development areas are presented below. "The text for each SMA includes...management goals, and management prescriptions.... The management goals state the general emphasis for administration". The BLM will manage existing oil and gas leases in SMAs in a manner that would minimize any adverse impact to the wildlife resources present. These measures may include but are not limited to modification to siting or design of facilities, timing of operations, and specification of interim and final reclamation measures.

Threatened and Endangered Species SMAs

Farmington Resource Area

Hogback ACEC (57 percent leased)

"In addition to known populations of the federally listed endangered Mancos milk-vetch (*Astragalus humillimus*) this area also contains several other plant species which are rare or endemic to New Mexico.

It contains the only known populations of several species including Cottam's milkvetch (*Astragalus monumentalis* var. *cottamii*), *Cryptantha paradoxa* and *Cryptantha recurvata*, and *Eriogonum scabrellum*. It is also one of the few known sites of *Phacelia splendens* in New Mexico. Succulent dwarf saltbush (*Atriplex pleiantha*), a federal candidate species and state-listed endangered species, may occur in the eastern half of the area. The ACEC also contains the southernmost range extension of several species including small-

leaf mahogany (*Cercocarpus intricatus*) and singleleaf ash (*Fraxinus anomala*). As such it is of significant scientific value as an area for studying ecotonal relationships."

The management goal of this SMA is "...to meet BLM responsibilities under the Endangered Species Act to protect the habitat for threatened or endangered plants and animals. It may also serve to help prevent the future listing of candidate species by protecting their habitat from undue or unnecessary degradation." The management of this ACEC is directed exclusively to the protection and preservation of threatened or endangered species. The second management prescription closes the unleased portions of the SMA to oil and gas leasing.

Reese Canyon Research Natural Area (87 percent leased)

"The only known habitat for Los Pinos milk-vetch (*Astragalus oolymus*) in New Mexico occurs in pinon-juniper habitat adjacent to the Los Pinos River. This plant species is a narrow endemic species. Other sensitive plant species may occur in this area as well. Botanists with the U.S. Fish and Wildlife Service and the New Mexico Resources Survey program have emphasized the need for special management attention in this area."

"The BLM will continue coordination and consultation with the USFWS, NM Resources Survey Program, and the Nature Conservancy to ensure proper management of the resources in this area." The management goal of this RNA is to "...provide for the protection and enhancement of habitat for Los Pinos milk-vetch and other sensitive plant species. It will provide an area for botanists to examine the unique flora of this region." The second management prescription closes the unleased portions of the RNA to oil and gas leasing.

Aztec Gilia ACEC (82 percent leased)

"Aztec gilia (*Gilia formosa*) is a state-listed endangered plant and a Category 2 candidate

for possible listing as a federal threatened or endangered species.

The presently known potential habitat of this species consists of badland areas east of Aztec and Bloomfield, N.M. The only known habitat for Aztec gilia is in the Farmington Resource Area. ...Botanists with the State of New Mexico Resource Survey program identified approximately 125,400 acres of public land as high potential habitat for Aztec gilia, of which approximately 11 percent is actually occupied by the species. Two portions of the habitat [approximately 6,400 acres (50% of the occupied habitat)] have been designated as an ACEC. These areas were selected because they are of sufficient size to maintain a viable genetic population base and between them, they express most of the genetic variability within the species. Botanists with the State of New Mexico's Resource Survey Program believe that the designation of the ACEC will relieve ORV pressure on sufficient habitat to avert and prevent progression of listing activities by the U.S. Fish and Wildlife Service."

The management goal of this ACEC is to "...protect populations of Aztec gilia to the extent necessary to prevent the species from being listed as threatened or endangered." The second management prescription closes the unleased portions of the ACEC to oil and gas leasing.

Bald Eagle ACEC (87 percent leased)

"Approximately 80 to 100 bald eagles winter in the Resource Area in the vicinity of the Animas River and Navajo Reservoir. Preferred roosting sites are isolated stands of ponderosa pine located in canyons within pinon-juniper habitat. Some of these areas also provide important winter habitat for deer and elk. A total of 22 sites covering approximately 3,840 acres are involved. The ACEC makes up 20 use areas covering 1,700 acres.

This SMA provides for integrated habitat management and protection for the sites partially covered by the Rosa/Middle Mesa and Pump Habitat Management Plans.

The main management goal of this SMA is to provide for the protection of habitat for a federal and state listed endangered species. This is in compliance with the requirements of the Endangered Species Act and BLM policy." The second management prescription states that "special stipulations or siting requirements for APDs are on existing leases." (USDI, BLM 1988c).

Rio Puerco Resource Area

Cabazon Peak ACEC

The amount of leased acreage is not available for this ACEC. "The Cabazon Peak SMA...contains Cabazon Peak, one of the most prominent local landmarks in the Rio Puerco Valley. The surrounding low-lying foothills give way to large rugged shoulders that support a nearly cylindrical neck from which the peak receives its name. ...Cabazon Peak towers approximately 8,000 feet above sea level and is surrounded by rolling grassy foothills and steep-sided arroyos. The Peak itself is part of the Mt. Taylor volcanic region and is the largest of several volcanic necks protruding from the floor of the Rio Puerco Valley.

...Cabazon Peak is currently being managed under Interim Management Policy and Guidelines for Lands Under Wilderness Review (USDI, BLM 1979b). It is a popular recreation site for casual visitation and for climbing. ...The area also contains two rare cactus species and raptor nesting sites. The raptors using the area are golden eagles, red-tailed hawk, sparrow hawk, prairie falcon, and great horned owl. The rare plants growing in the Cabazon SMA are pincushion cactus and blue grama cactus....

Management of the Cabazon Peak SMA will emphasize scenic values, socio-cultural values, rare cactus, and intensive recreation use, specifically semi-primitive non-motorized recreation opportunity... (USDI, BLM 1985). The fourth "management action" states "allow no surface disturbance.

Management prescriptions for all but the last

two SMAs closed the unleased portions to oil and gas leasing for 20 years, the projected life of the resource management plan (USDI, BLM 1988c). Existing leases in the SMAs can and will continue to be developed. Development within these areas would occur with special COAs in the leased portions of the SMAs. This development can, however, only occur after a review has been made to determine if the proposed development would endanger a T&E species or its habitat. If a determination is made that the proposed development would adversely impact a T&E species or its habitat, the proposed action is denied by the BLM. At this point, the applicant would have to forego development in the area proposed or seek (and acquire) an exemption from the USFWS under section 7(g) of the Endangered Species Act.

A T&E determination that results in a "jeopardy" decision from the USFWS is one of the few actions that takes precedence over the terms of the oil or gas lease and can, therefore, preclude development at that location of the lease. This is also true for the statement made on page 1-13 of the DEIS, which said "Based on well densities used in this document, 706 acres within these SMAs and ACECs (2.6 percent) could be disturbed by oil and gas development under one or more of the alternatives considered." Development and impacts on a projected 706 acres would only occur in portions of ACEC areas where T&E species are not present. Development in ACECs is possible. ACEC boundaries were delineated for an area larger than that occupied by T&E species and their habitat. T&E species or habitat are found in different locations within ACECs. T&E species and habitat are not present in every acre of the ACEC. Until APDs are submitted to the BLM, by companies holding leases in these SMAs, site specific determinations cannot be made.

Threatened and Endangered Species Analyses

The results of a Mexican spotted owl survey being conducted in the Farmington (9,400 acres) and Rio Puerco (8,300 acres) Resource

Areas should be available late 1993 or early 1994. The entire survey for the Farmington Resource Area will be completed in 1993. Results of interim surveys will be available as soon as survey work is completed for both the Rio Puerco and Taos Resource Areas.

Specific evaluation(s) of impacts cannot be made at this time because information is not available as to where oil and gas wells would be drilled. Until APDs are submitted to the BLM, by companies holding leases, site-specific (potential) impacts to any resource component cannot be made. Prospective development in areas with T&E would be purely speculative in nature at this time. However, based on the provisions of the ESA and BLMs procedures for implementing this federal act, impacts to T&E would not occur. Since the development of the BLMs RMPs, there has been no documented loss of habitat or adverse population impacts to listed T&E species due to oil and gas development.

The approach of relying on the Bureau's procedures and process to protect T&E species was also used in the *Fruitland Coal Gas EA* (1988). The area considered for Fruitland development is 75 to 80 percent of the high-intensity oil and gas development area considered in the Farmington Resource Area. It is stated in the impacts section of the Fruitland EA that:

"As long as current standard operating procedures for T&E species compliance and Section 7 consultation continue to be followed there will be no impacts on Federal threatened or endangered species under either alternative. The FRA will continue to work with USFWS on all site specific activities which are determined to be "May Affect" situations and will not approve any activity which would result in a "jeopardy opinion". Likewise, Federal candidate species and state listed species will continue to be protected by site specific analysis of individual proposals."

APPENDIX J

The Effects of Habitat Fragmentation on Wildlife

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1871

APPENDIX J

THE EFFECTS OF HABITAT FRAGMENTATION ON WILDLIFE

Development of roads would subdivide habitat types into smaller areas thus reducing the habitat effectiveness by wildlife. New road construction (long-term impacts) would generally be in the high-intensity development areas. Since gas development in the Taos Resource Area is limited to six wells, roads required (1) for access into an area and (2) to well locations would be needed. Because of the extent of past development in both the Farmington (22,000 wells) and Rio Puerco (80 wells) Resource Areas, road construction should be limited primarily to areas with existing access roads to well locations. Many of the roads, therefore, would be short road segments to new well locations.

The extent and rate of new road construction corresponds with the number of wells drilled each year. Additionally new road construction, particularly for access roads, occurs as the need arises for access into an area or well. The rate of road construction and habitat fragmentation would be proportional to the rate of drilling and development activity. As with past drilling, oil and gas development occurs in cycles or as is more commonly referred to as boom or bust periods. Therefore, development is not at a constant rate.

With the development of six gas wells, gas development in the Taos Resource Area has not resulted in habitat fragmentation. Future development is projected to occur at a rate of 1.5 wells a year for 20 years. Some degree of habitat fragmentation could occur in the high-intensity development area. Actual well locations and the number, length, and location of roads for 31 new wells would not be known until companies submit APDs.

Wildlife in the high-intensity development area are comprised primarily of nonconsumptive wildlife. The grasslands, in the high-intensity development area, support low species diversity and scattered populations over extensive areas.

Traffic on roads disturbs wildlife and occasionally kills animals. Although habitat fragmentation would occur, nonconsumptive wildlife generally require smaller areas or territories for feeding and rearing young. A significant loss of wildlife is not anticipated. Approximately 50 percent of the surface impacts to wildlife habitat should be rehabilitated the next growing season. This would allow some wildlife species to return to their normal use patterns. The remaining surface impacts would remain in long-term surface disturbances such as roads and approximately half of the well pad area. When abandoned, these areas would be rehabilitated. Rehabilitated areas would be returned to grasses and beneficial forbs. In some instances, reseeded of some areas may improve wildlife habitat from what it was originally.

Extensive habitat fragmentation has occurred in the high-intensity development area in the Farmington Resource Area. With serious development of oil and gas resources beginning in the 1950s, the extent of habitat fragmentation, to date, has occurred over a 40 year period. As is noted in the *Fruitland Coal Gas EA* (1988), "undisturbed habitat is extremely limited in the FRA. Only about 14 sections of public land in the Fruitland (coal-gas) area contain habitat in blocks of 320 acres or more without existing roads. These areas are primarily limited to portions of the Carracas Mesa and Negro Canyon SMAs, and Laguna Seca Mesa." Management prescriptions for these areas closed the unleased portions to oil and gas leasing for 20 years, the projected life of the resource management plan (USDI, BLM 1988b). Existing leases in these areas cannot be rescinded or canceled. Development of existing, pre-NEPA/FLPMA leases can and will continue to occur (with special COAs) in portions of these SMAs.

With continued development projected to occur at a rate of 200+ wells a year, habitat fragmentation will continue to occur in this resource area. As was identified in the Taos Resource Area, the same type of impacts would occur to nonconsumptive wildlife in the San Juan Basin. A significant loss of wildlife is not anticipated. Approximately half of the wildlife habitat would be restored the next growing season. This would allow some wildlife species to return to their normal use patterns.

The New Mexico Department of Game and Fish recognizes critical winter habitat for both deer and elk in the Farmington Resource Area. Most of this habitat is located in NMDGF's big game management Unit 2. Critical areas for pronghorn antelope have not been delineated by NMDGF.

Information, as to the effects of habitat fragmentation on game or consumptive wildlife in the San Juan Basin, is not available for predicting the extent of impacts to deer and elk. Although habitat fragmentation has and is occurring, areas that have been rehabilitated and reseeded, particularly rights-of-way, are being used as travel and feeding lanes by deer and elk. Rehabilitation of disturbed areas produces a habitat conversion from sagebrush or pinyon-juniper types to a grassland forb type. Additionally,

"Studies conducted by the BLM in 1984, on 50 miles of reseeded pipelines in the Carracas Mesa SMA, showed that more deer and elk pellet groups were found associated with pipelines than were found in other open areas. There was more big game use of pipelines routed cross country than those located along roads.

Further habitat fragmentation in elk calving areas and an increase in human activities and disturbance might (1) reduce the suitability of these areas as calving sites and/or (2) result in an increase in calf mortality. Little information is available to predict the potential of or significance of habitat fragmentation in elk calving areas. Johnson (1985) found that coal strip mining

activities had no significant impact on elk calving in Colorado. Productivity, size of calving home ranges, fidelity to calving home ranges, and habitat utilization were the same for active mine areas and control areas. There are no studies to indicate if analogous behavior occurs in developed oil or gas fields.

Vehicle traffic and human activities to maintain producing wells could cause an impact during the winter months. Fruitland gas wells may require daily maintenance and can not be shut in during the winter as can conventional wells. This means increased activity in the 17,000 acres (specific areas studied in the Fruitland EA) big game habitat currently under the no winter disturbance stipulation for APDs. The affect of human disturbance on big game has not been well documented in the Southwest (Severson and Medina 1983). Deer apparently readily adapt to roads and regular human activity. The extent of factors which could influence any subtle impacts of these activities is so diverse that no meaningful prediction of cumulative impacts is possible (Reed 1981).

Elk are less tolerant of human disturbance. While they readily adapt to regular patterns of human activity, elk seem to prefer to maintain a one-half mile buffer between themselves and regular activity such as vehicle traffic, camping, and other recreational activities (Skovlin 1982). However, studies of human impacts have centered primarily around timber harvesting activities and the secondary impact of logging roads. Ward (1985) observed that elk adapt to repetitive human activities in established oil fields and coal mines. That is, provided they do not see humans move on foot away from vehicles. Over the last 10 years, elk in the Farmington Resource Area appear to have expanded their range into habitats which in forested areas would be considered unsuitable habitat due to high road densities as described by Lyon and Ward (1982). Without additional study, it can not be determined if other factors, such as

topography, provide a visual buffer or if elk have become conditioned to roads and vehicle activity." (USDI, BLM 1988b).

Special Management Areas

Areas requiring special management, over other public lands in the Farmington Resource Area, were designated for wildlife in 1988 (USDI, BLM 1988c). A summary description of the SMA, management of wildlife species, and the management goals and prescriptions for SMAs in the high-intensity development area are presented below. "The text for each SMA includes...management goals, and management prescriptions.... The management goals state the general emphasis for administration". The BLM will manage existing oil and gas leases within SMAs in a manner that would minimize any adverse impact to the wildlife resources present, which are consistent with the original lease rights granted. These measures may include, but are not limited to, modification to siting or design of facilities, timing of operations, and specification of interim and final reclamation measures.

Wildlife SMAs

Carracas Mesa SMA (61 percent leased)

"Wintering big game is the most visible wildlife use with elk numbering 150-300 animals in winter months and mule deer averaging 400 to 800 animals. Snows in Colorado drive animals down into this area beginning in late November. Mountain shrubs and grass, found in clearings, and seedlings provide winter forage. This area has been recommended by the BLM and USFS as a trophy mule deer hunting area."

The management goal for this SMA is based primarily on "...administrative emphasis for management of the Carracas Mesa SMA...for semi-primitive non-motorized and motorized outdoor recreation opportunities as defined by the Recreation Opportunity Spectrum." Although the management goal is concerned

with ORV management, management of this SMA is for recreation and wildlife values and resources. The second management prescription closes the unleased portions of the SMA to oil and gas leasing. Another of the 13 management prescriptions requires "...Visual, Wildlife, and Recreation program clearances for all (prior to) surface disturbing activities."

Thomas Canyon SMA (55 percent leased)

"Critical resources were identified as natural and wildlife values. ...The area is heavily forested (pinon and juniper) with small pockets of ponderosa pine. The topography generally slopes from higher elevations in the west to lower elevations in the east with dissecting steep-sided canyons. The pinon-juniper habitat site supports large herds of wintering mule deer. ...Adjacent lands to the east and south are scattered with oil and gas wells, storage facilities and related roads. Natural values within the area are considered important and somewhat rare in an otherwise developed region. The area...is the only relatively undisturbed natural environment of its size (4,630 acres) within a 30-mile radius of the city (Farmington)."

The management goal for this SMA is based primarily on "...management of the area for semi-primitive nonmotorized types of outdoor recreation." Although the management goal is concerned with ORV management, management of this SMA is for recreation and wildlife values and resources. The second management prescription closes the unleased portions of the SMA to oil and gas leasing. Another of the 10 management prescriptions requires "...Visual, Wildlife, and Recreation program clearances for all (prior to) surface disturbing activities."

Negro Canyon SMA (15 percent leased)

This area was identified for special management status

"because of its natural, scenic and wildlife values. ...There is high potential for natural value enjoyment by the public as the area is noted for its wildlife and botanical sightseeing opportunities as well as being suited for recreation use by those wishing a relatively undisturbed backcountry experience. Backpacking, primitive camping, day hiking and nature viewing opportunities are prevalent in this woodland canyon area."

The management goal for this SMA is based primarily on "...management of the area for semi-primitive non-motorized types of outdoor recreation." Although the management goal is concerned with ORV management, management of this SMA is for recreation and wildlife values and resources. **The second management prescription closes the unleased portions of the SMA to oil and gas leasing.** Another of the 10 management prescriptions requires **"...Visual, Wildlife, and Recreation program clearances for all (prior to) surface disturbing activities."**

Gas development in the Rio Puerco Resource Area has not resulted in extensive habitat fragmentation. Future development is projected to occur at a rate of 2.3 wells a year for 20 years. Most of this development and further habitat fragmentation would occur in the high-intensity development area. Actual well locations and the number, length, and location of roads for 48 new wells would not be known until companies submit APDs. As was identified in the Taos Resource Area, the same type of impacts would occur to nonconsumptive wildlife in the San Juan Basin. A significant loss of wildlife is not anticipated. Approximately half of the wildlife habitat should be restored the next growing season. This would allow some wildlife species to return to their normal use patterns.

Mule deer range throughout the Rio Puerco Resource Area. An area from Cuba, New Mexico south to the Elk Springs ACEC is located in parts of NMDGFs big game management Units 6, 7, and 9. A portion of unit 6 is located in the high-intensity oil and

gas development area. The BLM lands in Unit 6 consist of scattered sections and fragments of sections distributed east of Highway 44 and 96 from Regina, New Mexico south to La Ventana just north of the Jemez Indian Reservation. The BLM tracts, from Cuba, New Mexico south to La Ventana, New Mexico are in critical winter habitat areas for both deer and elk. Populations of deer in this area are down, consistent with the overall trend of mule deer throughout northern New Mexico.

There are a few, small islands of critical deer and elk habitat in the high-intensity development area (refer to map 11 in the map section). These appear to be the outer edges of the critical deer and elk habitat identified on U.S. Forest lands. Although development in the Rio Puerco Resource Area is minimal when compared to the development in the San Juan Basin, the impacts to deer and elk should be similar to those discussed for the Farmington Resource Area. As with the Farmington Resource Area, information on the impacts of oil and gas development to game or consumptive wildlife is not available for predicting the extent of impacts to these species.

A NMDG&F management unit for antelope (unit 2) occurs in the high-intensity development area. Critical winter areas have not been established by the NMDG&F for pronghorn antelope. Impacts to antelope habitat could result in habitat removed for roads. Antelope could be scared away from the immediate vicinity of vehicles and people. Increased access due to new roads would increase the opportunity for poaching. Selection of antelope preferred plant species for reclamation may mitigate forage loss due to roads.

Special Management Areas

Areas requiring special management, over other public lands in the Rio Puerco Resource Area, were designated for wildlife in 1985 (USDI, BLM 1985). A summary description of the SMA, management of wildlife species, and the management goals and prescriptions for

SMAs in the high-intensity development area are presented below. The amount of leased acreage in these SMAs is not available.

Wildlife SMAs

Cabazon Peak ACEC

"The Cabazon Peak SMA...contains Cabazon Peak, one of the most prominent local landmarks in the Rio Puerco Valley. The surrounding low-lying foothills give way to large rugged shoulders that support a nearly cylindrical neck from which the peak receives its name. ...Cabazon Peak towers approximately 8,000 feet above sea level and is surrounded by rolling grassy foothills and steep-sided arroyos. The Peak itself is part of the Mt. Taylor volcanic region and is the largest of several volcanic necks protruding from the floor of the Rio Puerco Valley.

...Cabazon Peak is currently being managed under Interim Management Policy and Guidelines for Lands Under Wilderness Review (USDI, BLM 1979b). It is a popular recreation site for casual visitation and for climbing. ...The area also contains two rare cactus species and raptor nesting sites. The raptors using the area are golden eagles, red-tailed hawk, sparrow hawk, prairie falcon, and great horned owl. The rare plants growing in the Cabazon SMA are pincushion cactus and blue grama cactus...

Management of the Cabazon Peak SMA will emphasize scenic values, socio-cultural values, rare cactus, and intensive recreation use, specifically semi-primitive non-motorized recreation opportunity...". The fourth "management action" states "allow no surface disturbance.

Canon Jarido SMA

"Canon Jarido...consists of a steep-sided sandstone canyon, approximately 100 feet deep, cut into Mesa Portales which provides raptor nesting sites. Lower elevations consist of sage cover interspersed with

pinyon and juniper. This vegetative community progresses into ponderosa pine and Gambel's oak, also providing good mule deer habitat.

Five springs are located within the canyon, two of which are associated with historic homesteads settled sometime during the early 1900's. ...Goals of special management for Canon Jarido emphasize management for scenic values, wildlife habitat, cultural values, and intensive recreation use, specifically semi-primitive motorized recreation opportunities...". The third "planned action" states "allow no surface disturbance".

Elk Springs ACEC

"The western foothills and piedmont of the Nacimientos was designated a crucial winter range for the Jemez elk and deer herds in the New Mexico Comprehensive Wildlife Plan (N.M. Department of Game and Fish 1980). The portion of this area north of the Jemez Indian Reservation is predominantly public land proposed for management as the Elk Springs SMA.... Chaining and seeding projects have been completed to improve winter forage for big game on BLM lands. Lands in the crucial winter range from San Miguel to Cuba are predominantly in private ownership.

...The goals of the Elk Spring SMA are to provide quality winter range for Jemez elk and deer herds by providing optimal cover and forage, thus alleviating big game depredations on private lands. In addition the Juana Lopez Member reference section, and scenic and recreational values, specifically semi-primitive motorized opportunities". Planned actions, that would affect oil and gas development are "...(4) Allow no surface disturbance associated with fluid mineral development Nov. 16 to May 14; (5) Limit motorized vehicles to existing roads and trails; (6) Close to motorized vehicle use Nov. 16 to May 14;...(8) Allow no surface disturbance in the Research Natural Area;..."

Ignacio Chaves SMA

"The Ignacio Chaves SMA is situated on the physiographic boundary between the Navajo and Datil sections of the Colorado Plateau Province.... Landforms common to the northern part of the SMA include mesas, cuestas, rock terraces, retreating escarpments, canyons, and arroyos. These landforms are in striking contrast to the southern portion of the SMA, which is characterized by basalt plains, cinder cones, exhumed plugs and dikes, and extensive talus slopes.

...The Ignacio Chaves SMA is within one of the most diverse and productive wildlife habitat areas on BLM-administered lands in northwest New Mexico. The mix of pinyon-juniper woodland, ponderosa pine with oak understory, and open grassland parks in the Ignacio Chaves SMA, along with the protection afforded by the steep slopes and cliffs of Mesa Chivato, provide potentially excellent habitat for many species of wildlife. Approximately 257 vertebrate species may inhabit the area, including 146 species of birds, 71 of mammals, 31 of reptiles, and 9 species of amphibians. Although use of the area by threatened or endangered species is limited, the SMA is important habitat for a large variety of wildlife, including at least six game species (mule deer, elk, Merriam's turkey, black bear, tassel-eared squirrel, and mourning dove.) Other wildlife common to the area include coyotes, badgers, porcupines, cottontails, Gunnison's prairie dog, golden eagles, sharpshinned hawks, red-tailed hawks, Stellar's jays, pinyon jays, and gray-headed juncos.

...Ignacio Chavez SMA contains the Ignacio Chavez and Chamisa Wilderness Study Areas, and is currently being managed under the Interim Management Policy and Guidelines for Lands Under Wilderness Review (USDI, BLM 1979b).

Management of the Ignacio Chavez SMA will emphasize maintenance of the current wildlife habitat diversity and environmental

education potential by maintaining the current mix of three representative ecosystems. The Ignacio Chavez SMA will also be managed to maintain visual values and intensive recreation values, including 23,587 acres of primitive, 8,800 acres of semi-primitive non-motorized, 3,696 acres of semi-primitive motorized, and 7,065 acres of roaded-natural recreation opportunity..."

Planned actions, that would affect oil and gas development are

"...(3) Allow no surface disturbance; (4) Limit motorized vehicles to existing roads and trails, (5) Determine standard fluid mineral lease stipulations during activity planning; (6) Close certain routes (except for authorized users)..."

San Luis Mesa Raptor Area ACEC

"San Luis Mesa consists of about 20 miles of sandstone bluffs about 100 to 200 feet high.... The exposure is generally to the south and southeast. Ledges carved in the bluff by wind erosion form excellent nesting substrate for birds of prey (raptors). Species which have been recorded nesting at San Luis Mesa are golden eagle, prairie falcon, great-horned owl, red-tailed hawk, and raven.

...The western half of the SMA is part of the La Lena Wilderness Study Area, currently being managed under the Interim Management Policy and Guidelines for Lands Under Wilderness Review (USDI, BLM 1979b).

Management objectives for the area are to protect the area from disturbance during nesting season, protect nesting habitat from surface disturbance, and maintain the integrity of the Empedrado Watershed Study. This will be done by restricting disturbance during nesting season (February 1-July 1) and by not allowing surface disturbance which would adversely affect the area as nesting habitat..."

Planned actions, that would affect oil and gas development are "... (3) Allow no surface

disturbance February 1 to July 1; (4) Allow no surface disturbance in the Empedrado Watershed Study Area; (5) Limit motorized vehicle use to existing roads and trails,..."

APPENDIX K

**Present Threatened and Endangered Special Status
Species Ongoing Actions**

APPENDIX K

PRESENT THREATENED AND ENDANGERED AND SPECIAL STATUS SPECIES ONGOING ACTIONS

The objective of the Albuquerque District Threatened and Endangered (T/E) and Special Status Species program is to protect and enhance the recovery of federal and state listed and candidate threatened and endangered plant and animal species. The Albuquerque District has been actively involved in inventorying and monitoring of T/E and special status species for many years. Monitoring of raptor nesting and wintering areas for bald and golden eagles and ferruginous hawks has been conducted since the early 1980's. Due to the increase in emphasis of plant species in recent years, the BLM has begun annual inventory and monitoring effort for many of these T/E and special status plant species.

In 1986 field inventories were conducted in the Farmington Resource Area for two species (Zuni fleabane and grama grass cactus), which are federal threatened and category 2 respectively. No populations were located on public lands. Presently the Farmington Resource Area is involved in monitoring plants: (Knowlton's cactus and Aztec/beautiful gilia) animals: (bald eagles and ferruginous hawks) on an annual basis. In 1991, the Farmington RA conducted two plant inventory projects in association with the New Mexico Natural Heritage and the Navajo National Heritage groups. The resource area will be developing monitoring plans for additional plant species (Mesa Verde cactus, Mancos saltplant, and others as part of these inventory projects.

The Rio Puerco Resource Area will be initiating two monitoring plans on federal candidate plant species (grama grass cactus and Knight's

milk-vetch) in 1992. In 1992 the Rio Puerco and Farmington Resource Area will initiate a two year spotted owl inventory on 17,000 acres of prime habitat. Additional acres of spotted owl habitat will be inventoried in future years.

In 1984, an intensive inventory of 546,000 acres of the Taos Resource Areas was conducted by the State of New Mexico, Department of Natural Heritage Program. The survey located two species on the states list #1 (endangered), three species on list #2 (sensitive), one on list #3 (review) and one on list #4 (drop). One of the species (grama grass cactus) on the states #1 list is also federally listed as a category 2 candidate. The Taos Resource Area is currently monitoring one federal candidate plant species (Ripley milk-vetch), one endangered animal species (Peregrine falcon) and one sensitive animal species (golden eagle) on an annual basis. In 1992, the resource area will initiate a monitoring plan on another federal candidate plant species (grama grass cactus).

In order to protect and enhance the recovery of listed and proposed species, both plant and animals, SMAs and ACECs have been established and activity plans are being developed for the protection of these species. The existing Resource Management Plans for the resource areas (Farmington-1988, Rio Puerco-1986, and Taos-1988) have identified the establishment of SMAs and ACECs, and the development of activity plans for the protection of T/E and special status species and their habitats.

APPENDIX L

**Requirements to Operate on Federal and Indian Leases:
Casing and Cementing Requirements**

APPENDIX L

Requirements to Operate on Federal and Indian Leases: Casing and Cementing Requirements

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Notice to Lessees and Operators of Onshore Federal and Indian
Oil and Gas Leases Within the Jurisdiction
of the Farmington Resource Area
(Covering Northwest New Mexico and the Navajo Reservation
Lands in Northwest Arizona and Southeast Utah)

(NTL-FRA 90-1)

Requirements to Operate on Federal and Indian Leases: Casing and Cementing Requirements

This Notice is issued pursuant to the authority prescribed in the Oil and Gas Operating Regulations, Title 43 CFR 3162 and 3164, in accordance with Onshore Orders 1 and 2 and the terms of Federal and Indian oil and gas leases under the jurisdiction of the Bureau of Land Management /1, 2 and 4.

I. General

Lessees and operators shall conduct operations in a manner which protects other natural resources and environmental quality; which protects life and property; which results in maximum ultimate economic recovery of oil and gas with minimum waste and with minimum adverse effect on the ultimate recovery of the mineral resources. In that respect these standards are formulate in order to facilitate the extraction of hydrocarbons with minimum adverse impact on usable water resources. Usable water resources are to be protected by quality cement applications with special enhancements in selected critical intervals. These requirements are applicable to all wells drilled under Applications for Permit to Drill (APDs) received by the Bureau of Land Management after the effective date of this Notice and apply to lessees and operators of all leases within the jurisdiction of the Farmington Resource Area /1, 2 and 3.

II. Definitions

As used in this Notice, certain terms are defined as follows:

A. "Cement circulated to surface" shall mean excess cement circulated from the annulus between the casing and borehole or between two strings of casing; including excess cement circulated up from the top of a cementing stage or a liner top.

B. "Usable water" shall mean water containing 10,000 ppm or less of total dissolved solids /1.

III. Requirements for Isolation and Protection of Formations Containing Usable Water

A. All permeable zones containing fresh water and other usable water containing 10,000 ppm or less of total dissolved solids (tds) shall be isolated and protected from contamination by cement circulated in place for the protection of all permeable zones. Permeable zones in all formations, down to, and including the Ojo Alamo Formation, are to be treated as aquifers containing usable water (except for any parts exempted under Section V.A. of this Notice).

1. All usable water present in other formations, in addition to those mentioned in Section III.A. above, shall be protected in like manner /6.

B. The following methods and procedures are required to ensure that a reasonable effort is made to place a high integrity cement barrier to cross flow, through the annulus, between usable water zones, hydrocarbon bearing zones, and any strata that could be a source of contaminants:

1. The hole size shall be no smaller than 1.5" larger diameter than the casing O.D. across all usable water zones.

2. An adequate spacer must be pumped ahead of the cement slurry to help prevent mud contamination of the cement /9.

3. An adequate number of casing centralizers must be run through usable water zones to ensure that casing is centralized through these zones. The adequate number of centralizers to use shall be determined by API standards /10.

4. Centralizers to impart a swirling action around the casing (such as turbulators) are required just below and into the base of the lowest usable water zone. These devices will assist mud displacement, increase cement bonding potential, and create an effective hydraulic seal.

5. A chronological log must be kept which records the pump rate, pump pressure, slurry density, and slurry volume for the cement job. This log shall be sent to BLM after completion of the job.

All criteria noted above must be addressed in the APD for approval. These items must be documented in an appropriate Sundry Report and reported to BLM after completion of the work.

C. Each stage of cement is to be circulated to cover all permeable zones below the next higher stage or shoe of the next larger casing string, or to the surface. (See Sections V.B. and V.C. of this Notice for authorized exceptions.)

D. Cement tops for all stages of cement used to protect usable water zones must be verified by cement circulated to surface or by wireline log /8. Suggested wireline logs are temperature surveys or cement bond logs.

E. All casing cementing programs shall be implemented and verified as meeting the objectives set forth in the approved APD. Remedial cementing is required for all cementing operations that fail to meet these requirements and must be performed prior to acceptance of the Well Completion Report (see Section V.C. of this Notice for authorized exceptions.)

F. Liners are to extend to a minimum of 100 feet above the shoe of the next larger casing, and cemented. The interval of overlap shall be sealed and pressure tested (see Section V.B. of this Notice for authorized exceptions) /5.

G. Pre-perforated liners are to be secured in place with a locking device /5.

IV. Suggested Practices for More Effective Cement Jobs

In addition to the required cementing practices, the following suggested practices may provide even more effective cementing, although these practices may not always be practical.

A. If at all possible, the wellbore should be stable (not kicking, sloughing, or losing circulation) prior to running of casing and cementing.

B. During the running of casing, or once casing is run, circulate a minimum of 1.5 hole volumes to condition hole for adequate mud displacement. The mud funnel viscosity and yield point should be as low as well conditions permit.

C. When applicable, casing movement (rotation or reciprocation) should be used to enhance mud characteristics after casing reaches bottom and until the first stage cement is in place.

D. A small amount of neat cement (i.e. 25 sx) can be pumped ahead of filler cement to aid in the detection of the cement top in case the cement does not circulate to the surface.

V. Authorized Exceptions to Requirements

A. Any aquifer may be exempted from the requirement set forth in Section III of this Notice, provided the lessee or operator shows that no usable water, containing 10,000 ppm or less of total dissolved solids, is present in samples of formation fluid drawn from that strata in the immediate vicinity of the proposed well; or by demonstrating the total dissolved solids from the aquifer are greater than 10,000 ppm in the well by an acceptable method of TDS calculation from well log analysis.

B. Open hole completions and/or pre-perforated liners are exempt from the requirements set forth in Sections III.C. and III.F. of this Notice /5.

C. Requirements to perform remedial cementing of gaps in the cement column may be waived, provided no more than one permeable zone is exposed to the uncemented annulus.

D. Exceptions to any provision of this NTL may be granted by the Area Manager.

APPROVED:

JUN 01 1990

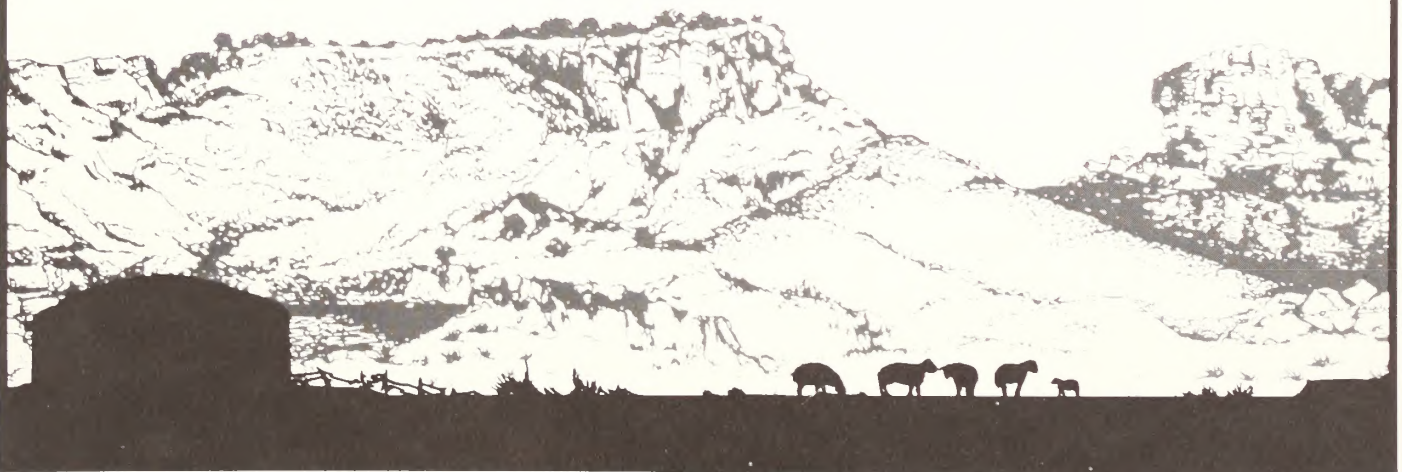
Effective Date

Ron Fellows
Area Manager

Reference List of Related Requirements:

- 1 43 CFR 3162.1(a) (10-1-88 Edition)
- 2 43 CFR 3162.5-1(a) (10-1-88 Edition)
- 3 Onshore Oil and Gas Order No. 2 III.B.
- 4 43 CFR 3164.2(a) (10-1-88 Edition)
- 5 Onshore Oil and Gas Order No. 2 III.B.i.b
- 6 Onshore Oil and Gas Order No. 1 III.G.4.a.(2)
- 7 Onshore Oil and Gas Order No. 2 II.Y.
- 8 43 CFR 3162.5-2(d) (10-1-88 Edition)
- 9 Onshore Oil and Gas Order No. 2 III.B.1.g.
- 10 API Specification 10D

References



REFERENCES

- Albee, M. H., 1982. Wildlife Inventory of the Chaco Strippable Coal Area, New Mexico. BLM Contract Report No. YA-553-CTO-1072). Logan, Utah: Bio/West Inc.
- Ayers, W.B., Jr.; W.R. Kaiser, T.E. Swartz, S.D. Zellers, and A.H. Scanlon, 1988. Geologic Report of Critical Production Parameters for Coalbed Methane Resources. Part 1, San Juan Basin, Annual Report for Gas Research Institute. Chicago, Illinois.
- Brewer, Don, 1978. Rio Puerco Summer Bird Census. Report on File, Rio Puerco Resource Area, Albuquerque District, Bureau of Land Management, Albuquerque, New Mexico.
- _____, 1981. Winter Bird Survey of the Rio Puerco Grazing ES Area. Report on file, Rio Puerco Resource Area, Albuquerque District, Bureau of Land Management, Albuquerque, New Mexico.
- Brown, David E. and Charles H. Lowe, 1980. Biotic Communities of the Southwest (a map). General Technical Report RM-78 Rocky Mountain Forest and Range Experiment Station, U.S. Department of Agriculture, Forest Service.
- _____, 1982. Biotic Communities of the American Southwest - United States and Mexico. Special Issue Desert Plants. Vol. 4, Number 1-4. Published by the University of Arizona for the Boyce Thompson Southwestern Arboretum.
- Busch, Ernie, 1990. Personal communication regarding procedures and anticipated effects of coal gas water disposal. New Mexico Oil Conservation Division. Aztec, New Mexico.
- Buys and Associates, 1990. Reclamation Procedures-Fruitland Coal Wells. Prepared for Meridian Oil Inc. and ARCO Oil and Gas Company. Farmington, New Mexico.
- Clemens, W. A., 1973. The Roles of Fossil Vertebrates in Interpretation of Late Cretaceous Stratigraphy of the San Juan Basin, New Mexico; *In* Fassett, J. E., ed., Cretaceous and Tertiary Rocks of the Southern Colorado Plateau: Four Corners Geological Society Memoir, pp. 154-167.
- Cobban, W. A., 1969. The Late Cretaceous Ammonites *Scaphites lee* (Reeside) and *Scaphites hippocrepis* (Dekay) in the Western Interior of the United States. U. S. Geological Survey Professional Paper 619.
- Cutler, M. R., 1989. Overview from Defender's President In Preserving Communities and Corridors. Published by Defenders of Wildlife, 1224 19th Street NW, Washington, D.C. 20036.
- _____, 1990. Needed: An American Bio-Diversity Network; *In* Cadwick, D. H., The Bio-Diversity Challenge. Published by Defenders of Wildlife, 1224 19th Street NW, Washington, D.C. 20036.
- Crumpacker, D. W., S. W. Hodge, D. Friedley, and W. P. Greg, Jr., 1988. A Preliminary Assessment of the Status of Major Terrestrial and Wetland Ecosystems on Federal and Indian Lands in the United States. Conservation Biology, Vol. 2, No. 1:103-115.
- Dane, C. H., W. A. Cobban, and E. G. Kauffman, 1966. Stratigraphy and Regional Relationships of a Reference Section for the Juana Lopez Member, Mancos Shale, in the San Juan Basin, New Mexico. U.S. Geological Survey Bulletin 1224-H:1-15.
- Diener, R., 1981. Herpetofauna of the Rio Puerco Resource Area. Report on file, Rio Puerco Resource Area, Albuquerque District, U.S. Department of the Interior, Bureau of Land Management, Albuquerque, New Mexico.

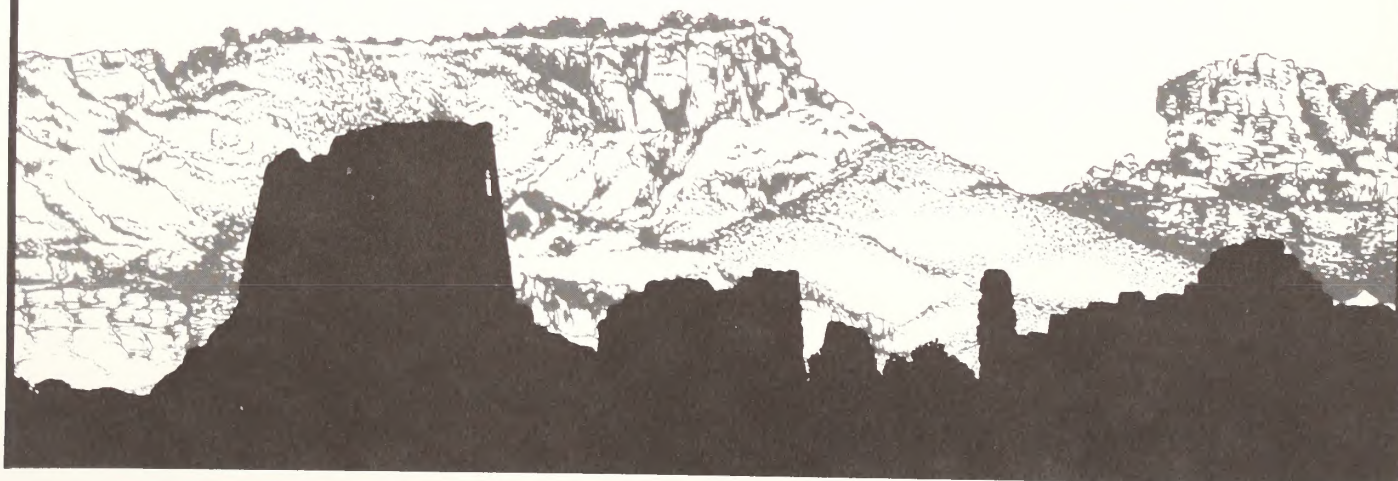
- Earth Environmental Consultants, Inc. 1978. Study of Sediment Yields in the San Juan Planning Unit. Prepared for Bureau of Land Management, Albuquerque, New Mexico.
- Estes, J., 1987. Looking Beyond Species-Oriented Conservation. *Endangered Species Update*, Vol. 5 (2):4.
- Finley, J. S., A. H. Harris, D. E. Wilson, and C. Jones, 1975. *Mammals of New Mexico*, University of New Mexico Press, Albuquerque, New Mexico.
- Galusha, Ted and J. C. Blick, 1971. Stratigraphy of the Santa Fe Group, New Mexico: *American Museum of Natural History Bulletin*. Vol. 144, pp. 1-128.
- Gardiner, R. and D. Bralove, undated (circa 1989). Monitoring Study of the Ute Mountain Section of the Rio Grande Gorge. Taos, New Mexico.
- General Accounting Office, 1987. Report to Congressional Requesters, Cultural Resources, Problems Protecting and Preserving Federal Archeological Resources. Washington, D.C.
- Goetz, Carole L. and Cynthia G. Abeyta. 1987. Adequacy of NASQAN Data to describe Areal and Temporal Variability of Water Quality of the San Juan Basin Upstream from Shiprock, New Mexico. US Geological Survey Water-Resources Investigation Report 85-4043. Albuquerque, New Mexico. 89p.
- Green, N. F., 1980. Winter 1980 Bald Eagle Surveys of Navajo Lake and Adjacent Rivers (unpublished report). Denver, Colorado, Colorado State Office, U. S. Department of the Interior, Bureau of Land Management.
- Grubb, T. G., 1984. Winter Activity of Bald Eagles (*Haliaeetus leucocephalus*) at Navajo Lake, New Mexico. *Southwestern Naturalist* 29(3): 335-341.
- Hibben, Frank C., 1938. The Gallina Phase: *American Antiquity*, Volume 2.
- Herrick, C. L. and D. W. Johnson, 1900. The Geology of the Albuquerque Sheet. *Bulletin of the University of New Mexico*, Hadley Laboratory, Vol. 2, pp. 1-67.
- Holland, R. F., 1987. Is *Quercus lobata* a rare plant? Approaches to conservation of rare plant communities that lack rare plant species; In *Conservation and Management of Rare and Endangered Plants*. T. S. Elias, ed., pp. 129-32. California Native Plant Society, Sacramento, California.
- Hubbard, J. P., 1978. Revised Checklist of the Birds of New Mexico. *New Mexico Ornithological Society* No. 6.
- Hubbard, J. P. and G. C. Schmitt, 1983. The Black-footed Ferret in New Mexico. *Endangered Species Program*, New Mexico Department of Game and Fish, Santa Fe, New Mexico.
- Hunt, A., 1985. Dinosaurs from the Upper Jurassic Morrison Formation in New Mexico. *New Mexico Journal of Science*, Vol. 25.
- Hutto, R. L., S. Reed, P. B. Landers, 1987. A critical evaluation of the species approach to biological conservation. *Endangered Species Update*, Vol. 4 (12):1-4.
- Ingersoll, R. V. and S. G. Lucas, 1978. Paleontological Survey, Resource Assessment, and Mitigation Plan for the Southern Half of the Rio Grande Resource Area, North-Central New Mexico. U.S. Department of the Interior, Albuquerque, New Mexico.

- Jackson, William L., R. Gordon Bentley, and Scott Fisher. 1984. 1980-82 Salinity Status Report: Results of Bureau of Land Management Studies on Public Lands in the Upper Colorado River Basin. BLM Technical Note 364. Denver, Colo. p54.
- Kelley, V. C. and S. A. Northrup, 1975. Geology of Sandia Mountains and Vicinity, New Mexico. New Mexico Bureau of Mines and Mineral Resource Memoir 20.
- Kuchler, A. W., 1985. Potential Natural Vegetation (U.S. Geological Survey Map No. 38077-AH-NA-07M-00). National Atlas of the United States of America, Department of the Interior, U.S. Geological Survey, Reston, Virginia 22092.
- Kues, Barry S., 1982. Fossils of New Mexico. New Mexico Natural History Series, University of New Mexico Press.
- Lee, W. T. and T. H. Knowlton, 1917. Geology and Paleontology of Raton Mesa and Other Regions of Colorado and New Mexico. U. S. Geological Survey Professional Paper 101, pp. 198-217.
- Lucas, S. G., 1977. Vertebrate Paleontology of the San Jose Formation, East Central New Mexico. J. B. Fassett, ed., pp. 221-225. New Mexico Geological Society, Albuquerque, New Mexico.
- Maser, C. and J. W. Thomas, 1983. Wildlife Habitats in Managed Rangelands: The Great Basin of Southeastern Oregon (Introduction). U.S. Department of the Interior, Bureau of Land Management and U.S. Department of Agriculture, Forest Service, General Technical Report PNW-160.
- Meridian Oil Co., 1990. Water Spill Contingency Plan. Farmington, New Mexico.
- New Mexico Department of Game and Fish, 1978a. Comprehensive Plan -- Part 1: Strategic Section, Santa Fe, New Mexico.
- _____, 1978b. Comprehensive Plan -- Part 2: Game Maps. Santa Fe, New Mexico.
- _____, 1987. Operation Plan -- 1987-1995. Villagra Building, Santa Fe, New Mexico.
- _____, 1990a. Biota Information System of New Mexico (BISON-M), Santa Fe, New Mexico.
- _____, 1990b. Myths of Deer Management. New Mexico Wildlife, July-August 1990.
- _____, 1990c. New Mexico Fishing Waters. Santa Fe, New Mexico.
- New Mexico Environment Department. 1990. Intensive Water Quality Stream Surveys and Lake Water Quality Assessment Surveys. Santa Fe, New Mexico. 209p.
- New Mexico Environmental Improvement Division. 1989. Intensive Water Quality Stream Surveys and Lake Water Quality Assessment Surveys. Santa Fe, New Mexico. 199p.
- New Mexico Water Quality Control Commission. 1990. Water Quality and Water Pollution Control in New Mexico 1990. Santa Fe, New Mexico. 289p.
- _____, 1991. Water Quality Standards for Interstate and Intrastate Streams in New Mexico. Santa Fe, New Mexico. 49p.
- Nickens, P. R., S. L. Larraide, and G. C. Tucker, 1981. A Survey of Vandalism to Archeological Resources. Cultural Resource Series. Bureau of Land Management, Colorado State Office, Denver, Colorado.

- O'Neill, F. M., 1981. Acanthosuchus langstoni, a New Crocodylian from the Paleocene of New Mexico. *Journal of Paleontology*, Vol. 55, No. 2, pp. 340-352.
- Ostrom, J. H., 1961. A New Species of Hadrosaurian Dinosaur from the Cretaceous of New Mexico. *Journal of Paleontology*, Vol. 35, pp. 575-77.
- Peckham, Stewart, 1984. The Anasazi Culture of the Northern Rio Grande Rift. New Mexico Geological Society Guidebook, 35th Field Conference, Rio Grande Rift: Northern New Mexico.
- Reeside, J. B. Jr., 1927. The Cephalopods of the Eagle Sandstone and Related Formations in the Western Interior of the United States. U. S. Geological Survey Professional Paper 151.
- Rigby, V. K., Jr. and D. L. Wolberg, 1987. The Therian Mammalian Fauna (Campanian) of Quarry, Fossil Forest Study Area, San Juan Basin, New Mexico. Geological Society of America Special Paper 209.
- Rocky Mountain Regional Coordinating Committee, 1989. Uniform Format For Oil and Gas Lease Stipulations, Final Recommendations. Prepared by: Rocky Mountain Regional Coordinating Committee, March 1989.
- Roybal, F. Eileen and others. 1983. Hydrology of Area 60, Northern Great Plains, and Rocky Mountain Coal Provinces, New Mexico, Colorado, Utah, and Arizona. US Geological Survey Water Resources Investigation Open File Report 83-203. Albuquerque, New Mexico. 80p.
- Rykiel, E. J., Jr. 1979. Ecological Disturbances. In Mitigation Symposium: A National Workshop on Mitigating Losses of Fish and Wildlife Habitats. U.S. Department of Agriculture, Forest Service, General Technical Report RM-65, pp. 624-26.
- Savage, D. E. and D. E. Russell, 1983. Mammalian Paleofaunas of the World. Addison Wesley Publishing Company, Reading Mass.
- Scott, J. M., B. Csut, K. Smith, J. E. Estes, and S. Caicco, undated. Beyond Endangered Species: An Integrated Conservation Strategy for the Preservation of Biological Diversity. Endangered Species Update Volume 5, No. 10; pp. 43-48.
- Simpson, G. G., 1948. The Eocene of the San Juan Basin, New Mexico. *American Journal of Science* 246: 257-292, 363-385.
- Stearns, C. E., 1953. Upper Cretaceous Rocks of Galisteo-Tongue Area, North Central New Mexico. *American Association of Petroleum Geology Bulletin*, Vol. 37, pp. 961-974.
- Stone, W.J., F.P. Lyford, P.F. Frenzel, N.H. Mizell, and E.T. Padgett. 1983. Hydrogeology and Water Resources of San Juan Basin, New Mexico. Hydrologic Report 6. New Mexico Bureau of Mines and Mineral Resources, New Mexico Institute of Mining & Technology, Socorro, New Mexico.
- Sullivan, R. M. and S. G. Lucas, 1988. Spots Before Our Eyes: A Unique Fossil Sheds Light on the Color Pattern of a Turtle that Died 63 Million Years Ago. *Terra*, Vol. 26, No. 6.
- U. S. Congress, 1987. Technologies to Maintain Biological Diversity. Office of Technology Assessment, OTA-F-330. Washington, D.C.: U. S. Government Printing Office, March 1987.
- _____, 1976. Federal Land Policy and Management Act of 1976. Public Law 94-579, 90 Stat. 2743, October 21, 1976.

- U.S. Department of Agriculture, Forest Service, 1989. An Analysis of the Wildlife and Fish Situation in the United States, 1989 - 2040. A technical document supporting the 1989 RPA Assessment.
- U.S. Department of the Interior, Bureau of Land Management, 1982. Integrated Habitat Inventory and Classification System. Manual Section 6602, March 26, 1982.
- _____, 1985. Rio Puerco Resource Area Management Plan and Final Environmental Impact Statement. Albuquerque District Office, Rio Puerco Resource Area Office, Albuquerque, New Mexico.
- _____, 1987a. Fish and Wildlife 2000: A Plan for the Future. Washington, D.C.
- _____, 1987b. Riparian Area Management Policy. Washington, D.C.
- _____, 1987c. Update Document H-8550-1 for Interim Management Policy and Guidelines for Lands Under Wilderness Review.
- _____, 1988a. Manual Section 6840 - Special Status Species Management. Release 6-116, September 16, 1988.
- _____, 1988b. Fruitland Coal Gas EA. Farmington BLM Resource Area Office, Farmington, New Mexico.
- _____, 1988c. Farmington Resource Area Management Plan. Albuquerque District Office. Farmington Resource Area Office, Farmington, New Mexico.
- _____, 1989. Report on Impacts to Groundwater in the Northern San Juan Basin from Coal Bed Methane Development. Mineral Resources Section, Colorado State Office. Lakewood, Colorado.
- _____, 1990. Watchable Wildlife Memorandum of Understanding. Information Bulletin No. 91-174, December 19, 1990. Washington, D.C.
- _____, 1991a. Colorado Oil and Gas Leasing and Development - Final Environmental Impact Statement. Colorado State Office, Lakewood, CO.
- _____, 1991b. Letter to Fowler-Propst, Jennifer. U.S. Fish and Wildlife Service. Albuquerque, New Mexico, requesting a biological opinion on BLM assessment of potential contamination of the San Juan River system from proposed BLM permitted oil and gas activities.
- U. S. Department of the Interior, Fish and Wildlife Service, 1976. Black-Footed Ferret Investigations -- BLM Rio Puerco Impact Statement Area. Report on file, Rio Puerco Resource Area, Albuquerque District, Bureau of Land Management, Albuquerque, New Mexico.
- _____, 1988. 1985 National Survey of Fishing, Hunting and Wildlife Associated Recreation. Washington, DC.
- Vickerman, S., 1989. Watchable Wildlife: A New Initiative. Published by the Defenders of Wildlife in cooperation with the U.S. Bureau of Land Management, U.S. Fish and Wildlife Service, and U.S. Forest Service.
- Waltemeyer, Scott D. 1989. Statistical Summaries of Streamflow Data in New Mexico through 1985. U.S. Geological Survey Water-Resources Investigation Report 88-4228. Albuquerque, New Mexico. 204p.
- Wood, H. E., R. W. Chaney, E. H. Colbert, G. L. Jepson, J. B. Reeside, and C. Stock, 1941. Nomenclature and Correlation of the North American Continental Tertiary. Bulletin of the Geological Society of America, Vol. 52, pp. 1-48.

Acronyms, Abbreviations, and Glossary





ACRONYMS AND ABBREVIATIONS

ACEC	Area of Critical Environmental Concern
AIRFA	American Indian Religious Freedom Act
APD	Application for Permit to Drill
ARPA	Archcological Resources Protection Act
AUM	Animal Unit Month
bbf	barrel (of oil)
Bcf	billion cubic feet (of gas)
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BR	Bureau of Reclamation
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	cubic feet per second
COAs	conditions of approval
COE	U.S. Corps of Engineers
CSU	Controlled Surface Use (Constraint)
DEIS	Draft Environmental Impact Statement
DOE	Department of Energy
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ERMA	Extensive Recreation Management Area
FLPMA	Federal Land Policy and Management Act
FRA	Farmington Resource Area
Mbf	thousand board feet (of lumber)
Mcf	thousand cubic feet (of gas)
NCA	National Conservation Area
NEPA	National Environmental Policy Act
NMOCD	New Mexico Oil Conservation Division
NOI	Notice of Intent
NRHP	National Register of Historic Places
NSO	No Surface Occupancy (Constraint)
NTL	Notice to Lessees and Operators
NWPS	National Wilderness Preservation System
OHV	off-highway vehicle
ORV	off-road vehicle
R&PP	Recreation and Public Purposes Act
RFD	reasonably foreseeable development
RMP	Resource Management Plan
RNA	Research Natural Area
ROS	Recreation Opportunity Spectrum
ROW	right-of-way
RPRA	Rio Puerco Resource Area
SCS	Soil Conservation Service
SMA	Special Management Area

SMA	Special Management Area
STCs	standard terms and conditions
T&E	threatened and endangered (plants and animals)
tds	total dissolved solids
TRA	Taos Resource Area
USDI	U.S. Department of the Interior
USFS	U.S. Forest Service
VRM	visual resource management
WA	Wilderness Area
WSA	Wilderness Study Area

GLOSSARY

ABANDONMENT. The termination of oil and gas production operations, removal of facilities, plugging of the well bore, and reclamation of surface disturbances.

ANIMAL UNIT MONTH (AUM). The amount of forage necessary to sustain one cow and one calf or their equivalent for one month.

APPLICATION. A written request, petition, or offer to lease lands for the purpose of oil and gas exploration and/or the right of extraction.

AREA OF CRITICAL ENVIRONMENTAL CONCERN (ACEC). An area established through the planning process, as provided in FLPMA, where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values; fish and wildlife resources or other natural systems or processes; or to protect life and afford safety from natural hazards.

BASIN. A depressed area with no surface outlet. A low area in the earth's crust of tectonic origin in which sediments have accumulated.

BIG GAME. Larger species of wildlife that are hunted, such as elk, deer, bighorn sheep, and pronghorn antelope.

CONDITIONS OF APPROVAL (COAs). Provisions or requirements under which an Application for a Permit to Drill or a Sundry Notice is approved.

CONTROLLED SURFACE USE (CSU). An oil and gas leasing constraint under which use and occupancy is allowed (unless restricted by another stipulation), but identified resource values require special operational limitations that may modify lease rights. CSU is used for operating control, not as a substitute for the NSO or Timing constraints.

CRUCIAL HABITAT. A biological feature that, if lost, would adversely affect a wildlife species.

CULTURAL RESOURCES. Those fragile and non-renewable remains of human activity, occupation, or endeavor reflected in districts, sites, structures, buildings, objects, artifacts, ruins, works of art, architecture, and natural features important in human events.

CULTURAL RESOURCE INVENTORY CLASSES.

CLASS I. An existing data survey. This is an inventory of a study area to (1) provide a narrative overview of cultural resources by using existing information, and (2) compile existing cultural resources site record data on which to base development of the BLM's site recordation system.

CLASS II. A sampling field inventory designed to locate, from surface and exposed profile indications, all cultural resource sites within a portion of an area so that an estimate can be made of the cultural resources for the entire area.

CLASS III. An intensive field inventory designed to locate, from surface and exposed profile indications, all cultural resource sites in an area. Upon its completion, no further cultural resources inventory work is normally needed in the area of concern.

CUMULATIVE IMPACTS. The collective and aggregate impacts of all actions affecting a particular resource.

DIRECTIONAL DRILLING. Planned drilling of a well at an angle other than 90 degrees (vertical) to reach a target zone offset from the surface location.

DIVERSITY. The relative abundance of wildlife species, plant species, communities, habitats, or habitat features per unit of area.

EASEMENT. A right afforded a person or agency to make limited use of another's real property for access or other purposes.

ENDANGERED SPECIES. Any species in danger of extinction throughout all or a significant portion of its range.

ENVIRONMENTAL ASSESSMENT (EA). A concise public document prepared to provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact. An EA includes a brief discussion of the need for a proposal, the alternatives considered, the environmental impacts of the proposed action and alternatives, and a list of agencies and individuals consulted.

ENVIRONMENTAL IMPACT STATEMENT (EIS). A document prepared to analyze the impacts on the environment of a proposed project or action and released to the public for comment and review. An EIS must meet the requirements of NEPA, CEQ, and the directives of the agency responsible for the proposed project or action.

EXCEPTION. Case-by-case exemption from a lease stipulation. The stipulation continues to apply to all other sites within the leasehold to which the restrictive criterion applies.

FEDERAL LAND POLICY AND MANAGEMENT ACT OF 1976 (FLPMA). Public Law 94-579, signed by the President on October 21, 1976. Establishes public land policy for the management of lands administered by the Bureau of Land Management. FLPMA specifies several key directions for the BLM, notably (1) management on the basis of multiple-use and sustained yield; (2) land use plans prepared to guide management actions; (3) public land management for the protection, development, and enhancement of resources; (4) public land retention in federal ownership; and (5) public participation in reaching management decisions.

FORAGE. All browse and herbaceous foods that are available to grazing animals.

FORMATION. A generally tabular layer of rock identifiable by its characteristics and position relative to other formations, and mappable at the surface and in the subsurface.

FOSSIL. The remains or traces of organisms or assemblage of organisms preserved by natural processes in the earth's crust (exclusive of organisms that have been buried since the beginning of historic time). Minerals such as oil and gas, coal, oil shale, bitumen, lignite, asphaltum, tar sands, phosphate, limestone, diatomaceous earth, uranium, and vanadium, while they may be of biologic origin, are not here considered "fossils." Fossils of scientific value may occur within or in association with such minerals.

FRAGILE SOIL. A soil that is especially vulnerable to erosion or deterioration due to its physical characteristics and/or location. Disturbance to the surface or the vegetative cover can initiate a rapid cycle of loss and destruction of the soil material, structure, and ability to sustain a biotic community.

GEOPHYSICS. Study of the earth by quantitative physical methods.

GROUND COVER. The area of ground surface occupied by the stem(s) of a range plant, as contrasted with the full spread of its herbage or foliage, generally measured at 1 inch above soil level.

HABITAT. A specific set of physical conditions that surround a single species, a group of species, or a large community. In wildlife management, the major components of habitat are considered to be food, water, cover, and living space.

HYDROCARBON. Any organic compound, gaseous, liquid, or solid, consisting solely of carbon and hydrogen.

IMPACT. The effect, influence, alteration, or imprint on the natural and human environment caused by an action.

LAND TREATMENT. All methods of artificial range improvement and soil stabilization such as reseeding, brush control (chemical and mechanical), pitting, furrowing, and water spreading.

LEASE. A contract in legal form that provides for the right to develop and produce resources for

a specific period of time under certain agreed-upon terms and conditions.

LEASE NOTICE. Provides public notification of parcels available for lease and any special stipulations on those parcels.

LEASE STIPULATION. A modification of the terms and conditions on a standard lease form at the time of the lease sale.

LEASABLE MINERALS. Those minerals or materials designated as leasable under the Mineral Leasing Act of 1920. They include coal, phosphate, asphalt, sulphur, potassium and sodium minerals, and oil and gas.

MINERAL ESTATE (MINERAL RIGHTS). The ownership of minerals, including rights necessary for access, exploration, development, mining, ore dressing, and transportation operations.

MITIGATION. Alleviation or lessening of possible adverse effects on a resource by applying appropriate protective measures or scientific study.

MODIFICATION. A fundamental change in the provisions of a lease stipulation, either temporarily or for the term of the lease. A modification may, therefore, include an exemption from or alteration to a stipulated requirement. Depending on the specific modification, the stipulation may or may not apply to all other sites within the leasehold to which the restrictive stipulation applies.

MULTIPLE USE. Management of the various surface and subsurface resources so they are jointly used in the manner that will best meet the present and future needs of the public, without permanent impairment of the productivity of the land or the quality of the environment.

NATIONAL ENVIRONMENTAL POLICY ACT OF 1969 (NEPA). Public Law 91-190. Establishes environmental policy for the nation. Among other items, NEPA requires federal agencies to consider environmental values in decision-making processes.

NATIONAL REGISTER OF HISTORIC PLACES (NATIONAL REGISTER, NRHP).

A listing of architectural, historical, archaeological, and cultural sites of local, state, or national significance. The list of sites was established by the Historic Preservation Act of 1966 and is maintained by the National Park Service.

NO SURFACE DISTURBANCE. In general, applies to an area where an activity is allowed so long as it does not disturb the surface estate.

NO SURFACE OCCUPANCY (NSO). An oil and gas leasing constraint that prohibits occupancy or disturbance on all or part of the lease surface to protect special values or uses. Lessees may exploit the oil and gas resources under leases restricted by this constraint through use of directional drilling from sites outside the NSO area.

NOTICE TO LESSEES (NTL). A written notice issued by the BLM to implement regulations and operating orders, and serve as instructions on a specific item(s) of importance within a state, district, or area.

OFF-HIGHWAY VEHICLE (OHV). Any motorized vehicle capable of or designed for travel on or immediately over land, water, or other natural terrain.

OFF-ROAD VEHICLE DESIGNATIONS.

CLOSED. Applies to areas and trails where the use of off-road vehicles is permanently or temporarily prohibited. Emergency use of vehicles is allowed.

LIMITED. Applies to areas and trails where the use of off-road vehicles is subject to restrictions such as limiting the number or types of vehicles allowed, dates and times of use (seasonal restrictions), limiting use to existing roads and trails, or limiting use to designated roads and trails. Under the designated roads and trails designation, use is allowed only on roads and trails that are signed for use. Combinations of restrictions, such as limiting use to certain types of vehicles during certain times of the year, are possible.

OPEN. Applies to areas and trails where off-road vehicles may be operated (subject to operating regulations and vehicle standards set forth in BLM Manuals 8341 and 8343).

PALEONTOLOGICAL RESOURCE. A site containing non-human life of past geological periods, usually in the form of fossil remains.

PATENT. A grant made to an individual or group conveying fee simple title to public lands.

PLANNING AREA. The geographical area for which land use and resource management plans are developed and maintained.

PRIMITIVE. Refers to areas that are almost completely free of management controls, are located more than 3 miles from the nearest point of motor vehicles access, and have unmodified landscapes and little evidence of other people.

PUBLIC LAND. Any land and interest in land (outside of Alaska) owned by the United States and administered by the Secretary of the Interior through the Bureau of Land Management (BLM).

RAPTOR. Bird of prey with sharp talons and strongly curved beak, e.g., hawk, owl, vulture, eagle.

RECLAMATION. Returning disturbed lands to the form and productivity that is ecologically balanced and in conformity with a predetermined land management plan or management constraint.

RECREATION AND PUBLIC PURPOSES ACT (R&PP). This act authorizes the Secretary of the Interior to lease or convey public lands for recreational and public purposes, under specified conditions, to states or their political subdivisions and to nonprofit corporations and associations.

RESOURCE AREA. A geographic portion of a BLM District that is the smallest administrative subdivision in the BLM.

RESOURCE MANAGEMENT PLAN (RMP). A land use plan that establishes land use allocations, multiple-use guidelines, and management objectives for a given planning

area. The RMP planning system has been used by the BLM since 1980.

RIPARIAN. Situated on or pertaining to the bank of a river, stream, or other body of water. Normally describes plants of all types that grow rooted in the water table or subirrigation zone of streams, ponds, and springs.

RIPARIAN ZONE. An area encompassing riparian and adjacent vegetation.

ROADLESS. Refers to the absence of roads constructed and maintained by mechanical means to ensure regular and continuous use.

ROADS. Vehicle routes that improved and maintained by mechanical means to ensure relatively regular and continuous use. (A way maintained strictly by the passage of vehicles does not constitute a road.)

SALINITY. Refers to the solids such as sodium chloride (table salt) and alkali metals that are dissolved in water. Often in non-saltwater areas, total dissolved solids (tds) are used as an equivalent.

SCOPING PROCESS. An early and open public participation process for determining the scope of issues to be addressed in an environmental and/or planning document, and for identifying the significant issues related to a proposed action.

SEDIMENT YIELD. The amount of sediment produced in a watershed, expressed as tons, acre-foot, or cubic yards, of sediment per unit of drainage area per year.

SEMIPRIMITIVE. Refers to areas that have very few management controls, are located between 1/2 and 3 miles from the nearest point of motor vehicle access (excluding four-wheel drive roads and trails), and have mostly natural landscapes and some evidence of other people.

SHUT-IN. An oil and gas well that is capable of production but is temporarily not producing.

SPECIAL RECREATION MANAGEMENT AREA (SRMA). An area that possesses outstanding recreation resources or where recreation

use causes significant user conflicts, visitor safety problems, or resource damage.

SPLIT ESTATE. Refers to land where the mineral rights and the surface rights are owned by different parties. Owners of mineral rights generally have a superior right.

STIPULATION. A provision that alters standard lease rights and is attached to and made a part of the lease.

STUDY AREA. Refers to all the resource areas and planning areas covered in this EIS collectively.

SUITABILITY. As used in the Wilderness Act and in the Federal Land Policy and Management Act, refers to a recommendation by the Secretary of the Interior or the Secretary of Agriculture that certain federal lands satisfy the definition of wilderness in the Wilderness Act. These lands have been found appropriate for designation as wilderness on the basis of an analysis of their existing and potential uses.

SUNDRY NOTICE. A standard form used for well operations after the Application for Permit to Drill has been approved. The lessee uses a sundry notice to request approval for a change in the approved action or to notify BLM that an event (action) previously approved has been completed.

SURFACE MANAGEMENT AGENCY. Any agency outside of the Bureau of Land Management with jurisdiction over the surface overlying federal minerals.

SUSTAINED YIELD. The achievement and maintenance, in perpetuity, of a high-level annual or regular periodic output of the various renewable resources on public lands consistent with multiple use.

THREATENED SPECIES. Any species or significant population of that species likely to become endangered within the foreseeable future throughout all or a significant portion of its range. This category usually includes only those species that have been recognized and listed as threatened by federal and state governments, but

may include species categorized as rare, very rare, or depleted.

TIMBER. Standing trees, downed trees, or logs capable of being measured in board feet.

TIMING LIMITATION (SEASONAL RESTRICTION). An oil and gas leasing constraint that prohibits surface use during specified time periods to protect identified resource values. The constraint does not apply to the operation and maintenance of production facilities unless analysis demonstrates that such constraints are needed and that less stringent, project-specific constraints would be insufficient.

TOTAL DISSOLVED SOLIDS (tds). Salt, or an aggregate of carbonates, bicarbonates, chlorides, sulfates, phosphates, and nitrates of calcium, magnesium, manganese, sodium, potassium, and other positively charged ions that form salts.

UTILIZATION. The proportion of the current year's forage production that is consumed or destroyed by grazing animals. Utilization is usually expressed as a percentage.

VALID EXISTING RIGHTS. Legal interests that attach a land or mineral estate and cannot be divested from the estate until those interests expire or are relinquished.

VANDALISM. Willful or malicious destruction or defacement of public property; e.g., cultural or paleontological resources.

VEGETATION MANIPULATION. Planned alteration of vegetation communities through use of prescribed fire, plowing, herbicide spraying, or other means to gain desired changes in forage availability or wildlife cover.

VEGETATION TYPE. A plant community with immediately distinguishable characteristics based upon and named after the apparent dominant plant species.

VISUAL RESOURCES. The visible physical features of a landscape, (topography, water, vegetation, animals, structures, and other features) that comprise the scenery of the area.

VISUAL RESOURCE MANAGEMENT (VRM). The inventory and planning actions taken to identify visual resource values and to establish objectives for managing those values. Also, the management actions taken to achieve the established objectives.

VISUAL RESOURCE MANAGEMENT CLASSES. VRM classes identify the degree of acceptable visual change within a particular landscape. A classification is assigned to public lands based on the guidelines established for scenic quality, visual sensitivity, and visibility.

VRM CLASS I. This classification preserves the existing characteristic landscape and allows for natural ecological changes only. Includes Congressionally authorized areas (wilderness) and areas approved through an RMP where landscape modification activities should be restricted.

VRM CLASS II. This classification retains the existing characteristic landscape. The level of change in any of the basic landscape elements (form, line, color, texture) due to management activities should be low and not evident.

VRM CLASS III. This classification partially retains the existing characteristic landscape. The level of change in any of the basic landscape elements due to management activities may be moderate and evident.

VRM CLASS IV. This classification provides for major modifications of the characteristic landscape; the level of change in the basic landscape elements due to management activities can be high. Such activities may dominate the landscape and be the major focus of viewer attention.

VRM CLASS V. This classification applies to areas where the characteristic landscape has been so disturbed that rehabilitation is needed. Generally considered an interim short-term classification until rehabilitation or enhancement is completed.

VISUAL SENSITIVITY. Visual sensitivity levels are a measure of public concern for scenic quality and existing or proposed visual change.

WAIVER. Permanent exemption from a lease stipulation. The stipulation no longer applies anywhere within the leasehold.

WILDERNESS, WILDERNESS AREA. An area formally designated by Congress as a part of the National Wilderness Preservation System.

WILDERNESS CHARACTERISTICS. Qualities identified by Congress in the Wilderness Act of 1964, including size; naturalness; outstanding opportunities for solitude or a primitive and unconfined type of recreation; and supplemental values such as geological, archaeological, historical, ecological, scenic, or other features.

WILDERNESS MANAGEMENT POLICY. The policy that prescribes the general objectives, policies, and specific activity guidance applicable to all designated BLM wilderness areas. Specific management objectives, requirements, and decisions that implement administrative practices and visitor activities in individual wilderness areas are developed and described in a wilderness management plan for each unit.

WILDERNESS STUDY AREA (WSA). An area determined to have wilderness characteristics. Wilderness study areas are subject to interdisciplinary analysis through the BLM's land use planning system and public comment to determine their wilderness suitability. Suitable areas are recommended to the President and Congress for designation as wilderness.

WITHDRAWAL. An action that restricts the use of public land and segregates it from the operation of some or all of the public land and mineral laws. Withdrawals are also used to transfer jurisdiction of management of public lands to other federal agencies.

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