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Department of
Agriculture

FOREST SERVICE

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FINAL OIL AND GAS LEASING ENVIRONMENTAL IMPACT STATEMENT

GRAND MESA,
UNCOMPAHGRE
AND GUNNISON
NATIONAL FORESTS

Volume II



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Cooperating Agency
USDI BUREAU OF LAND MANAGEMENT

**Chapter VI -
Response to
Public Comments**

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Chapter VI - Response to Public Comments

Introduction

This chapter includes our response to the comments we received; copies of the letters we received from other governmental agencies, the oil and gas industry, and organizations; a list of reviewers keyed to the comments and responses; and the mailing list.

Other aspects of public participation are discussed in Chapter I.

Letters were received from various governmental agencies, oil and gas companies, industry advocacy groups, several local and regional environmental organizations, and other interested organizations and people. 270 letters were received from 263 reviewers. The majority of the comments were from local communities. Comments were received from the following areas:

| | |
|-----------------------------|-------|
| Crested Butte/Gunnison area | 39.2% |
| Paonia and vicinity | 15.3% |
| Grand Junction and vicinity | 12.2% |
| Denver Metro area | 6.7% |
| Boulder | 6.2% |
| Other Forest Communities | 5.9% |
| Fort Collins | 3.5% |
| Other Colorado towns | 4.3% |
| Other States | 6.7% |

Four letter writing campaigns and one petition drive generated the majority of the comment letters. These campaigns were organized by:

Forest Rescue: Support Alt. 3 - No Lease anywhere, no timber harvest following oil and gas activity.

Western Colorado Congress, Colorado Environmental Coalition, et al.: Support Alt. 5 - No Lease in Roadless Areas, never waive stipulations.

Western Slope Energy Research Center, Black Canyon Audubon Society: Above, plus RFD too low, coal bed methane impacts not addressed.

Chuck Davies/Dick Pennington Outfitters: 1113 signatures, 62 form letters. No oil and gas development in Clear Fork/Muddy drainages.

Industry comments were received from:

Independent Petroleum Association of Mountain States: Preferred alternative too restrictive, violates multiple-use, adequate resource protection under SLT.

Arco Oil & Gas Co.: Preferred alternative okay, but with less restrictions in Roadless Areas.

Texaco Exploration & Production Inc.: Analysis underestimates economic benefits, *SLT* everywhere.

The following State and Federal agencies commented on the DEIS:

Colorado Division of Parks & Outdoor Recreation: Support protection of Tabeguache RNA.

Colorado Department of Transportation: Need to discuss impacts to State highways, list required DOT permits.

Environmental Protection Agency: Concern over impacts to water quality, air quality, riparian et al., suggests additional mitigation measures.

NOAA Ecology and Conservation Division: Protect geodetic survey monuments.

US Department of Health & Human Services: Elaborate on spill contingency plan.

USDI Office of Environmental Affairs: Supports Alt. 5 with changes; *NL* in alpine/tundra, need more on air quality impacts, consider impacts to mineral resources, *NL* in geologic hazard areas, do not waive etc. special stipulations.

US Fish and Wildlife Service: Supports Alt. 5, concern over T&E species, do not waive etc. special stipulations.

Additional comments were received from the following organizations (not previously mentioned):

Colorado Mountain Club: Supports Alt. 5, concern with impacts to biodiversity, loss of backcountry recreation opportunities.

Colorado Outfitters Association: No development in Clear Creek/Muddy, loss of backcountry recreation, do not lease undeveloped lands.

High Country Citizens Alliance: Supports Alt. 5 because they know Alt. 3 would not be selected, protect Kebler Pass, concern areas opened for oil and gas will be closed to general public.

Sierra Club: Preferred alternative does not protect Roadless Areas, RFD is too low, keep oil and gas roads closed to public.

Thunder Mountain Wheelers: Supports Alt. 2, no special protection in Roadless Areas.

Wilderness Study Group: Supports Alt. 5, currently studying Roadless Areas for biodiversity values - want development held until study complete and recommendations made for area protection.

Colorado Wildlife Society: Supports Alt. 5, concern about impacts to riparian and wildlife, no timber harvest following oil and gas development.

The major areas of concern identified from these letters included: Roadless Areas; biodiversity; water and air quality; the alpine/tundra ecosystem; aquatic, riparian, and wetland habitats; municipal watersheds; recreation complexes; wildlife habitat; the RFD; coal bed methane development; the potential for timber harvest; the effects of oil and gas on recreation use, opportunities and experiences; and the granting of waivers, exceptions, and modifications to stipulations. The Roadless Area issue was easily the biggest issue. The potential for increased timber sales as a result of access provided by oil and gas activity was a concern expressed quite often.

Response to Comments

Individual comments were identified from all the letters received. These comments are listed below (pages VI-3 through VI-67). Comments are numbered to identify general categories and subcategories. For example: AEG02 refers to the second comment in the **Affected Environment** category, **General Forest** subcategory. Where the numerical sequence is broken (i.e. AEG24 is followed by AEG27), comments were combined as the comment analysis process proceeded.

Each individual/agency/organization who commented has been assigned an index number. A list of these reviewers and their index numbers begins on page VI-111. The list is indexed alphabetically. These index numbers are the numbers listed after the heading *Reviewer(s)*; under each comment. To find a comment from a given reviewer, first look up their index number on pages VI-111 through VI-113. This index number appears in the *Reviewer(s)* list after each comment made by that given reviewer.

AE3A01 Affected Environment 3A - SPNM

Was oil and gas potential considered in identifying Semi-primitive Non-motorized management areas?

Reviewer(s): 178

RESPONSE: No. 3A Management Areas (Semi-primitive Non-motorized recreation) were previously designated in the Forest Planning effort. Many of the 3A Management Areas are leased or have been leased.

AEAT01 Affected Environment Alpine/Tundra

Allow no leasing in alpine/tundra affected environment.

Reviewer(s): 99, 133, 177, 242, 243

RESPONSE: The *No Surface Occupancy (NSO)* stipulation applied to Alpine/Tundra areas is designed to protect the Alpine/Tundra environment. Approval of a waiver of the stipulation would be considered only if the lessee/operator could meet the purpose of the *NSO* stipulation. The purpose of the *NSO* stipulation in Alpine/Tundra areas is displayed on page C-10, i.e., the operator would have to demonstrate that they could:

- a. Prevent significant or permanent impairment of soil productivity.
- b. Maintain or improve water quality to meet Federal or State standards.
- c. Minimize the potential for significant or cumulatively significant impacts in alpine ecosystems, per 40 CFR 1508.27(b)(7).
- d. Minimize visual quality impacts.
- e. Maintain the integrity of associated ecosystems.

See page I-16 for a discussion of waivers, modifications, and exceptions. Waivers, exceptions or modifications are considered only at the time operations are proposed (APD) and will be subject to the Forest Plan in effect at the time of consideration and will be subject to applicable regulatory and environmental compliance requirements. Granting of a waiver, exception and modification is discretionary action which the agency will not routinely consider.

AEAT02 Affected Environment Alpine/Tundra

We support *NSO* in fragile alpine areas.

Reviewer(s): 46, 47, 88, 151

RESPONSE: See the response to Comment #: AEAT01.

AEAT03 Affected Environment Alpine/Tundra

The DEIS is deficient in analyzing the impacts of oil and gas activities in Alpine/Tundra areas by not discussing the impacts on recreation use and opportunities in these areas.

Reviewer(s): 46

RESPONSE: Impacts to recreation use and opportunities in Alpine/Tundra areas have been added on pages II-23 and IV-18.

AEEC01 Affected Environment Economics

The DEIS minimizes the socio-economic impact of lost opportunities for oil and gas development. This needs to be discussed in further detail under each alternative.

Reviewer(s): 237

RESPONSE: The number of wells drilled (potential economic activity) is the same for all alternatives. The difference in jobs and other social effects is explained between action and no action alternatives on pages IV-60 through IV-63.

AEEC02 Affected Environment Economics

The document is inaccurate and underestimates the economic impacts under Alternative 4.

Reviewer(s): 237

RESPONSE: Table S-4 and the Summary Comparison of Program Alternatives on pages II-51 through II-55 under the Economic and Social Setting Environmental Factors have been revised. The effects described under Alternative 3 - No Lease, are common to all alternatives. The assumption is that 40 wells will be drilled on existing leases under all alternatives, and 7 wells will be drilled on new leases under alternatives 1, 2, 4 and 5. The effects described for alternatives 1, 2, 4 and 5 are in addition to those described for Alternative 3 - No Lease. See also the discussion of Social and Economic Conditions on pages IV-60 through IV-63 for more on the economic benefits to local communities.

AEEC03 Affected Environment Economics

Some discussion is needed comparing differences between employment projections in the draft and in earlier more generic studies of energy resource development.

Reviewer(s): 41

RESPONSE: Employment projections used in the EIS are those local jobs occurring in the project area.

AEEC04 Affected Environment Economics

The document needs to address the adverse economic effects of low oil and gas prices on alternative energy and energy conservation and on the high cost to consumers resulting from pricing policies which favor pollution control over prevention.

Reviewer(s): 225

RESPONSE: Decisions made in the ROD to this EIS will not significantly affect oil and gas prices. The volume of gas produced from the Forest is insignificant when compared to the volume of gas available in the world and national marketplace. Other decisions which may affect oil and gas prices are made at the national level (Congress, FERC, etc.) and are beyond the scope of this document.

AEEC05 Affected Environment Economics

You need to show costs and what market price would be necessary to allow oil and gas extraction, similar to the market demand simulation done in the timber amendment [to the Forest Plan].

Reviewer(s): 185

RESPONSE: Oil and gas exploration and development is a free market enterprise on which we have little affect. Oil and gas extraction is dependent on the volume of the resource and the rate of recovery of the resource. It is a speculative, risky business and there is no guarantee of the presence of the resource in volumes that make it economical.

AEG01 Affected Environment General Forest

Biodiversity values and issues must be addressed in the FEIS on both a Forest-wide and site specific basis.

Reviewer(s): 43, 47

RESPONSE: Biodiversity issues and values are discussed on pages III-3 through III-4 and the effects are discussed on pages IV-1 and IV-39 through IV-41.

AEG02 Affected Environment General Forest

Old-growth values and issues must be addressed in the FEIS.

Reviewer(s): 13, 43

RESPONSE: Old growth is discussed on pages III-9 - III-10. The effects on old growth are discussed on pages IV-2 and IV-58 - IV-59. At this stage of the leasing process we do not know where oil and gas activity will occur. We can only make generalized statements about the effects to old growth. Old growth issues and effects will be discussed further in the environmental documentation for an APD and SUPO.

AEG03 Affected Environment General Forest

Ecosystem management values and issues must be addressed in the FEIS.

Reviewer(s): 43

RESPONSE: Ecosystem management values and issues are discussed throughout Chapters III and IV. Effects on biodiversity, forest fragmentation, wildlife habitats, wildlife and man's use, both consumptive and non-consumptive are discussed in Chapter IV. *Affected Environments* such as Alpine/Tundra, Aquatic/Riparian/Wetland Habitats, and certain Roadless Areas represent unique ecosystems. A discussion of their values and issues and effects are discussed in Chapter IV, but not in the context of "ecosystem management".

AEG04 Affected Environment General Forest

What is the potential for serious water and other contamination from burying reserve pits and fuel spills?

Reviewer(s): 43

RESPONSE: The potential for serious water and other contamination from reserve pits and fuel spills is very low because of the environmental mitigations that are required. (See Mitigation Appendix H.)

AEG05 Affected Environment General Forest

Biodiversity would be altered as a result of oil and gas exploration and development.

Reviewer(s): 12, 13, 34, 46, 47, 64, 66, 68, 89, 94, 99, 105, 106, 114, 143, 149, 153, 160, 161, 175, 197, 199, 204, 206, 209, 212, 213, 217, 238, 252, 258, 259

RESPONSE: Some alteration of biodiversity would occur as a result of oil and gas activity. This is discussed on pages IV-1 and IV-39 - IV-41 and as part of the wildlife section on pages IV-56 - IV-59.

AEG06 Affected Environment General Forest

Air quality would be degraded as a result of oil and gas exploration and development.

Reviewer(s): 12, 13, 21, 33, 54, 64, 66, 68, 89, 94, 105, 106, 114, 124, 153, 160, 189, 193, 197, 207, 209, 212, 217, 238

RESPONSE: Some local short-term degradation of air quality would occur. See page IV-4.

AEG07 Affected Environment General Forest

Water quality would be degraded as a result of oil and gas exploration and development.

Reviewer(s): 12, 13, 21, 33, 34, 54, 64, 66, 68, 89, 94, 96, 105, 106, 114, 124, 145, 153, 160, 161, 189, 193, 197, 207, 209, 212, 217, 238

RESPONSE: Some local short-term degradation of water quality would occur. See page IV-4, IV-14 - IV-15, IV-17, IV-19, IV-20, IV-28, IV-45 - IV-48 and IV-63.

AEG08 Affected Environment General Forest

Oil and gas exploration would remove trees as a result of constructing developments.

Reviewer(s): 33, 157

RESPONSE: Yes, the construction of roads, well pads and pipelines would likely result in the removal of trees. 10.7 acres of land are estimated to be disturbed per well site (this includes the road and pipeline corridor and the well pad). The number of trees removed would depend on the density of the trees along the proposed road or pipeline corridor or well site. The construction may or may not be in a forested area.

AEG09 Affected Environment General Forest

New roads for oil and gas activities will increase erosion resulting in increased dissolved solids in water, robbing water of oxygen required by fish and aquatic insects.

Reviewer(s): 13, 59, 107, 152, 171, 189

RESPONSE: Some short-term increase in erosion would likely occur. The greatest impact from erosion would be an increase in sediment load, especially during spring runoff and storm events. An increase in fine sediment may smother the gravel beds that fish have spawned in or normally spawn in, resulting in less reproductive viability for those species affected. Some increase in dissolved solids may also occur, depending on the physical and chemical characteristics of the soil being eroded.

AEG10 Affected Environment General Forest

The DEIS does not address possible air quality impacts to National Park System resources adjacent to the analysis area.

Reviewer(s): 242

RESPONSE: See revised air quality discussion (pages III-22 - III-24).

AEG11 Affected Environment General Forest

The FEIS should include a cumulative air quality analysis related to projected oil and gas activities.

Reviewer(s): 242

RESPONSE: See revised air quality discussion (pages IV-43 - IV-45).

AEG12 Affected Environment General Forest

Air quality mitigation measures need to be specified in the FEIS.

Reviewer(s): 242

RESPONSE: Mitigation measures are discussed in Appendix H. Site specific air quality mitigation measures will be specified at the time of an APD and SUPO.

AEG13 Affected Environment General Forest

The document should address water quality impacts in more terms than just erosion and road construction.

Reviewer(s): 185, 247

RESPONSE: The potential for water quality impacts are most closely tied to the ground disturbing activities such as road, well pad and pipeline construction. The potential for local water quality impacts is greatest from erosion. The effects are not considered to be significant. Other water quality impacts are less predictable and much less likely to occur (spills, leaks, etc.). Impacts from these occurrences are addressed on pages IV-45 through IV-48.

AEG14 Affected Environment General Forest

The document should address water quality impacts on the basis of an RFD closer to 1000 wells.

Reviewer(s): 247

RESPONSE: There is no justification to address water quality impacts on the basis of a RFD closer to 1000 wells. The RFD represents the best information available regarding future oil and gas activity on the Forest over the next 15 years. It was prepared by an expert in the field, and considers past trends, future prices and future supply and demand.

AEG15 Affected Environment General Forest

Many locations in the analysis area are not designated as Roadless or 3A Management Areas but offer potential for solitude and backcountry experiences. These areas need to be inventoried and protected.

Reviewer(s): 91

RESPONSE: The Forest Plan made land allocations based on the numerous resource values found on the Forest. Protection of the type of areas you mentioned may or may not occur. Protection would be based on the Forest Plan management prescription for those areas. Roadless Areas are not designated by a management prescription. The Roadless Areas displayed in this document are generally the RARE II areas slightly modified by our knowledge of road construction that has occurred since 1979.

AEG16 Affected Environment General Forest

The Forest Service does not have inventories of all resources that will be effected by oil and gas activities. How can we make management decisions without knowledge of existing resources?

Reviewer(s): 13, 86, 91

RESPONSE: It is true that inventories of all resources may not exist and may not ever exist on a Forest-wide basis. Section 6 of the standard lease form (BLM FORM 3100-11 - Offer to Lease and Lease for Oil and Gas) specifies that the lessee may be required to conduct inventories or special studies to determine the extent of impacts to other resources. Special studies may be required as a Condition of Approval of the lessees proposed Surface Use Plan of Operations when submitting an Application for Permit to Drill (see page H-14, Pre-Activity Inventories).

AEG17 Affected Environment General Forest

The phrase "expecting no impact" is questioned because some impact occurs as a result of any activity.

Reviewer(s): 1

RESPONSE: Some impact does occur as a result of any activity. In the context of this document the effects were described relative to a specific *Affected Environment*.

AEG18 Affected Environment General Forest

The Final EIS needs to contain a map and discussion of forest fragmentation and how each alternative will affect it.

Reviewer(s): 47

RESPONSE: A map of forest fragmentation is not available at this time.

AEG19 Affected Environment General Forest

The Grand Mesa should be added to the list of sensitive areas. There needs to be a cumulative effects analysis of the timber harvest, roads, oil and gas activities and extensive motorized vehicle use in this area.

Reviewer(s): 47

RESPONSE: Sensitive areas as defined in this document are lands proposed for resource use that precludes intensive development. Portions of the Grand Mesa are designated as sensitive (see pages III-90 and Figure III-10). The Forest Plan has allocated portions of Grand Mesa as suitable for timber harvest and recreational developments. Assigning the entire Grand Mesa as a sensitive area would not be an appropriate allocation of the multiple resources found there. Cumulative effects analyses of activities on Grand Mesa are being done as projects are proposed.

AEG21 Affected Environment General Forest

No Lease should be the designation where water pollution can be a problem.

Reviewer(s): ,

RESPONSE: Those *Affected Environments* potentially most affected by oil and gas operations (Riparian/Aquatic/Wetland habitats) and related water pollution are stipulated in the preferred alternative and by Forest Service oil and gas regulation (36 CFR 228.108(j)) to be *No Surface Occupancy*. Even though they are *NSO* some effects will be expected to occur to those *Affect Environments*. It is likely that roads will cross these areas. Mitigation measures will be applied to minimize the potential for adverse impacts. Mitigation measures will be specified in the approval of the SUPO.

AEG22 Affected Environment General Forest

Would it be reasonable to inventory and evaluate the oil and gas resources as other resources (like soils, slopes, etc.) have been evaluated in this document?

Reviewer(s): 178

RESPONSE: The oil and gas potential map represents the "inventory" of those resources. Unlike soils, slopes, etc., we do not know that oil and gas resources will be found in any particular area of the Forest. The potential for oil and gas resources takes into consideration the factors that are normally associated with the presence of oil and/or gas resources like geologic formations with suitable source and reservoir rocks, thermal maturation and traps. However, there is no assurance, short of drilling, that those resources are present in paying quantities.

AEG23 Affected Environment General Forest

The document underestimates the impact of oil and gas development on vegetation. It should reflect that plugged wells have been known to leak oil and salt water, contaminating soils and preventing vegetation from growing.

Reviewer(s): 225

RESPONSE: The impact to vegetation in the vicinity of the well head was considered in the DEIS. The impact to vegetation from leaks, as you suggest, would likely be confined to the well pad - an area already disturbed. Leaks are uncommon and the impacts from them would likely be short term.

AEG24 Affected Environment General Forest

To date what amount of spills have occurred and detail their effects. Give historical information on past oil and gas activity impacts and previously used mitigation procedures.

Reviewer(s): 78, 96

RESPONSE: Several incidents have occurred, none of which caused any significant impact to vegetation, surface water, or other surface resources. Reserve pits have overflowed in the spring during heavy rains and snowmelt; an operator spread mud from a reserve pit on a road for dust abatement (without approval); a reserve pit was breached and about 20 barrels of water and mud flowed about 100 yards downslope; and a water truck rolled. In one case, the State of Colorado took the operator to court and the BLM issued an Incidence of Noncompliance. In the case of the rolled water truck, it was either empty at the time or was hauling produced water. In reviewing photographs of the accident scene, there was no evidence of a spill.

These incidents took place several years ago. Based on these experiences, the Forest now requires reserve pits to be closed by November 1 or requires a closed system. Accidents can still happen, but to date they have been minor and have done very little environmental damage.

AEG27 Affected Environment General Forest

No Lease stipulations were not addressed to old growth stands.

Reviewer(s): 96

RESPONSE: The amount of old growth timber affected would not result in the Forest Plan standard and guideline being violated. The standard is "5-12% or more of a diversity unit will be in old growth classification (where biologically feasible)". At the most, only 500 acres will be disturbed over the next 15 years by oil and gas activity (47 wells - 10.7 acres/well). It is unlikely that all the disturbance would be in old growth. Old growth issues will be discussed further at the site specific APD - SUPO stage.

AEG28 Affected Environment General Forest

We assume that *SLT* for wildlife summer range under Alternative 5 on Table S-2 is a printing error.

Reviewer(s): 252

RESPONSE: You are correct, it is a typographical error. It should be *NSO*.

AEG29 Affected Environment General Forest

Significant environmental impacts are identified in the DEIS for the projected 47 wells. What will the impacts be if more activity occurs?

Reviewer(s): 252

RESPONSE: If more activity occurs, the effects would be commensurately greater. The effect of each individual well would be similar to that discussed in the DEIS. The greatest potential for adverse environmental effects would occur if wells are concentrated. Some concentration of activity is expected in the unitized areas (the Narrows and the Ragged Mountain Unit).

AEG30 Affected Environment General Forest

The impacts of emissions of sulfur dioxide from waste gas flaring and tail gas incineration from oil and gas processing operations are not addressed.

Reviewer(s): 78

RESPONSE: See revised air quality discussion pages III-22 - III-24 and IV-43 - IV-45.

AEG31 Affected Environment General Forest

The impact of fugitive hydrogen sulfide emissions are not discussed in the Draft EIS.

Reviewer(s): 78

RESPONSE: See revised air quality discussion pages III-22 - III-24 and IV-43 - IV-45.

AEG32 Affected Environment General Forest

The DEIS inadequately deals with intact late seral ecosystems, particularly since an old growth inventory is not complete. Cumulative effects on old growth need to be addressed.

Reviewer(s): 185

RESPONSE: See response to Comment #: AEG27.

AEG33 Affected Environment General Forest

Page IV-3 states road construction would increase the rate of erosion 80-100 times normal. This coupled with the fact that large areas of the Forest are subject to mass movement indicates potential for further soil and water degradation.

Reviewer(s): 185

RESPONSE: The area involved in the construction of roads for oil and gas activity is small compared to the area subject to mass soil movement. The erosion rate of 80-100 times normally is a short-term effect. The increase in erosion would not be significant relative to natural rates across the analysis area.

AEG34 Affected Environment General Forest

In the face of declining water quality and increased use and demand for quality and quantity of water, the impacts to water quality from the proposed oil and gas activity is unacceptable.

Reviewer(s): 185

RESPONSE: This document does not propose oil and gas activity. It makes certain land available for oil and gas leasing. Mitigation measures will be required to lessen any impacts to water quality. Operators will be required to maintain water quality at or above Clean Water Act and State standards. Operators may be subject to civil and criminal action if water quality is degraded as a result of their activity to below state and Federal standards for water quality. See also the response to Comment #: AEG33.

AEG35 Affected Environment General Forest

The DEIS inadequately treated water quality issues of sedimentation, drilling waste and cumulative effects of potential timber harvest following oil and gas activities.

Reviewer(s): 185

RESPONSE: Impacts to water quality are discussed on pages IV-4, IV-14, IV-17, IV-19, IV-20, IV-28, IV-45 through IV-48 and IV-63. A cumulative effects discussion relative to impacts to water quality resulting from timber harvest is on page IV-48. Mitigation measures that will be employed to lessen impacts to water quality are in Appendix H.

AEGE01 Affected Environment Geology

The sections of land in T49N R6W near Cimarron Point are shown as having moderate hydrocarbon potential in the DEIS; however, geological maps suggest no potential would be more appropriate for this area.

Reviewer(s): 242

RESPONSE: The moderate hydrocarbon potential rating is based on the BLM's Oil and Gas Potential Rating Criteria displayed in Appendix B. The potential was based on review of the "Geologic Map of Colorado" (Tweto, 1979). Geologic mapping on that map is displayed at a scale of 1:500,000, a scale sufficient to make a generalized determination of oil and gas resource potential.

An area is rated as moderate potential if there is geophysical or geological indication that the following are present: (1) source rock, (2) thermal maturation, (3) reservoir strata possessing permeability and/or porosity, and (4) traps. All of the above may or may not be present in your area of concern. Based on further site specific investigation of the area, a rating of no potential may well be more appropriate. However, that is beyond the needs of this document. The potential for oil and gas resources is relevant generally only in the context of determining the area of analysis for this EIS. Rating an area as having no known potential for hydrocarbons does not preclude an area from being leased. Lands outside the analysis area are subject to leasing on a case by case basis, i.e., if a lease is requested for a parcel outside the analysis area (low or no known potential for oil and gas resources) the Forest Service will determine the availability of the parcel and whether to authorize the BLM to lease the parcel. These determinations will be documented in the decision document for a NEPA analysis (ROD or FONSI).

AEGE02 Affected Environment Geology

The DEIS does not address potential impacts to other mineral resources resulting from oil and gas activities. The possible long-term impacts on other mineral resources in the areas proposed to be restricted or closed to leasing should be addressed in the FEIS.

Reviewer(s): 242

RESPONSE: Locatable minerals, generally those hardrock minerals which are mined and processed for the recovery of metals, are subject to disposal under the General Mining Law of May 10, 1972 (17 Stat. 91, as amended; 30 USC 22 et seq.). Restricting oil and gas activities or closing an area to oil and gas activity does not preclude the location of mining claims in those areas, assuming those areas have not been withdrawn from mineral entry. A mining claimant may stake a claim and mine according to an approved plan of operations in areas where the Forest Service has exercised its authority not to lease for oil and gas (again, if not withdrawn and/or subject to valid existing rights). Exploration and development activities for locatable minerals would not be affected by closing an area to oil and gas leasing. Mitigation measures for the locatable activity would be required based on the surface resource values of the area.

Salable minerals include sand, stone, gravel, pumicite, cinders, pumice (except pumice with special properties), clay and petrified wood. Like leasable minerals, disposal of salable minerals is discretionary. Salable minerals would likely be impacted in a manner similar to leasables in areas where oil and gas activities are controlled or not allowed. It is likely that in the areas where oil and gas activity is restricted or not allowed, salable mineral activity would be restricted or not allowed.

AEGH01 Affected Environment Geologic Hazard

Allow no leasing in high to moderate geologic hazard sites.

Reviewer(s): 152, 242, 243

RESPONSE: High geologic hazard sites are subject to *No Surface Occupancy (NSO)* stipulations and moderate geologic hazard sites are subject to the terms of *Controlled Surface Use (CSU)* stipulations. Prior to approval of activity in these areas an interdisciplinary team analysis and mitigation plans detailing construction and mitigation techniques will be required (see page C-1). *NSO* stipulations on high geologic hazard areas effectively protect these areas and associated resources from the potential effects of oil and gas activities.

AEGH02 Affected Environment Geologic Hazard

There are concerns over steep slope sitings of wells which would require large cut and fill slopes, resulting in erosion and slides.

Reviewer(s): 82

RESPONSE: As with geologic hazard areas, steep slopes (>40%) are stipulated with the intent of strictly controlling construction methods and mitigation measures and minimizing the potential for erosion and slides. However, some erosion is likely to occur immediately following construction when the cut and fill slopes have yet to be stabilized by vegetation and/or erosion control devices. Slides may also occur in spite of careful slope design. Whether these occurrences result in adverse impacts to streams or other water bodies depends on the site location and distance to the stream or water body.

AEMW01 Affected Environment Municipal Watersheds

The Forest is a municipal watershed that needs to serve in this capacity in as pure a state as possible. Oil and gas activities will impact watersheds.

Reviewer(s): 8, 32, 65, 105, 130, 152, 207, 210

RESPONSE: The impacts to water quality and quantity are discussed on pages IV-4, IV-14, IV-17, IV-19, IV-20, IV-28, IV-45 to IV-48 and IV-78. Mitigation measures are displayed in Appendix H. *Controlled Surface Use* stipulations for Municipal Watersheds are designed to minimize impacts to water quality and quantity (see page C-4).

AEMW02 Affected Environment Municipal Watersheds

There are concerns about disposal of highly saline water resulting from drilling and its possible impacts on increasing salinization of the Colorado River drainage.

Reviewer(s): 32, 65, 152, 171

RESPONSE: Highly saline water can result from drilling. Discharge of saline waters into surface waters has been allowed by the State in instances where the saline water is no more saline than the water in which it would be discharged. The Forest has required that water produced by the drilling operation be hauled to an EPA approved disposal site. Other methods, such as evaporation ponds and re-injection wells have also been used for the disposal of produced water. Evaporation ponds have not been used on the Forest because of the cooler temperatures, adverse weather conditions, and short summer season. Note also, that not all wells produce high quantities of water, saline or not. See page IV-46 for a discussion of past water production and disposal. See also the response to Comment #: OGCBM8.

AEMW03 Affected Environment Municipal Watersheds

If the potential for the Cimarron Point area (T49N R6W) is not changed to no potential, then CSU or NSO stipulations should be applied to protect the Curecanti water supply from chemical or oil spills in this area.

Reviewer(s): 242

RESPONSE: Project level protections and mitigations are considered sufficient to negate significant risk. The stipulations as proposed in the preferred alternative in this document and the requirements of the Clean Water Act are adequate to protect the Curecanti water supply.

AEMW04 Affected Environment Municipal Watersheds

The document needs to address the potential of polluting domestic water wells or groundwater as a result of drilling. How will aquifers be protected?

Reviewer(s): 40, 78, 252

RESPONSE: The potential is very low given the legal requirements for the separation of aquifers with plugs, casing and the cementing of wells. There are very few water wells in the analysis area. The majority of the wells are in the valley bottoms and generally away from the majority of the projected activity.

AEMW05 Affected Environment Municipal Watersheds

Bell Creek Springs, the water source for Paonia, should be identified as a municipal watershed and should be *No Lease*.

Reviewer(s): , 167, 252

RESPONSE: Bell Creek Springs was identified in the DEIS as a municipal watershed. Bell Creek Springs are actually outside the analysis area. Only the portion of the watershed that is below the springs are included in the analysis area. The *Controlled Surface Use* stipulations are adequate to protect the watershed.

AEMW06 Affected Environment Municipal Watersheds

The Coal Creek watershed should be included as being among the Watersheds of Special Interest to Municipalities, since it is the water source for Crested Butte.

Reviewer(s): 41, 103

RESPONSE: The Coal Creek watershed has been added to the discussion of Watersheds of Special Interest to Municipalities.

AEMW07 Affected Environment Municipal Watersheds

Existing leasing in some municipal watersheds indicate a potential for oil and gas activity in these areas. *NL* and *NSO* should be applied to these areas. *CSU* is not adequate protection from spills and accidents.

Reviewer(s): 96, 252

RESPONSE: Existing leases are subject to the terms and conditions of the lease at the time. Oil and gas activity may occur in those areas regardless of the stipulation applied to the area in this document. If any oil and gas activity is proposed on an existing lease, the Forest Service will work with the operator through the SUPO to protect water resources. *CSU* provides adequate protection of the water resources in the municipal watersheds (see the language of the stipulation on page C-4).

AEMW08 Affected Environment Municipal Watersheds

There is special concern about impacts to water quality in the Muddy Creek watershed as a result of concentrated oil and gas activity in the area.

Reviewer(s): 252

RESPONSE: Mitigation measures will be applied in the Muddy Creek watershed, as well as all watersheds, to protect water quality. Site specific analysis will be done at the time an APD for full field development in the Muddy Creek watershed is proposed. The next APD which would require significant road, pipeline and well pad construction will likely require an EIS to address the effects of what the Forest Service considers to be a proposal for full field development. Mitigation of potential water quality impacts will be required.

AEMW09 Affected Environment Municipal Watersheds

The hydrogeologic chapter lacked information concerning what aquifer formations supply municipal drinking water and which, if any, have waste water pumped into them. What will future use of aquifers be?

Reviewer(s): 78, 96

RESPONSE: No aquifers supplying municipal drinking water will have waste water pumped into them. It is unlikely that much development of aquifers would occur. It is unknown what the future uses of aquifers will be.

AEMW10 Affected Environment Municipal Watersheds

Does waste water end up accidentally being pumped in the wrong formation because of porosity and permeability problems?

Reviewer(s): 96

RESPONSE: No. Cement plugs or packers are used to isolate the formation or zone. The formations are tested prior to injection.

AER01 Affected Environment Aquatic/Riparian/Wetlands

Strictly enforce *No Surface Occupancy* stipulations in riparian areas.

Reviewer(s): 83, 88, 99, 110, 151, 177, 242, 243

RESPONSE: The Forest Service recognizes the importance of wetlands and riparian areas. The Forest Service regulations at 36 CFR 228.108(j) state that unless otherwise authorized in the approved Surface Use Plan of Operations, the operator shall not conduct operations in areas subject to mass soil movement, riparian areas and wetlands. A lessee has the right to access a well site. As stated on page II-3, "Crossing riparian areas, wetlands and areas of high geologic hazard may be unavoidable in some cases to access a well site." Proposed activity in the riparian area will be subject to a NEPA analysis - part of the approval process of an Application for Permit to Drill and Surface Use Plan of Operations. Mitigation measures designed to minimize the impacts to riparian areas will be determined on a site specific basis. Possible mitigation measures are listed in Appendix H.

AER02 Affected Environment Aquatic/Riparian/Wetlands

Leasing under Alternative 2 will harm wetlands and riparian areas.

Reviewer(s): 8, 47, 199, 210, 212

RESPONSE: The estimated impacts to Aquatic/Riparian/Wetland Habitats are discussed on page IV-13 through page IV-16 and page IV-64 through IV-67. See also the response to Comment #: AER01.

AER03 Affected Environment Aquatic/Riparian/Wetlands

It is not clear in the DEIS whether oil and gas activities will be allowed to occur in wetlands, floodplains and riparian areas.

Reviewer(s): 256

RESPONSE: Wetlands, floodplains and riparian areas are all *No Surface Occupancy (NSO)*. Activities would be allowed in a wetland, floodplain or riparian area if approved in the Surface Use Plan of Operations. A waiver, exception or modification of the *NSO* stipulation would have to be approved prior to operations in these areas. Proposed activity in these areas would be subject to the NEPA analysis that would occur for approval of the Surface Use Plan of Operations filed when the operator submits an Application for Permit to Drill (APD).

AER04 Affected Environment Aquatic/Riparian/Wetlands

Wetland areas should be *No Lease*.

Reviewer(s): 46, 133, 168

RESPONSE: See the response to Comment #: AER01.

AER05 Affected Environment Aquatic/Riparian/Wetlands

Aquatic resources information should be summarized on the third order river basin level, including name, length/size, stream order, uses, current quality, etc.

Reviewer(s): 78

RESPONSE: This information has not been compiled for the Forest.

AER06 Affected Environment Aquatic/Riparian/Wetlands

It is not clear what the section entitled "Effects of Alternatives on Wetlands and Floodplains" (page S-19), means.

Reviewer(s): 78

RESPONSE: Forest Service Handbook 1909.15 Environmental Policy and Procedures, requires that the environmental effects on Floodplains and Wetlands be considered.

AER07 Affected Environment Aquatic/Riparian/Wetlands

Does the statement "decisions are being made to a map resolution of about 40 acres" (page I-9) imply wetlands/riparian areas are mapped to a resolution of 40 acres?

Reviewer(s): 78

RESPONSE: Wetlands and Riparian areas have not been mapped. The Forest is in the process of mapping these areas.

AER08 Affected Environment Aquatic/Riparian/Wetlands

Page III-50 discussion is confusing regarding apparent interchange of riparian and wetland terms.

Reviewer(s): 78

RESPONSE: Our discussion of Riparian and Wetlands is accurate and reflects definitions used in our Forest Plan.

AER09 Affected Environment Aquatic/Riparian/Wetlands

Page III-54 should also note EPA as one of the authors of the 1989 Federal wetlands manual.

Reviewer(s): 78

RESPONSE: The EPA's efforts are now noted.

AER10 Affected Environment Aquatic/Riparian/Wetlands

Page IV-13 discussion needs to address impacts from pipelines and potential discharges into floodplains and waters.

Reviewer(s): 78

RESPONSE: The impacts from the construction of pipelines would be similar to that of road construction. The pipeline, in most cases, would be constructed within a road corridor. The pipelines would be gas pipelines. Little or no oil resources are expected to be found in the analysis area.

AERC03 Affected Environment Recreation Complexes

Allow no leasing in Crag Crest area.

Reviewer(s): 242, 243

RESPONSE: The Crag Crest National Recreation Trail is protected with *No Surface Occupancy (NSO)* stipulations designed to protect the recreational experience from the trail and in the vicinity of the trail. The trail is treated as a highly sensitive recreation complex consisting of the trail, trailheads, two campgrounds and one boat ramp. The *NSO* corridor extends a quarter mile around the complex. *NSO* stipulations will adequately protect the recreational experiences in the area and allow exploration for oil and gas resources via directional drilling from outside the *NSO* block.

It should also be noted that about 105 acres of the complex is currently leased. The lease expires in 1994.

AERC04 Affected Environment Recreation Complexes

Some major recreation trails, such as Bell Creek (#834), Horse Ranch Park (#830) and Raggeds (#820) are not identified in Fig III-17.

Reviewer(s): 252

RESPONSE: These trails are not identified as major recreational complexes based on the amount of use, size of sites, and are not considered significant on the basis of analysis area size (they are not National Recreation Trails).

AERC05 Affected Environment Recreation Complexes

Much more of the Analysis Area than is shown in Fig. III-16 should be considered dispersed recreational areas.

Reviewer(s): 252

RESPONSE: The whole analysis area supports dispersed recreation. The areas displayed in Fig. III-16 and discussed on pages III-95 - III-96 of the FEIS are the major complexes where dispersed recreation is concentrated.

AERNA1 Affected Environment Research Natural Area

The Colorado Natural Areas Program supports the proposed *No Lease* status for the Tabeguache proposed Research Natural Area.

Reviewer(s): 31

RESPONSE: Thank you for your comments.

AES01 Affected Environment Slopes

Exploration & development would occur on slopes >40%, even though many parts of the Forest exhibit high erosion and slump potential. Timber harvest is not allowed on slopes >40%. It is unwise to road or develop steep slopes for oil and gas.

Reviewer(s): 185

RESPONSE: Exploration and development on slopes > 40% will be controlled by the use of stipulations. Construction on slopes > 40% will require the use of various mitigative measures to minimize the potential for adverse impacts to the soil and water resources. These measures have proven to be effective in the reduction of impacts to soil and water. Regarding timber harvest, 40% is the upper limit of the ground-based equipment used in the harvest activities on this Forest.

AETE01 Affected Environment T,E & S Species

Special stipulations should be applied where Threatened, Endangered and Sensitive species may occur.

Reviewer(s): 242, 243

RESPONSE: All oil and gas activities are subject to the requirements of the Endangered Species Act (ESA). Threatened, endangered and sensitive species are protected by ESA, regardless of lease stipulation. Therefore, the use of a lease stipulation to protect them is not necessary. The Forest will consult with the Fish and Wildlife Service at every phase of oil and gas exploration and activity. Additional NEPA analysis will occur at the time an Application for Permit to Drill and Surface Use Plan of Operations is submitted.

AETE02 Affected Environment T,E & S Species

Oil and gas activity should not be allowed where Threatened or Endangered species occur.

Reviewer(s): 243

RESPONSE: Biological evaluations concerning Threatened and Endangered species will be completed prior to any ground disturbing activity.

AETE03 Affected Environment T,E & S Species

If the Forest Service determines that a project may adversely affect listed species then formal Section 7 consultation with the US Fish and Wildlife Service will be required.

Reviewer(s): 242

RESPONSE: Yes, this is correct.

AETE04 Affected Environment T,E & S Species

Page IV-35, acreage restrictions for activities in Mexican spotted owl habitat are too little and indefensible.

Reviewer(s): 185

RESPONSE: Acreage restrictions are based on the recommendations of Fletcher (1990).

AEV01 Affected Environment Visuals

The VQO's appear to have been adopted without NEPA documentation. We feel it is a mistake to make leasing decisions that will change the character of much of the Forest based on decisions made without public participation.

Reviewer(s): 252

RESPONSE: The existing VQO's were adopted as part of the Forest Plan in 1983. General direction in the Plan was to apply the Visual Management System to all NFS lands (see page III-12 of the Plan amendment). Although the VQO's were not displayed, the technical inventory was part of the Plan. Desired Future Condition (VQO) has not been determined but will receive public participation when developed.

AEW01 Affected Environment Wildlife

Continuous habitat values and issues must be addressed in the FEIS.

Reviewer(s): 43

RESPONSE: Forest fragmentation is discussed on pages IV-11, IV-22, IV-39, IV-59 and IV-87. See also the response to Comment #: RDW02.

AEW02 Affected Environment Wildlife

Oil and gas exploration and/or development will result in loss of wildlife habitat. (Plus 62 form letters.)

Reviewer(s): 8, 12, 13, 21, 33, 47, 54, 64, 66, 68, 72, 89, 94, 99, 105, 105, 106, 114, 122, 130, 131, 135, 145, 152, 153, 157, 160, 161, 172, 185, 187, 189, 197, 199, 209, 210, 212, 217, 228, 232, 238, 252, 258

RESPONSE: Some loss of wildlife habitat will occur as a result of the construction of roads, pipelines and well pads. It is estimated that 10.7 acres of land will be disturbed per well. This equates to a direct loss of 10.7 acres of wildlife habitat per well. However, the presence of road and pipeline corridors and well pads disrupts wildlife habitat for some distance outside of the corridors and well pad. That distance varies based on the topography and vegetative cover present in the area.

AEW03 Affected Environment Wildlife

Oil and gas activities will interfere with elk calving grounds.

Reviewer(s): 8, 21, 189, 210, 212

RESPONSE: Oil and gas exploration and development activity will not be allowed in elk calving areas from April 16 to June 30. However, operation and maintenance activities are generally not subject to *Timing Limitations*. Mitigation will be addressed at the APD stage. Operation and maintenance activities are generally of lesser disturbance (1 or 2 vehicles per day). See also response to Comment #: STP18.

AEW04 Affected Environment Wildlife

Information in the DEIS concerning elk summer range is not correct in the Clear Creek/Muddy area.

Reviewer(s): 39, 124, 152, 234

RESPONSE: The information on elk summer range (concentrated use) was provided by the Colorado Division of Wildlife and is the best information we have on elk summer range (concentrated use).

AEW05 Affected Environment Wildlife

Oil and gas activities will harm elk migration routes.

Reviewer(s): 8, 130, 210

RESPONSE: Some disruption of migration routes will occur. Effects are discussed on pages IV-33 and IV-82.

AEW06 Affected Environment Wildlife

Exclude bighorn sheep lambing areas from oil and gas development.

Reviewer(s): 256

RESPONSE: The bighorn sheep range in the Battlements will be protected from oil and gas development. It is within the Battlement Mesa Roadless Area which is available for oil and gas leasing, but with *No Surface Occupancy* stipulations.

AEW07 Affected Environment Wildlife

Exclude sage grouse leks and breeding areas from oil and gas development.

Reviewer(s): 173, 256

RESPONSE: Only one sage grouse lek and nesting area is located partially within the analysis area. The lek is protected with *No Surface Occupancy (NSO)* stipulations. The *NSO* stipulation extends a half mile beyond the lek. Further protection is provided for nesting with *Controlled Surface Use* and *Timing Limitations* within 2 1/2 miles of the lek.

AEW08 Affected Environment Wildlife

The DEIS does not map elk and deer migration routes and staging areas near Cimarron Point (T49N R6W).

Reviewer(s): 242

RESPONSE: Elk and deer migration routes and staging areas are not mapped. Migration routes and staging areas will be protected with *Timing Limitations*. They will be identified at the time an operator submits an Application for Permit to Drill and Surface Use Plan of Operations.

AEW09 Affected Environment Wildlife

The document should examine effects to wildlife from a larger RFD perspective.

Reviewer(s): 45, 247

RESPONSE: In Wildlife Special Habitats, those areas where animals are most susceptible to stresses brought on by human disturbances, the preferred alternative places *Timing Limitations* and *Controlled Surface Use* and/or *No Surface Occupancy* stipulations on the lease operations. In these areas, regardless of the degree of Reasonably Foreseeable Development, the animals are protected during the time periods when they are most vulnerable to disturbance. These habitats include Big Game Winter Range, Elk Calving Areas, Migration Routes and Staging Areas, Bighorn Sheep Lambing and Breeding Areas, summer range (areas of Concentrated Use), and Sage Grouse Leks and nesting areas. Threatened and endangered species are protected under the Endangered Species Act. Protective measures are required by law.

AEW10 Affected Environment Wildlife

Did you consider the adaptability of elk to oil and activities when deciding on NSO for elk summer range?

Reviewer(s): 178

RESPONSE: Yes. The Colorado Division of Wildlife recommended that elk summer range (concentrated use areas) be stipulated NSO. They feel that the effects of oil and gas activity in combination with all the other human activity (such as timber harvesting and recreational uses), the elk would be driven off their summer range earlier than desired. The adaptability of elk to oil and gas and other activities is an underlying implication.

AEW11 Affected Environment Wildlife

If roads are put into undeveloped areas for oil and gas there will be a problem of illegal hunters killing game from their trucks.

Reviewer(s): 181

RESPONSE: Operators and their crews will not be allowed to have firearms on the job or in their camps. This mitigation measure has been added to the mitigation displayed in Appendix H.

AEW12 Affected Environment Wildlife

Some big game winter range areas are not indicated on Fig. III-21, including portions of Coal Creek and along the Forest boundary south of the North Fork of the Gunnison River. Elk calving and concentrated summer use areas are also missing.

Reviewer(s): 252

RESPONSE: The information on wildlife habitats was provided by the Colorado Division of Wildlife. This information will be reviewed at each APD and any new information will be incorporated into the Forest's database.

AEW13 Affected Environment Wildlife

The DEIS does not quantify the effects of oil and gas activity on Management Indicator Species, or other wildlife species.

Reviewer(s): 185

RESPONSE: Quantification of the effects on Management Indicator Species is not possible at this stage of the process. We do not know where oil and gas activities will occur, their concentration or duration.

AEW14 Affected Environment Wildlife

No where in the DEIS is there a discussion of the effects current oil and gas activities have had on wildlife.

Reviewer(s): 185

RESPONSE: The effects discussed in Chapter IV are based on past experience with oil and gas and timber activity.

AEW15 Affected Environment Wildlife

Page III-45 states the greatest threat to pine marten populations (an old growth indicator species) is roading. Given the intensive invasion of Roadless Areas under this proposal you fail to provide assurance of protecting wildlife.

Reviewer(s): 185

RESPONSE: There is no proposal for an intensive invasion of Roadless Areas with oil and gas activity. There is no way of knowing at this time the level of activity in any one area. Some Roadless Areas will be made available for oil and gas leasing, but there is no assurance that they will be leased or if they are leased that they will incur oil and gas activity. Wildlife mitigation measures will be applied to oil and gas operations, as needed (discussed in Appendix H).

AEW16 Affected Environment Wildlife

Encroachment on 7% of an already inadequate critical habitat (page III-98) is too much, particularly when coupled with the potential cumulative effects of timber harvest or more roaded recreation.

Reviewer(s): 185

RESPONSE: At most, 7% of the winter range utilized by big game found in the analysis area would be affected by oil and gas activity. Activities would not be allowed during the time the animals are using winter range. In most cases, weather and road conditions would preclude activity during this time. Roads in winter range would be closed to public travel during the time the animals are on the winter range, and perhaps year round.

ALT01 Alternatives General

There should be an alternative that attempts to integrate existing leases and proposed leases into logical units for efficient development and production likely in full field development, including consolidating leases into blocks held by single producers

Reviewer(s): 247, 252

RESPONSE: Industry typically does this through unitization. Unitization is an agreement lessees enter in to jointly operate an entire producing reservoir as a single entity without regard to individual lease boundaries, and allows the maximum recovery of production from the reservoir. Unit agreements require BLM approval and the BLM must determine that the unit agreement is necessary or advisable in the public interest. Unitized lands are considered to be one lease with a single operator. See the discussion on pages G-12 - G-13.

ALT02 Alternatives General

Leases (existing and potential) could be consolidated in a way to preserve Roadless Areas, yet still allow for efficient exploration and development of oil and gas resources.

Reviewer(s): 34, 252

RESPONSE: See the response to Comment #: ALT01 and the discussion on unitization on pages G-12 - G13.

ALT03 Alternatives General

The amount of land proposed for leasing is many times greater than that needed to satisfy the projected demand.

Reviewer(s): 14

RESPONSE: That is correct.

ALT101 Alternatives Alternative 1

Alternative 1 - No Action is unacceptable.

Reviewer(s): 43

RESPONSE: The Forest Service appreciates your comments.

ALT201 Alternatives Alternative 2

We favor Alternative 2 - Preferred.

Reviewer(s): 1, 164, 165, 226, 231, 239, 257

RESPONSE: The Forest Service appreciates your comments.

ALT202 Alternatives Alternative 2

The existing leases (leased under *SLT*) make the restrictions imposed in the preferred alternative meaningless.

Reviewer(s): 8, 91, 247

RESPONSE: Existing leases cover less than 1/4 of the analysis area. The existing leases are contracts between the lessee and the government. As such the contracts may not be unilaterally changed. However, negotiation with the lessee could occur and the concerns and/or restrictions identified in this document may be agreed upon. Approximately half of the existing leases are expected to expire during the life of this document. At expiration, the lands if they are to be re-leased would be subject to the stipulations identified in this document.

ALT203 Alternatives Alternative 2

Alternative 2 offers little protection to Roadless Areas.

Reviewer(s): 40, 46, 47, 94, 105, 225, 234

RESPONSE: In the DEIS, Alternative 2 provided *No Lease* protection to the Kannah Creek, Tabeguache and Roubideau Roadless Areas. Public comment and further review has resulted in the Whetstone Mountain Roadless Area and parts of the Priest Mountain, Raggeds, West Elk and Flat Top Mountain Roadless Areas being added to the list of *No Lease* Roadless Areas. Additionally, the Battlement Mesa Roadless Area is stipulated *No Surface Occupancy* to protect its roadless character. Other resource values within Roadless Areas, such as Slopes > 60%, Floodplains, Aquatic/Riparian/Wetland Habitats, Alpine/Tundra, High Geologic Hazard Areas, and Wildlife Special Habitats are protected by the stipulations specified in Table II-5. However, it should be noted that several of these Roadless Areas are currently leased and may be subject to oil and gas exploration and development in accordance with the lease rights granted to the lessee.

ALT204 Alternatives Alternative 2

Rewrite Alternative 2 to protect identified areas (primarily Roadless Areas and scenic corridors) of concern.

Reviewer(s): 183

RESPONSE: Alternative 2 has been revised. See Chapter II and the response to Comment #: ALT203. The Kebler Pass corridor is now *No Lease*, as well as several other Roadless Areas.

ALT205 Alternatives Alternative 2

Alternative 2 violates the Forest Service multiple use mandate by making vast areas off limits or available under restrictions for oil and gas development.

Reviewer(s): 126, 178

RESPONSE: The Forest Service oil and gas regulations were created to assure that oil and gas production on NFS lands continues, but only in an environmentally sound manner. We feel, based on our and other agency and public knowledge of the surface resources of the Forest, that in some areas other resource values (surface) are more important than the oil and gas resource values.

ALT206 Alternatives Alternative 2

The Forest Service claim that Alternative 2 provides the greatest resource protection (on page S-19) is not justified due to impacts that will occur in Roadless Areas.

Reviewer(s): 225, 252

RESPONSE: The sentence has been revised to more clearly reflect the Forest Service mission. See also response to Comment #: ALT205. (See page S-30.)

ALT207 Alternatives Alternative 2

CSU would provide more protection to Roadless Areas while still allowing oil and gas activity and should be applied to these areas under Alternative 2.

Reviewer(s): 78

RESPONSE: Allowing oil and gas activity within a Roadless Area would result in some degradation of roadless values. *No Surface Occupancy, Controlled Surface Use* and *Timing Limitations* have been applied to other resource values within the analysis area, on Slopes > 60% in Roadless Areas, a *NSO* stipulation would be attached to the lease.

ALT208 Alternatives Alternative 2

The preferred alternative is flawed because it opens up most of the Forest to *Standard Lease Terms*.

Reviewer(s): 185

RESPONSE: Under Alternative 2, only 13% of the analysis area is available with *Standard Lease Terms* only. See Table II-6 on page II-11.

ALT301 Alternatives Alternative 3

We favor Alternative 3 - No Lease.

Reviewer(s): 8, 11, 12, 12, 13, 21, 26, 33, 42, 49, 51, 54, 56, 57, 59, 63, 68, 75, 86, 89, 91, 98, 101, 105, 106, 107, 111, 112, 114, 121, 123, 124, 127, 130, 132, 138, 141, 153, 160, 161, 171, 176, 182, 185, 186, 191, 193, 197, 198, 199, 207, 209, 210, 212, 217, 218, 224, 225, 253, 258, 259, 260

RESPONSE: The Forest Service appreciates your comments.

ALT302 Alternatives Alternative 3

Alternative 3 - No Lease, is not banning oil and gas exploration permanently but is holding these resources for a later date.

Reviewer(s): 63, 225

RESPONSE: At a later date those areas of *No Lease* could be re-allocated for leasing (provided they have not been formally withdrawn from mineral leasing). Re-allocation would require an amendment to the Forest Plan and associated environmental documentation.

ALT303 Alternatives Alternative 3

Because of the number of existing leases it is not necessary to make any more available, especially with such minimal development being proposed.

Reviewer(s): , 34, 35, 49, 64, 66, 68, 86, 94, 96, 105, 123, 124, 160, 189, 197, 212, 252, 259

RESPONSE: Forest Service policy is to encourage and facilitate the orderly exploration, development and production of mineral and energy resources. The existence of leases does not guarantee the presence of oil and gas resources or oil and gas development. See also pages I-2 and I-3.

ALT304 Alternatives Alternative 3

Alternative 3 is unjustified because it is inconsistent with Forest Service policy to impose the "least restrictive" measures that will adequately protect resource values.

Reviewer(s): 237

RESPONSE: Thank you for your comments. See also the response to Comment #: ALT401.

ALT401 Alternatives Alternative 4

Alternative 4 provides sufficient management authority over surface operations (under *Standard Lease Terms*) to adequately protect resource values in areas listed as *NL* or *NSO* in Alternative 2.

Reviewer(s): 126, 237

RESPONSE: The Forest Service does not agree. We feel additional management authority is needed to protect the resource values (*Affected Environments*) described in the EIS.

ALT402 Alternatives Alternative 4

We favor Alternative 4 - Standard Lease Terms everywhere.

Reviewer(s): 237

RESPONSE: Thank you for your comments.

ALT403 Alternatives Alternative 4

With the low amount of predicted surface disturbance, Alternative 4 should be adapted and the Forest Service should work closely with lessees to ensure proper environmental considerations are carried out.

Reviewer(s): 126

RESPONSES: We feel that it is important for the lessee to know what surface protection measures will be required at the time of the lease. It also lets the lessee know, up front, what surface resource

values are present in the leasehold. We intend to work closely with the lessees to ensure that our stipulations and mitigation measures are followed. Additional environmental considerations may also be identified at the time the operator submits an APD and SUPO for approval.

ALT501 Alternatives Alternative 5

We favor Alternative 5 - No Lease in Roadless Areas and Semi-primitive Non-motorized areas.

Reviewer(s): 3, 4, 6, 10, 15, 18, 19, 22, 23, 30, 37, 38, 41, 46, 47, 53, 62, 65, 69, 77, 80, 82, 87, 90, 92, 96, 99, 102, 104, 109, 113, 117, 118, 120, 125, 128, 129, 133, 136, 137, 142, 143, 144, 146, 147, 148, 149, 150, 151, 158, 159, 162, 166, 169, 170, 172, 173, 174, 175, 179, 183, 188, 194, 195, 196, 201, 203, 204, 208, 213, 214, 215, 221, 222, 224, 228, 230, 234, 236, 240, 242, 243, 244, 245, 246, 248, 249, 255, 256, 263

RESPONSE: The Forest Service appreciates your comments.

ALT502 Alternatives Alternative 5

There is no need to place all available land up for lease at this time.

Reviewer(s): 22, 41, 63, 188

RESPONSE: All available land on the Grand Mesa, Uncompahgre and Gunnison National Forests has not been put up for lease. Only about a third of the land available for leasing on the Forest was included in the analysis area for this EIS. On about 2 million acres of the Forest no decision will have been made regarding oil and gas leasing. Eighteen (18%) of the analysis area, including certain Roadless Areas and the Tabeguache Research Natural Area have been designated as *No Lease* and as such are not available for oil and gas leasing.

ALT503 Alternatives Alternative 5

Alternative 5 will protect Roadless Areas and still allows for oil and gas development in an environmentally safe manner.

Reviewer(s): 5, 10, 15, 18, 23, 36, 37, 47, 62, 77, 82, 92, 113, 120, 128, 129, 130, 134, 149, 150, 158, 170, 175, 190, 195, 203, 215, 219, 240, 255

RESPONSE: That is correct.

ALT504 Alternatives Alternative 5

Alternative 5 is meaningless because of the existing leases in Roadless Areas which guarantee oil and gas development.

Reviewer(s): 237, 247

RESPONSE: The presence of a lease does not guarantee development. The holder of a lease may or may not drill for oil and gas resources on his leasehold. The lease gives the lessee the exclusive rights to explore for oil and gas resources on the lease. Several of the Roadless Areas currently have no leases (see Table III-11), several have leases about to expire and several have leases that amount to less than 10% of the Roadless Area.

CE01 Cumulative Effects

The DEIS does not address cumulative effects of oil and gas activities on existing leases well enough.

Reviewer(s): 34, 78, 167, 232

RESPONSE: The existing leases are not subject to the decisions that will be documented in the Record of Decision (ROD) for this EIS. The document does discuss the cumulative effects of the seven wells predicted to be drilled on new leases in addition to the 40 wells predicted to be drilled on existing

leases. The effects of oil and gas activities on existing leases is discussed in the context of cumulative effects for each *Affected Environment*. At this stage in the process, we do not know where or when activities will occur. We have to rely on analysis assumptions to estimate the effects and the cumulative effects of oil and gas leasing. The timing and location of post-leasing activity are key to cumulative effects analysis. If activity is concentrated in both space and time, the potential for cumulative effects may be greater than if activity is spaced out both in time and location.

CE02 Cumulative Effects

Page II-6 shows the total acres disturbed over the next 15 years is consistent in all but Alt. 3. This cannot be accurate given activities in Roadless Areas will occur in previously undisturbed areas.

Reviewer(s): 225

RESPONSE: The figures displayed in Table II-3 on page II-6 represent figures developed based on the analysis assumptions. The assumptions are averages based on past activity on the Forest. Activities outside Roadless Areas may also occur in previously undisturbed areas.

CE03 Cumulative Effects

The document does not assess the environmental impacts correctly because the impacts from coal bed methane development proposed by the Dept. of Energy and the Trans-Colorado pipeline have not been considered.

Reviewer(s): 14

RESPONSE: Discussion of the potential impacts of coal bed methane wells was included in the DEIS and has been improved in the final. We are not aware of any coal bed methane wells proposed by the Department of Energy. The effects of the Trans-Colorado are not specifically addressed in this document. The Trans-Colorado pipeline EIS says it's construction is expected to stimulate construction of gathering pipelines to shut-in wells and additional drilling in the Piceance Basin. What the indirect effects will be on the Forest is not known. The Trans-Colorado pipeline passes through the Forest where oil and gas activity is projected to be light (the Uncompahgre Plateau).

CE04 Cumulative Effects

Discussion of wetlands et al should note existing impacts and causes, planned restoration (if any), and any special protection required. This information should be mapped and available at leasing stage.

Reviewer(s): 78

RESPONSE: The Forest does not have an inventory of wetlands and their condition. Location of wetlands and special protection will be identified when an operator submits an APD and Surface Use Plan of Operations for approval. USGS quadrangle maps generally show the location of Wetlands (streams, lakes and swamps.)

CE05 Cumulative Effects

The cumulative effects discussion inadequately addresses the issues of roads built in Roadless Areas for oil and gas activities making timber harvest more economically efficient.

Reviewer(s): 185

RESPONSE: Within the Roadless Areas in the analysis area there is approximately 39,600 acres of timber that is unsuitable because of high road costs. Of that, 12,100 acres are not available for oil and gas leasing (*No Lease*); 27,500 acres are in areas available for oil and gas leasing. We do not know how much of that timber, if any, would become available for harvest as a result of roading by oil and gas activity. Determination of timber suitability is beyond the scope of this document and would be

speculation at this point. The Forest Plan would have to be amended to add timber to the suited base. See also the response to Comment #: RD05.

CE06 Cumulative Effects

The potential impacts of oil and gas activities that could occur are excessive compared to the Federal revenues that will be generated.

Reviewer(s): 185

RESPONSE: Forest Service policy is to "encourage and facilitate the orderly exploration, development and production of mineral and energy resources" in an environmentally sound manner. The use of special stipulations, discretionary *No Lease*, and the application of mitigation measures in Appendix H will ensure that the impacts of oil and gas activity will be minimized while ensuring a return to Federal, State and local economies.

CE07 Cumulative Effects

The cumulative effects discussion relative to water quality must be expanded to include effects of probable timber sales.

Reviewer(s): 185

RESPONSE: Cumulative effects on water quality from potential future timber sales are discussed on pages IV-48 and IV-64.

GS01 Geodetic Survey

All oil and gas projects need to be reviewed to determine if any Coast and Geodetic Survey locations will be impacted. The C&DS requires no less than 90 days notification prior to the activity to plan for site relocation.

Reviewer(s): 50

RESPONSE: Projects will be reviewed for C&DS locations at the time an operator submits an Application for Permit to Drill (APD) and Surface Use Plan of Operations for approval. Avoidance should be relatively easy to accomplish.

GS02 Geodetic Survey

Funding for oil and gas projects should include cost for any required monument relocation.

Reviewer(s): 50

RESPONSE: If relocation is required, the cost of the relocation will be borne by the lessee or operator.

MAP01 Maps

A map showing National Park System units needs to be included in the FEIS.

Reviewer(s): 242

RESPONSE: A map showing NPS units has been included in the FEIS as Figure III-28.

MAP02 Maps

The Alternative stipulation maps need to differentiate between *Standard Lease Terms* (in white) and areas outside the analysis area (also in white).

Reviewer(s): 242

RESPONSE: The maps have been changed to make the distinction you have noted. *Standard Lease Terms* are not displayed in yellow. Areas shown in white are outside the analysis area.

MAP03 Maps

Apparent differences between Table S-2 Display of Alternatives and Figure II-2 Lease Options for Alternative 2 need to be explained.

Reviewer(s): 47

RESPONSE: Where *Affected Environments* overlap, the most restrictive lease option applies. For example, where Concentrated Summer Use (*NSO*) occurs in a Roadless Area that would otherwise be *Standard Lease Terms*, *NSO* is the lease option that would apply, and that is shown on the map. The maps were included to give the reader a general idea of the amount and distribution of the lease options throughout the analysis area. Please refer to the 1/2" = 1 mile scale stipulation map included in the map pocket in the back of the document.

MAP04 Maps

Figure III-8A does not list Area 189 (Hightower) in the legend and Battlement Mesa is mislabeled as 183.

Reviewer(s): 164

RESPONSE: These corrections have been made. Thank you for pointing them out.

MAP05 Maps

Page III-1, no where is there a map showing where the moderate vs. high potential oil and gas opportunities exist.

Reviewer(s): 185

RESPONSE: The potential for oil and gas resources is displayed on Figure III-2, on page III-109, and on Figure 3 in Appendix E on page E-11.

NP01 NEPA

Public feels involvement has no effect on Forest Service management.

Reviewer(s): 7, 39, 52, 253

RESPONSE: Numerous changes were made to the EIS based on public feedback and comment.

NP02 NEPA

Thank you for opportunity to comment.

Reviewer(s): 1, 12, 21, 44, 45, 46, 62, 85, 91, 105, 113, 117, 119, 129, 142, 152, 164, 183, 196, 234, 256, 259

RESPONSE: The Forest Service believes that public involvement is necessary for balanced and informed decision making.

NP03 NEPA

Current scoping process is dishonest and does not get true input from the general public.

Reviewer(s): 39, 200

RESPONSE: The issues that the public raised have been addressed in the EIS. Many of the general public never visit National Forest System lands so they typically are unaware of forest

management issues. The Forest Service issues news releases to local newspapers in an effort to get information about Forest Planning issues to the public. The comments we have received indicate there is no consensus about oil and gas leasing.

NP04 NEPA

How will public input be addressed and evaluated? The FS must address the concerns of the citizens of the western slope before a Final EIS can be released.

Reviewer(s): 39, 252

RESPONSE: Each letter has been read and evaluated for comments. Comments are categorized and responses are written. If the DEIS appears deficient as suggested by public input, the FEIS will reflect the changes. At the beginning of the Summary and Chapter I is a section describing the changes made between the Draft and Final EIS.

NP05 NEPA

Crested Butte should have been included in the scoping process prior to preparing the DEIS and during the comment period for the DEIS.

Reviewer(s): 8, 123, 210, 258

RESPONSE: The Forest Service agrees, a scoping meeting should have been held in Crested Butte. The oversight was corrected in a meeting held on September 24, 1992, which was held in time for formal public comment to be received within the comment period.

NP06 NEPA

Residents and businesses in Crested Butte experience both the environmental and economic impacts of Forest Service decisions virtually immediately, making them uniquely qualified to evaluate the value-related tradeoffs involved.

Reviewer(s): 42, 207

RESPONSE: The Forest Service appreciates the comments we have received from Crested Butte. As a result of the comments we received, Alternative 2, the preferred alternative has been modified: That part of the analysis area in the immediate vicinity of Crested Butte (Kebler Pass and the Whetstone Mountain area) is no longer available for oil and gas leasing.

NP07 NEPA

The Forest Service willfully mislead the public with a low RFD prediction.

Reviewer(s): 25, 26, 119, 252

RESPONSE: The RFD is the best information we have. It was developed by a BLM staff specialist with 16 years experience in oil and gas, in industry and with the government. He has done the majority of the RFD's for Forest Service oil and gas leasing EIS's in Colorado. A geologist in the Forest Service's Washington Office, who independently reviewed the RFD, felt the projections were somewhat high, but reasonable.

NP08 NEPA

The Forest Service should start over with a new RFD and new alternatives.

Reviewer(s): 9, 65, 119, 135, 154

RESPONSE: See response to Comment #: NP07.

NP09 NEPA

We agree with the analysis area excluding low and no (known) potential areas where industry has shown no interest.

Reviewer(s): 46

RESPONSE: Thank you for your comment.

NP10 NEPA

The DEIS is flawed because the "d" (administratively available) and "e" (leasing) decisions are treated as one decision which is very confusing. The document only addresses the "d" decision.

Reviewer(s): 46

RESPONSE: The lands administratively available will also be authorized for leasing by the BLM, unless otherwise stated in the ROD.

NP11 NEPA

Making the "e" (leasing) decision for specific lands with no site-specific impact analysis is a violation of Forest Service regulation which specify this decision will be made when specific lands are being considered for leasing.

Reviewer(s): 46

RESPONSE: The *Affected Environments* discussions throughout the document are the site specific impact analyses. The site-specificity of the *Affected Environment* discussions is adequate to make the leasing decisions. Additional locality specific analysis will be done when an operator submits and APD and SUPO for approval.

Analyses respecting the availability and specific lands decisions are combined in the EIS. The Forest Service has no information about specific well hole locations or other ground disturbing activities at the time of either decision, whether they are made together or separately in environmental analyses. The level of resource information known about the lands being analyzed is the same for both decisions. Both decisions are made considering the location and development that has occurred on existing leases.

The primary difference between the two decisions is that a proposed boundary is known when monitoring the specific lands decisions for a proposed lease parcel. At neither time is a specific well site identified.

The specific lands decision required by 36 CFR 228.102(e), is not implemented until the Forest Service has reviewed the land parcel being considered for lease and validated the decision prior to authorizing the BLM to offer the lease tracts. Although the Forest Supervisor's decision commits Federal resources to an offering through lease advertisement, a specific lease parcel is not actually offered and issued until it has been determined that the information disclosed in the FEIS is accurate for a proposed parcel, and that the required stipulations are applied.

NP12 NEPA

The Final EIS must either include additional site-specific analysis and make separate "d" and "e" decisions, or call the existing DEIS the "d" decision and state that the "e" decision will be made in future NEPA documents.

Reviewer(s): 46

RESPONSE: The "d" and "e" decisions will be made in the ROD to the FEIS; and unless otherwise stated in the ROD, the lands available for leasing will also be authorized for leasing. See also the response to Comment #: NP11.

NP13 NEPA

The FEIS and ROD for this leasing analysis should state what will happen if oil and gas activity on the Forest exceeds the levels outlined in the RFD scenario.

Reviewer(s): 46

RESPONSE: On a well by well basis the impacts would be similar (based on the analysis assumptions). Cumulatively the impacts may be greater depending on the location of the activity, the amount of activity in any one area, and the environments affected. These impacts would be addressed at the review state to verify if an area should be leased based on this leasing analysis (EIS), and when additional NEPA is done for the APD and SUPO.

NP14 NEPA

Forest fragmentation, altered biodiversity and loss of roadless and undeveloped areas should be added to the list of irreversible commitment of resources.

Reviewer(s): 47, 111

RESPONSE: Irreversible (Forest Service Handbook 1909.15) is a term that describes the loss of future options. It applies primarily to the effects of use of nonrenewable resources, such as minerals or cultural resources, or to those factors such as soil productivity, that are renewable only over long periods of time. Forest fragmentation, altered biodiversity and the loss of roadless and undeveloped areas do not fall within the definition of irreversible. However, these could be considered irretrievable commitments of resources. Cumulative effects of oil and gas activity combined with potential timber harvest would have some impact on the resources discussed. Further discussion has been added to the FEIS. See page IV-87.

NP15 NEPA

Industry commends the analysis combining the available ("d") and specific lands ("e") decisions into one document.

Reviewer(s): 237

RESPONSE: Thank you for your comments.

NP16 NEPA

The Forest Service should guarantee that development and activity assumptions presented in the document are not exceeded.

Reviewer(s): 225

RESPONSE: The assumptions presented in the document represent the best information we have on the amount of activity that is reasonably foreseeable over the next 15 years. The assumptions allow for analysis of the potential for impacts. Leases grant the lessee the right to explore for and develop the oil and gas resources on their lease. The Forest Service cannot deny operators the right to develop these resources. Should oil and gas activity exceed the anticipated levels, this will be considered prior to authorizing the BLM to offer more leases. Further NEPA may be required.

NP17 NEPA

Due to the document length and content more time should be allowed for review and comment.

Reviewer(s): 220, 252

RESPONSE: The formal comment period ended October 13, 1992 (58 days). We also accepted comments beyond the end of the comment period.

NP18 NEPA

The Final EIS should provide an inventory-type of resource summary from which subsequent site-specific analyses can be readily tiered.

Reviewer(s): 78

RESPONSE: It would be desirable to have inventories of all our resources. However, we do not have inventories of all resources and those we do have would be voluminous and generally beyond the needs of this EIS.

NP19 NEPA

The Final EIS should provide a concise statement of purpose and need.

Reviewer(s): 78

RESPONSE:A paragraph has been added. See page I-1.

NP20 NEPA

The DEIS does not meet NEPA requirements as there is no comparison of economic cost and benefits, and PNV's (present net value), by alternative.

Reviewer(s): 185

RESPONSE: The NEPA regulations (40 CFR 1502.23) state "the weighing of the merits and drawbacks of the various alternatives need not be displayed in a monetary cost/benefit analysis and should not be when there are important qualitative considerations". The environmental effects of the alternatives outweigh the economic considerations.

NP21 NEPA

The reader feels that site-specific analysis should occur in the EIS and not wait until project level NEPA (EA) is done.

Reviewer(s): 185

RESPONSE: The discussion of the effects on *Affected Environments* is the site-specific analysis contained in the EIS. Further, more locality specific analysis will be done when there is a proposal for ground disturbing activity (APD-SUPO stage). The NEPA documentation at the time may be an EA or an EIS, depending on the scope of the activity proposed and the resources that may be impacted.

OG01 Oil & Gas

Drilling and production can be accomplished with little or no permanent environmental impacts.

Reviewer(s): 20, 226

RESPONSE: It is generally true that drilling and production can be accomplished without long-lasting environmental impacts. The environmental impacts that potentially could occur depend on site-specific conditions such as soil productivity, rainfall, vegetation, topography, etc. Some sites may be more easily reclaimed than other sites.

OG02 Oil & Gas

Oil and gas leasing should be allowed as a multiple use of National Forest land.

Reviewer(s): 20, 165, 229

RESPONSE: The Forest Service agrees that oil and gas leasing and production is a valid use of the National Forest System lands. We recognize that a component of the nation's energy supplies must come from the public resources on National Forests and rangeland, and also recognize the mandate to conserve the environmental quality of these regions.

OG03 Oil & Gas

There should be a profit for the lessor (U.S. government) resulting from a lease.

Reviewer(s): 165

RESPONSE: The Federal government receives minimum bid and rental payments from the lessee. Rental payments are required even if there is no oil and gas activity on the leasehold. If production occurs, the Federal government receives royalties amounting to 12 1/2 percent of the value of the production. Half of the monies received by the Federal government is distributed to the State.

OG04 Oil & Gas

Oil and gas leasing and development should not be allowed on National Forest System land.

Reviewer(s): 17, 33, 42, 72, 84, 93, 97, 100, 105, 114, 140, 145, 156, 157, 171, 180, 202, 216, 229, 236

RESPONSE: Oil and gas leasing and development is a valid use of the National Forest System lands. See the Forest Service minerals management policy displayed on pages I-2 and I-3, as well as the response to Comment #: OG02.

OG05 Oil & Gas

National Defense is no longer a viable reason for developing a non-renewable resource.

Reviewer(s): 180, 199

RESPONSE: This country is dependent on foreign sources for a majority of its oil and gas needs. If foreign sources become unavailable because of world events, the national defense may well be at risk, as well as all the economies dependent on oil and gas resources.

OG06 Oil & Gas

Will operators be responsible and held accountable for site cleanup?

Reviewer(s): 41, 43, 225, 256

RESPONSE: Operators are responsible for site cleanup and reclamation. They are required to have a bond in the amount that would accomplish site cleanup and reclamation. The Forest Service, at any time, may review the operator's bond amount and increase the amount as necessary to cover the costs for reclamation.

OG07 Oil & Gas

Will Forest Service personnel be on-site during drilling, cleanup and reclamation?

Reviewer(s): 41, 43, 154

RESPONSE: Yes. Forest Service personnel will monitor all phases of the activity to ensure compliance with the Surface Use Plan of Operations. If in the conduct of operations unanticipated environmental effects occur, additional mitigation will be applied.

OG08 Oil & Gas

Areas disturbed by oil and gas activities cannot be restored to predisturbance states.

Reviewer(s): 17, 41, 59, 108, 111, 155, 184, 225

RESPONSE: At the cessation of oil and gas activity, lands disturbed will be reclaimed for other uses. Reclamation may not achieve a predisturbance state in all instances, immediately. Over time, as vegetation is re-established on the site, it will approximate predisturbance states.

OG09 Oil & Gas

The DEIS does not address the acres that will be disturbed for pipelines.

Reviewer(s): 82, 85

RESPONSE: In most cases, pipelines will occupy the same corridor as the road system. Disturbance resulting from pipelines is addressed on page II-4 of the FEIS. Forest experience indicates, that on average, approximately 0.2 miles of pipeline corridor outside the road corridor is required, per well. This results in an additional 0.9 acres of disturbance, per well.

OG10 Oil & Gas

As a trade off (mitigation?) for oil and gas development, additional disturbed areas should be restored to original natural states, over and above reclaiming sites disturbed by oil and gas activities.

Reviewer(s): 45, 85, 198

RESPONSE: If the environmental document for the APD-SUPO specified certain mitigation measures to be completed prior to further ground disturbance in an area, to protect watershed values (for example), and as long as those requirements did not interfere with the lease rights of the lessee, it could be specified as a Condition of Approval.

OG11 Oil & Gas

We need an energy conservation policy that calls for less consumption of fossil fuels and the development of alternative energy resources.

Reviewer(s): 13, 28, 30, 42, 54, 59, 60, 61, 72, 74, 75, 93, 116, 124, 124, 129, 137, 147, 157, 199, 212, 225, 238, 248, 254, 258

RESPONSE: This is beyond the scope of this document.

OG12 Oil & Gas

Oil and gas leasing should not occur except in the case of a national emergency.

Reviewer(s): 163

RESPONSE: See Forest Service Minerals Management Policy, pages I-2 and I-3.

OG13 Oil & Gas

Do not lease undeveloped land.

Reviewer(s): 6, 19, 47, 48, 55, 75, 90, 147, 149, 177, 193, 194, 213, 214, 246, 263

RESPONSE: The Forest Service appreciates your comments.

OG14 Oil & Gas

Further energy development is a threat to our way of life in many ways.

Reviewer(s): 76, 137

RESPONSE: Beyond the scope of this analysis.

OG15 Oil & Gas

No more oil and gas leases should be created on the Forest.

Reviewer(s): 86, 116, 207, 217, 233, 254

RESPONSE: The Forest Service appreciates you comments. See also response to Comment #: ALT303.

OG16 Oil & Gas

Use of public lands for private gain does not serve the public good.

Reviewer(s): 21, 32, 80, 115, 222, 223

RESPONSE: The public not only receives revenues from the use of National Forest System lands (timber, grazing, skiing, camping, outfitter guides, oil and gas leasing, etc.), but generally receives access, recreational facilities, natural resources (raw materials such as wood fiber, oil and gas, minerals) and food. Without the use of public lands for private gain, much of the Forest would be inaccessible for recreational use.

OG17 Oil & Gas

Do not allow additional oil and gas leasing to encourage development of other energy sources.

Reviewer(s): 73, 86, 87, 112, 210, 223

RESPONSE: The Forest Service appreciates your comments.

OG18 Oil & Gas

Do not renew or allow any new oil and gas leasing in the Clear Fork/Muddy Basin area.

Reviewer(s): 39, 200

RESPONSE: Many of the leases in this area are presently held by production and are not likely to expire in the foreseeable future.

OG20 Oil & Gas

No leases should sell at below market rate.

Reviewer(s): 152

RESPONSE: All lands available for leasing are offered for competitive bidding. No evaluation of the worth of the parcel is made by the BLM or the Forest Service. Market forces are the sole determinant of value. If no one bids on the parcel on the day of the sale, the parcel is available over the counter the first business day after the sale for minimum rates.

OG21 Oil & Gas

What would the environmental impacts be from a catastrophe like the Exxon Valdez?

Reviewer(s): 132

RESPONSE: Beyond the scope of this analysis. Most of the petroleum resource on the Forest is natural gas.

OG22 Oil & Gas

There is concern that areas opened for oil and gas development would be closed to the general public.

Reviewer(s): 11, 87, 118

RESPONSE: Depending on the management prescription of an area, the resource concerns of the area, and the long term needs for the road, most roads built to access oil and gas resources would be closed to public use by motorized vehicles. Access by non-motorized means would be allowed.

OG23 Oil & Gas

With the current depressed oil and gas market operators would be able to acquire and hold leases at rock bottom prices, giving them undue competitive advantage over areas where gas is waiting to be put into production.

Reviewer(s): 161, 185

RESPONSE: See response to Comment #: OG20.

OG24 Oil & Gas

The use of "no potential" is questioned because changing technology is identifying areas with potential that were previously thought to have none.

Reviewer(s): 1

RESPONSE: You are correct. It is more appropriate to use the term "no known potential". The document has been changed to reflect the distinction.

OG25 Oil & Gas

The area of moderate potential on Grand Mesa should be high potential like the surrounding area.

Reviewer(s): 237

RESPONSE: The potential for hydrocarbon occurrence in the area shown as moderate potential on Grand Mesa should be similar to its surrounding area (high). As you suggest the sedimentary section below Grand Mesa's basalt cap is the same as the rest of the area. The potential for oil and gas activity is moderate, since the basalt cap would need to be penetrated.

OG26 Oil & Gas

Industry experience has shown a typical well disturbs only 1-2 acres.

Reviewer(s): 237

RESPONSE: The well pad when reclaimed (assuming production) is typically 1-2 acres in size. Experience on this Forest shows that a typical well pad, road construction and reconstruction, and pipeline disturbs almost 11 acres (see Analysis Assumptions pages II-3 and II-4).

OG28 Oil & Gas

Recommendations in the DEIS will discourage oil and gas development on NFS lands causing energy companies to shift capital overseas and threaten our national security by increasing dependence on foreign oil.

Reviewer(s): 237

RESPONSE: Global economics influences oil and gas development on NFS lands. When the price of oil and gas increase to the point where development on NFS lands is profitable, more development will likely occur. Forest Service oil and gas regulations were written to assure that oil and gas production continues on NFS lands, but only in an environmentally sound manner. The environmental constraints identified in the DEIS and changes made as a result of public comments will likely result in more expensive drilling, or in some cases will preclude drilling.

OG29 Oil & Gas

Priority should be given to leases along existing roads and in areas where impacts will be reduced.

Reviewer(s): 45, 183, 192

RESPONSE: The Forest Service will act on all lease requests in the same manner. There is no mechanism to prioritize lease requests once the leasing decision has been made.

OG30 Oil & Gas

All lessees should be made aware of all wildlife concerns at time of leasing and should be required to formally commit to wildlife mitigation as part of the lease.

Reviewer(s): 45

RESPONSE: At the time of leasing, potential lessees will be made aware of stipulations that will be attached to the lease. The lessees will be required to abide by the terms of the lease and the stipulations attached to the lease. Depending on the location of the lease parcel, the stipulations may or may not include wildlife mitigation measures.

OG31 Oil & Gas

Development should be geographically staggered when possible so that buffer areas exist between construction sites.

Reviewer(s): 45

RESPONSE: That may be a desirable way to mitigate some types of impacts; however, there can be no assurance that this goal could be accomplished due to existing leases and the rights granted by the lease allowing the lessee to explore and develop the oil and gas resources on the lease parcel.

OG32 Oil & Gas

The document needs to specifically describe what higher costs would be realized by industry under more restrictive alternatives.

Reviewer(s): 41

RESPONSE: The more restrictive alternatives would result in higher costs to industry for road construction, design, geotechnical studies, and special construction techniques. The higher road standards result in higher costs for such items as road surfacing (in lieu of native surface roads), bridges (in lieu of culverts), closed systems instead of open reserve pits, alternative access routes, and reclamation requirements. Directional drilling takes longer and is riskier - may miss the target. Industry has generally recognized the fact that it may cost them more to operate on National Forest System lands and to provide environmental protection in the forest than in other areas.

OG33 Oil & Gas

The document should display which leases are held by production and when leases will expire.

Reviewer(s): 252

RESPONSE: That information is displayed in tabular form. See Appendix L.

OG34 Oil & Gas

The document should discuss how unitization occurs and how it effects the Forest.

Reviewer(s): 252

RESPONSE: Unitization is discussed on page G-13.

OG35 Oil & Gas

What will be the rate and density of oil and gas development?

Reviewer(s): 185

RESPONSE: At this time, there is no way to know what the rate and density of oil and gas development will be on the Forest. The best information we have on the activity is the Reasonably Foreseeable Development scenario. It projects 47 wells drilled in the next 15 years; 40 of which will be drilled on existing leases. Appendix G describes typical oil and gas activities. Well density varies based on the geology and the nature of the recovery of the petroleum resource.

OGCBM1 Oil & Gas Coal Bed Methane

The RFD does not address coal bed methane development that could occur.

Reviewer(s): , 34, 46, 65, 119, 133, 135, 167, 232, 247

RESPONSE: The RFD does not predict any coal bed methane wells. The impetus for previous coal bed methane development was tax incentives for unconventional fuel in the Crude Oil Windfall Profits Tax Act of 1980. This tax incentive expired at the end of 1992 and has not been extended. No additional coal bed methane wells are anticipated on this Forest. Coal bed methane reserves are present under the analysis area. Four coal bed methane wells have been drilled on the Forest, none of which are producing. Additional discussion of coal bed methane has been added to the RFD, see page E-4.

OGCBM2 Oil & Gas Coal Bed Methane

The DEIS does not address the salt water pollution that will occur with CBM development.

Reviewer(s): 9, 14, , 133, 154, 167, 171, 247

RESPONSE: See page IV-46. Additional discussion of potential water disposal impacts associated with coal bed methane production has been added to the document. Conditions of Approval (Appendix H) relating to coal bed methane production have also been added to the document, and will be applied to the APD to mitigate impacts. See response to Comment #: AEMW02, also.

OGCBM3 Oil & Gas Coal Bed Methane

The RFD failed to consider the Department of Energy's plans to push the development of coal bed methane.

Reviewer(s): 14, 247

RESPONSE: The Forest Service and BLM are not aware of any Department of Energy plans to push the development of coal bed methane.

OGCBM4 Oil & Gas Coal Bed Methane

The RFD failed to consider the large tax incentives for the development of coal bed methane.

Reviewer(s): 247

RESPONSE: The tax incentives were considered - see page E-5, item #6. Existing tax incentives expired at the end of 1992. Extensions to the tax incentives were attached to the recent tax bill but it was not passed by Congress. No further tax incentives are pending.

OGCBM5 Oil & Gas Coal Bed Methane

The document does not address the fact that re-injection technology for waste water has resulted in failures at other locations.

Reviewer(s): 14, 247

RESPONSE: The Forest Service is not aware of any failures related to waste water re-injection wells. In the San Juan Basin, methane contamination of domestic water wells has been blamed on coal bed methane waste water injection wells. However, methane contamination has been known to occur in water wells in this area since the late 1800's (Oldaker, 1991). The San Juan Basin is underlain by one of the largest gas fields in the country. Methane migrates to the surface through natural fractures in the geologic strata. Gas may also enter shallow aquifers through old oil and gas wells on private land, which were not properly cased or where casing integrity has deteriorated. Testing has shown some of the methane contamination to be biogenic (biological in nature, from vegetative decomposition and/or anaerobic bacterial contamination), rather than thermogenic (hydrocarbon in nature). Domestic water wells in this area do not extend below 200 feet. Waste water is injected below 5000 feet. Interlying impermeable strata does not allow these aquifers to mix.

Disposal wells must meet stringent requirements (see response to Comment #: OGCBM2) before waste water can be injected.

OGCBM6 Oil & Gas Coal Bed Methane

Coal bed methane wells have greater impacts than conventional wells and should not be grouped when considering the cumulative effects of each.

Reviewer(s): 46, 252

RESPONSE: The effects of coal bed methane wells are similar to conventional wells. The coal bed methane wells drilled on the Forest resulted in no greater impacts than the conventional wells drilled on the Forest.

OGCBM7 Oil & Gas Coal Bed Methane

The process of leasing vast amounts of public land without first solving the problem of disposing of the salt that can potentially be generated cannot be allowed to happen.

Reviewer(s): 14

RESPONSE: Past conventional oil and gas and coal bed methane drilling on the Forest did not produce vast quantities of salt. Salt bearing water from coal bed methane wells on the Paonia Ranger District was trucked to an approved disposal site at Black Mountain, near Collbran.

OGCBM8 Oil & Gas Coal Bed Methane

What is the pH (quality) of waste water being pumped out of coal bed methane formations? How is waste water presently being stored and disposed of? How many gallons per day? Per well?

Reviewer(s): 96, 252

RESPONSE: Produced (waste) water from the coal bed methane wells on the Forest was slightly alkaline with the pH ranging from 7.17 to 8.17. The Forest does not have any records of the volume of

produced water from the coal bed methane wells drilled on the Forest. The conventional wells produce variable amounts of water, with one well producing almost 2,000 barrels of water in FY92. Most producing wells produced less than 150 barrels of water in FY92. coal bed methane wells on the White River National Forest produce 550 barrels/day/well (Divide Creek EIS). The water is stored on-site in large tanks until there is enough water to fill a truck. The waste water produced from the past coal bed methane wells was trucked to Black Mountain for disposal by evaporation.

OGM01 Oil & Gas Mitigation

What State/local/Federal regulations govern use and protection of surface and groundwater? How will activities be coordinated between FS and other agencies?

Reviewer(s): 78, 96, 225

RESPONSE: On the National Forest, the Forest Service regulates surface disturbing activities. The technical aspects of drilling are regulated by the BLM. In case of emergency, the Forest Service can assume responsibility for drilling activity. The State Health Department regulates water quality under the Clean Water Act. See also Appendix L for a list of required permits for oil and gas operations.

OGM02 Oil & Gas Mitigation

Does the mitigation plan call for sounder and better well capping to prevent methane from migrating uphole to drinking water aquifers?

Reviewer(s): 96

RESPONSE: Well capping procedures currently used by industry are adequate to prevent contamination of drinking water aquifers.

OGM03 Oil & Gas Mitigation

What is the funding mechanism for mitigation by the Forest Service and the oil companies?

Reviewer(s): 96, 225

RESPONSE: The oil companies are responsible to pay for the mitigation measures specified in the approval of the APD and the SUPO.

OGM04 Oil & Gas Mitigation

The FEIS Appendix H - Mitigation needs to clarify that the Abandonment and Rehabilitation Plan will be approved as part of the Surface Use Plan of Operations.

Reviewer(s): 78

RESPONSE: See page H-22.

OGM05 Oil & Gas Mitigation

Appendix H - Mitigation needs to specify what materials/fluids are considered "waste water" and how they will be disposed of.

Reviewer(s): 78

RESPONSE: Waste water consists of the water produced in conjunction with oil and gas operations. Disposal methods are discussed in Appendix H. Onshore Oil and Gas Order No. 7 (draft) deals with the disposal of produced water.

OGM06 Oil & Gas Mitigation

The FEIS Appendix H - Mitigation should note that pipeline trenches need to be constructed so they do not change the natural surface and groundwater flow regime.

Reviewer(s): 78

RESPONSE: This has been added. See Appendix H.

OGM07 Oil & Gas Mitigation

Appendix H - Mitigation, page H-19, expand requirement that pads will not be constructed in riparian et al areas to include related features (pits, tanks, etc.). Change "should not" to "shall not" be constructed in these areas.

Reviewer(s): 78

RESPONSE: This has been added. See Appendix H.

OGRF01 Oil & Gas RFD

The RFD underestimates the amount of oil and gas activity that could possibly occur in the analysis area. The RFD should be higher.

Reviewer(s): 9, , 25, 26, 34, 65, 96, 119, 131, 135, 154, 167, 173, 178, 225, 232, 233, 247, 252

RESPONSE: The RFD is intended to be a reasonable estimate of expected activity. It is based on trends. It is not an estimation of the maximum potential. The projection for the Grand Mesa, Uncompahgre and Gunnison National Forests use was developed by a BLM staff specialist with 16 years experience in oil and gas, in industry and with the government. See responses to Comments #: OGRF02 - OGRF12.

OGRF02 Oil & Gas RFD

The RFD failed to consider the period from 1986-1990 was a slump for the oil and gas industry, due to confusion over deregulation and removal of price controls.

Reviewer(s): 119, 178, 247

RESPONSE: Statistics for the Forest (Figure 13, page E-22) and for the Forest Region (Figure 14, page E-23) show that there was not a major slump in and around the Forest during the 1986-1990 time period. There was a minor drop off in activity as compared to the early 1980's. The projection beyond 1990 is at a steeper slope than the 1986-1990 time period, i.e., more wells per year are predicted beyond 1990 than occurred in 1986-1990.

OGRF03 Oil & Gas RFD

The RFD failed to consider the price of gas and the industry has picked up at a fast rate this summer.

Reviewer(s): 25, 34, 46, 65, 119, 154, 247

RESPONSE: The summer of 1992 gas price increase represents a departure from the long-term price trend. Exploration companies base their exploration programs on long-term projections and not short-term price "blips". Long-term price trends tend to level out any of the ups and down that occur in the volatile gas market as a result of natural disasters, political turmoil, etc.

OGRF04 Oil & Gas RFD

The RFD failed to consider the Federal Energy bill now before the President will likely confer numerous incentives for oil and gas exploration, production and use, nationwide.

Reviewer(s): 46, 65, 119, 167, 247

RESPONSE: The Forest Service and the BLM are unaware of any influences the Federal Energy Bill would have on the RFD. Prior to implementation of the Federal Energy Bill, agency implementing regulations would have to be written. This usually takes a few years. It is premature to guess what the impacts of the Federal Energy Bill would be on National Forest management and policy, let alone the number of wells that would likely be drilled on the Forest in the next 15 years.

OGRF05 Oil & Gas RFD

The RFD failed to consider the 1990 Clean Air Act which, when implemented gives further incentives for the use of gas as an alternative to oil and coal.

Reviewer(s): 34, 46, 65, 119, 247

RESPONSE: Beyond the scope of this analysis to predict.

OGRF06 Oil & Gas RFD

The RFD failed to consider efforts by major cities, counties and utilities to provide cleaner air which promote the use of gas for vehicle fleets and may foreshadow widespread use of gas to fuel transportation.

Reviewer(s): 65, 119, 247

RESPONSE: Liquefied Petroleum Gas (LPG) use by fleets is not considered to have a significant impact on the demand for gas, mainly due to the expense of fleet conversion, the price of gas and the low price of gasoline.

OGRF07 Oil & Gas RFD

The RFD failed to consider predictions by major utility organizations that gas-fired power plants will comprise about 1/2 of the new power plants built in the next decade, due to increased efficiency and reduced CO₂ output.

Reviewer(s): 9, 46, 65, 119, 247

RESPONSE: New gas fired power plants are being proposed in areas that are currently producing gas. It is unlikely the volume of new power plants built in the next 15 years would be large enough to significantly affect the demand for gas from the Grand Mesa, Uncompahgre and Gunnison National Forests.

OGRF08 Oil & Gas RFD

The RFD failed to consider the approval of the Trans-Colorado pipeline which if built will create new markets for gas.

Reviewer(s): 9, 14, , 34, 46, 65, 119, 154, 167, 178, 247

RESPONSE: The Trans-Colorado pipeline will not create new markets. It is being built for anticipated markets. Demand is built into the forecast by the Gas Research Institute and other utilities, which is reflected in the RFD.

OGRF09 Oil & Gas RFD

Did the RFD consider the volume and value of Proven, Probable & Possible Oil and Gas reserves under the analysis area?

Reviewer(s): 178

RESPONSE: The volume and value of Proven, Probable and Possible resources is beyond the scope of an activity forecast (RFD) and are typically not considered in these assessments.

OGRF10 Oil & Gas RFD

Did the RFD consider the value of oil and gas resources in the analysis area to provide jobs, tax base and reduced foreign dependence on fossil fuels?

Reviewer(s): 178

RESPONSE: The RFD is a projection of the anticipated oil and gas activity for the next 15 years. The economic analysis in the EIS considers the potential job creations and taxes that could occur as a result of a leasing program on the Forest with this anticipated level of development. The Forest Service policy for minerals management is displayed on page I-2 and specifically mentions the reduction of our dependency on foreign sources of fossil fuels.

OGRF11 Oil & Gas RFD

Did the RFD consider the 140 million natural gas consumers in this country as users of the public lands?

Reviewer(s): 178

RESPONSE: Demand for oil and gas resources was considered in the RFD.

OGRF12 Oil & Gas RFD

RFD predictions of 13 of 27 wells producing on leases and 18 of 20 wells in Units is higher than average success rate of 15% (page I-19). These success rates will increase leasing and APD's. Please review your analysis for higher RFD.

Reviewer(s): 96

RESPONSE: In the areas that have been unitized the rate of success will likely be higher than the national average for exploration wells. The units on the Forest are areas where the resource has been found and the drilling there should be considered development, rather than exploration. the RFD has been independently reviewed and is still thought to be a reasonable estimation of the activity for the next 15 years on the Forest.

RA01 Roadless Areas General

Do not allow oil and gas activity in Roadless Areas.

Reviewer(s): 3, 6, 8, 10, 11, 12, 15, , 18, 23, 27, 28, 30, 30, 32, 33, 36, 37, 38, 43, 53, 61, 62, 69, 72, 77, 79, 80, 82, 87, 88, 89, 92, 99, 102, 105, 106, 109, 113, 114, 115, 117, 122, 125, 129, 133, 135, 136, 142, 144, 146, 149, 150, 151, 152, 153, 158, 160, 169, 170, 172, 174, 175, 177, 182, 184, 187, 190, 192, 193, 195, 196, 197, 200, 203, 204, 209, 210, 211, 213, 214, 217, 219, 220, 227, 229, 233, 234, 240, 243, 244, 245, 249, 252, 255, 259, 261, 262

RESPONSE: With the preferred alternative, the following Roadless Areas are not available for oil and gas leasing: Kannah Creek, Roubideau, Tabeguache, Whetstone Mountain, and parts of West Elk, Raggeds, Flat Top Mountain, and Priest Mountain. The Battlement Mesa Roadless Area is stipulated *No Surface Occupancy*. Approximately 36% of the Roadless Area acreage within the analysis area is not available for oil and gas leasing. An additional 11% (Battlement Mesa) is *No Surface Occupancy*, to protect roadless values. See also Table IV-4 on pages IV-69 - IV-73.

RA02 Roadless Areas General

Preservation of Roadless Area recreational values and issues must be addressed in the FEIS.

Reviewer(s): 3, 12, , 43, 46, 118, 215

RESPONSE: Roadless Area recreational values and issues as discussed in the DEIS will be retained in the FEIS. Roadless Areas are discussed on pages III-56 through III-90, and the effects to Roadless Areas are discussed on pages IV-20 through IV-23, and IV-68 through IV-74.

RA03 Roadless Areas General

Once Roadless Areas are opened to road building for oil and gas exploration, these areas are opened to future motorized access, which will result in loss of biological diversity, aesthetics and non-motorized recreational values.

Reviewer(s): 65, 69, 94, 96, 102, 104, 171, 188, 248

RESPONSE: These areas may or may not be opened to motorized access and logging.

RA04 Roadless Areas General

The Forest Service's own analysis shows "No Lease" in Roadless Areas and Semi-primitive Non-motorized areas will not impact the level of oil and gas activity, but shift development to different areas. There is no justification for selecting Alt. 2.

Reviewer(s): 3, 30, 45, 46, 47, 109, 139, 158, 225, 228, 240, 255, 256

RESPONSE: The mission of the Forest Service in relation to minerals management is to encourage, facilitate and administer the orderly exploration, development and production of mineral and energy resources on NFS lands to help meet the present and future needs of the nation. Alternative 2 allows for the development of oil and gas resources in a logical and sound manner. Lessees currently holding rights to oil and gas resources may need to acquire adjacent tracts necessary to complete lease blocks that are logical for exploration and development. Not allowing leasing in areas adjacent to existing leases could force lessees to explore and develop their leases in a manner that does not foster the greatest ultimate recovery of the leased oil and gas resources. Much of the predicted activity is in areas where operators have pooled their resources and formed units for the purpose of exploration and development of oil and gas resources. Only seven wells are predicted to be drilled on lands not currently leased. The estimated effects of Alternative 2 on Roadless Areas are similar to those of Alternative 5 because the predominance of activity is expected to be on existing leases.

RA05 Roadless Areas General

What are the effects of road construction on Roadless Areas?

Reviewer(s): 132

RESPONSE: The construction of roads in currently Roadless Areas would result in part of the Roadless Area becoming roaded. That portion of the Roadless Area would not have the attributes of a Roadless Area. The effects on the other resources would be similar to those elsewhere. See pages IV-20 through IV-23 and IV-68 through IV-74.

RA06 Roadless Areas General

Roadless areas should only occur in designated Wilderness. All existing Roadless Areas should be considered for oil and gas leasing and development.

Reviewer(s): 231, 239

RESPONSE: All existing Roadless Areas within the analysis area were considered for oil and gas leasing. However, based on the attributes of the Roadless Area, planned activity in the Roadless Area, and public comment, several Roadless Areas were determined to be not available for oil and gas leasing. The Roubideau, Tabeguache, Kannah Creek, Whetstone Mountain, and parts of the Priest Mountain, West Elk, Flat Top Mountain, and Raggeds Roadless Areas are not available for oil and gas leasing at this time.

RA07 Roadless Areas General

Existing leases in Roadless Areas should not be renewed when they expire or are relinquished.

Reviewer(s): 242

RESPONSE: When existing leases expire or are relinquished the land will be subject to the leasing decisions made in the Record of Decision for this document. If the area is *No Lease* as a result of this document, the land covered by the lease will not be available for oil and gas leasing. Otherwise, it will be available with the stipulations specified in the ROD.

RA08 Roadless Areas General

NSO stipulations can protect Roadless Areas if not waived; however, if they are waived the only way to protect Roadless values is with a *No Lease* designation.

Reviewer(s): 46

RESPONSE: There may be a few instances where the roadless values of a Roadless Area may be protected and allow drilling to occur (helicopter access?). In most cases, however; if the stipulation protecting the roadless character of a Roadless Area is waived, the roadless character of the area may be sacrificed. As a result of public comment, Alternative 2 was modified to exclude several Roadless Areas from oil and gas leasing.

Waiving a stipulation is intended to be an unusual exception, rather than the rule.

RA09 Roadless Areas General

Was oil and gas potential considered in Roadless Area designation?

Reviewer(s): 47, 178

RESPONSE: The roadless character of an area is the main consideration in the designation of a Roadless Area. However, the oil and gas (and other mineral) potential is considered by Congress in the designation of a Roadless Area as Wilderness. Areas of high mineral potential typically are not designated as Wilderness.

RA10 Roadless Areas General

How many acres of the Forest are roaded versus unroaded, and what are the criteria for an area considered Roadless?

Reviewer(s): 263

RESPONSE: According to the Forest Plan FSEIS, there are approximately 1,523,780 acres of the Forest considered to be Roadless (including Wilderness). The Forest consists of approximately 2,953,186 acres. 52% of the Forest is roadless. The criteria defines a Roadless Area as an area exclusive of improved roads constructed or maintained for travel by means of motorized vehicles intended for highway use. The Roadless Area inventory (RARE II) recognized that areas of land could be included in the Wilderness System even though they may not be entirely free of the imprint of man but are fully capable of providing wilderness benefits to the public. Accordingly, roadless, undeveloped areas could include past timber harvest activities, evidence of old mining, some range improvement, minor recreation sites, water related facilities, etc., if the passage of time or their visibility allowed the area to appear natural.

RA11 Roadless Areas General

The environmental consequences of oil and gas activities will be greater in Roadless Areas because they currently have little permanent impacts.

Reviewer(s): 96

RESPONSE: The environmental consequences of oil and gas activities in Roadless Areas may appear to be greater than the effects elsewhere, but most likely the effects in Roadless Areas will be similar to those effects elsewhere.

RA12 Roadless Areas General

The U of C Wilderness Study group asks that Roadless Areas remain undisturbed during an ongoing study to measure their interior habitat values for biodiversity. They may propose that some of these areas be managed primarily for biodiversity.

Reviewer(s): 159

RESPONSE: It is likely that most of the Roadless Areas as displayed in the EIS will remain undisturbed for several years even though they are currently leased or are leased as a result of this analysis.

RA13 Roadless Areas General

The preferred alternative prescribes *Standard Lease Terms* for 15 Roadless Areas, which gives too much latitude in previously undisturbed habitats.

Reviewer(s): 185

RESPONSE: *Standard Lease Terms* would not likely adequately protect undisturbed habitats in Roadless Areas. Note however, that stipulations (*CSU*, *TL* and *NSO*) are applied to the many other *Affected Environments* that occur within Roadless Areas. For example, if there are slopes > 60% within the Roadless Area, those slopes will be subject to *No Surface Occupancy* stipulations. If the Roadless Area has moderate geologic hazards then those areas will be stipulated *Controlled Surface Use*. Similarly, if the Roadless Area contains an Elk Calving Ground, that area will have a *Timing Limitation*.

RA14 Roadless Areas General

The continued dissection of Roadless Areas by commodity development needs a thorough analysis on a Forest level and should not be relegated to project specific plans.

Reviewer(s): 185

RESPONSE: This EIS does this for the analysis area for oil and gas activity. The information on Roadless Areas will probably be used at the project stage for all activities in Roadless Areas requiring NEPA documentation. Roadless Areas will be reviewed at the time of the Forest Plan revision, scheduled to be completed in 1997.

RA181 Roadless Areas Raggeds

Do not allow oil and gas activity in Raggeds Roadless Area.

Reviewer(s): 3, 15, 23, 84, 91, 92, 105, 109, 113, 121, 132, 139, 148, 151, 153, 159, 179, 183, 204, 211, 242, 243, 244, 249, 255, 262

RESPONSE: Thank you for your comment.

RA182 Roadless Areas Drift Creek

Do not allow oil and gas activity in the Drift Creek Roadless Area.

Reviewer(s): 3, 15, 92, 92, 105, 109, 128, 139, 148, 151, 153, 159, 179, 204, 211, 215, 249, 255

RESPONSE: Thank you for your comment.

RA184 Roadless Areas Springhouse Park

Do not allow oil and gas activity in the Springhouse Park Roadless Area.

Reviewer(s): 3, 91, 105, 139, 148, 159, 179, 201, 204, 215

RESPONSE: Thank you for your comment.

RA1841 Roadless Areas Springhouse Park

Do not allow oil and gas activity near Floating Lake in the Springhouse Park Roadless Area.

Reviewer(s): 23, 92, 139, 188, 240, 255

RESPONSE: Thank you for your comment.

RA185 Roadless Areas Electric Mountain

Do not allow oil and gas activity in Electric Mountain Roadless Area.

Reviewer(s): 23, 109, 139, 148, 149, 159, 179, 188, 204, 215, 219, 240, 242, 243, 255

RESPONSE: Thank you for your comment.

RA186 Roadless Areas Clear Creek

Do not allow oil and gas activity in the Clear Creek Roadless Area.

Reviewer(s): 23, 39, 109, 139, 148, 164, 179, 204, 215, 240, 255

RESPONSE: Thank you for your comment.

RA1861 Roadless Areas Clear Creek

Oil and gas and timber activities should not occur in the Clear Fork and Muddy area, involving Baldy Creek drainages, June Creek, Elk Knob, Jones Creek, Trail Gulch, Clear Fork, Basin Creek, et al. and surrounding areas.

Reviewer(s): 39, 200, (Plus 62 ltrs. & 1113 sign.)

RESPONSE: Much of the area described is currently leased for oil and gas and timber sales are scheduled.

RA1862 Roadless Areas Clear Creek

With the recent closure and pending reclamation of Mid Continent Mines and associated roads, the Forest Service has the opportunity to expand the Clear Creek Roadless Area onto the White River National Forest. This needs to be addressed in the FEIS.

Reviewer(s): 200

RESPONSE: Expansion of Roadless Areas is beyond the scope of this document.

RA1863 Roadless Areas Clear Creek

The decision to make the Clear Creek Roadless Area a non-motorized area has improved the recreational value of this area, and it should be retained as a non-motorized area.

Reviewer(s): 39, 200

RESPONSE: The area will probably be maintained as a non-motorized area, but roads for oil and gas and scheduled timber sale activity will probably also be built. The roads will be closed to public travel (as they are now).

RA191 Roadless Areas Priest Mountain

Do not allow oil and gas activity in Priest Mountain Roadless Area.

Reviewer(s): 3, 23, 91, 92, 105, 109, 139, 143, 148, 159, 179, 185, 204, 215, 219, 235, 240, 242, 243, 255

RESPONSE: Part of the Priest Mountain Roadless Area is now *No Lease*. These are the areas of the Priest Mountain Roadless Area that were designated *NSO* in the DEIS. However, part of these areas are also currently leased. Activity may occur in those area.

RA191A Roadless Areas Priest Mountain - Bronco Knob

Do not allow oil and gas activity in the Bronco Knob portion of the Priest Mountain Roadless Area.

Reviewer(s): 92

RESPONSE: The Bronco Knob portion of the Priest Mountain Roadless Area is available for oil and gas leasing and the activity that may follow the leasing (drilling), under the preferred alternative.

RA191D Roadless Areas Priest Mountain - Flat Tops

More of the Flat Tops portion of the Priest Mountain Roadless Area should be considered *CSU* instead of *NSO* because it is considered as having high potential.

Reviewer(s): 1

RESPONSE: The majority of the Flat Tops portion of the Priest Mountain Roadless Area is not available for oil and gas leasing in the FEIS preferred alternative. This change was made to better protect the roadless values of the area. It is high potential, but only 15,250 acres of the 31,500 acres is currently leased.

RA191F Roadless Areas Priest Mountain-West Muddy

Do not allow oil and gas activity in the West Muddy portion of the Priest Mountain Roadless Area.

Reviewer(s): 153

RESPONSE: Thank you for your comments.

RA192 Roadless Areas Salt Creek

Do not allow oil and gas activity in the Salt Creek Roadless Area.

Reviewer(s): 23, 92, 109, 139, 148, 179, 204, 215, 240, 255

RESPONSE: Thank you for your comments.

RA193 Roadless Areas Battlement Mesa

Do not allow oil and gas activity in Battlement Mesa Roadless Area.

Reviewer(s): 3, 10, 23, 109, 128, 139, 146, 148, 159, 179, 185, 188, 201, 204, 211, 213, 215, 240, 242, 243, 255

RESPONSE: Battlement Mesa is available for leasing, but is stipulated *No Surface Occupancy* to protect roadless and other resource values in the preferred alternative.

RA194 Roadless Areas Nick Mountain

Do not allow oil and gas activity in Nick Mountain Roadless Area.

Reviewer(s): 23, 92, 109, 115, 139, 148, 149, 179, 204, 215, 240, 242, 243, 255

RESPONSE: Thank you for your comments.

RA195 Roadless Areas Kannah Creek

We support the decision to not allow oil and gas activity in the Kannah Creek Roadless Area.

Reviewer(s): 3, 4, 5, 6, 8, 15, 23, 30, 36, 37, 47, 53, 62, 80, 82, 92, 99, 102, 109, 113, 117, 120, 125, 128, 129, 136, 139, 142, 143, 144, 146, 148, 149, 151, 153, 158, 159, 164, 166, 172, 175, 177, 179, 183, 184, 190, 194, 195, 196, 203, 210, 211, 213, 215, 219, 240, 242, 243, 255, 261

RESPONSE: Thank you for your comments.

RA195A Roadless Areas Kannah Creek

The Kannah Creek Roadless Area should not be protected with *No Lease* designation.

Reviewer(s): 1, 231, 237, 239

RESPONSE: Thank you for your comments.

RA196 Roadless Areas West Elk

Do not allow oil and gas activity in West Elk Roadless Area.

Reviewer(s): 10, 37, 84, 91, 117, 121, 128, 129, 132, 146, 153, 185, 213, 235, 242, 243, 246

RESPONSE: That portion of the West Elk Roadless area within the analysis area east along Kebler Pass from Coal Creek, is not available for oil and gas leasing under the preferred alternative.

RA196A Roadless Areas West Elk - Coal Mesa

Do not allow oil and gas activity in the Coal Mesa portion of the West Elk Roadless Area.

Reviewer(s): 3, 12, 15, 23, 92, 105, 139, 148, 151, 153, 158, 159, 179, 201, 204, 209, 215, 249, 255

RESPONSE: The Coal Mesa portion of the West Elk Roadless Area is available for oil and gas leasing under the preferred alternative.

RA196B Roadless Areas West Elk - Snowshoe Mesa

Do not allow oil and gas activity in the Snowshoe Mesa portion of the West Elk Roadless Area.

Reviewer(s): 12, 15, 21, 23, 92, 105, 139, 148, 151, 153, 158, 159, 179, 183, 201, 204, 215, 255

RESPONSE: Snowshoe Mesa is not available for oil and gas leasing (considered part of the Kebler corridor) under the preferred alternative.

RA196C Roadless Areas West Elk - Kebler Pass

Do not allow oil and gas activity in the Kebler Pass portion of the West Elk Roadless Area.

Reviewer(s): 3, 12, 15, 23, 38, 92, 105, 113, 139, 148, 151, 159, 179, 183, 204, 209, 215, 244, 249, 255

RESPONSE: Kebler Pass is not available for oil and gas leasing from Coal Creek, east to the edge of the analysis area, under their preferred alternative.

RA200 Roadless Areas Whetstone Mountain

Do not allow oil and gas activity in Whetstone Mountain Roadless Area.

Reviewer(s): 12, 15, 23, 42, 84, 91, 92, 105, 113, 130, 139, 148, 151, 153, 158, 159, 179, 183, 195, 201, 204, 209, 215, 235, 242, 243, 244, 249, 255

RESPONSE: The Whetstone Mountain Roadless Area and that portion of the analysis area outside of Crested Butte is not available for oil and gas leasing under the preferred alternative.

RA2001 Roadless Areas Whetstone Mountain

Do not renew or issue new leases on Whetstone Mountain.

Reviewer(s): 8, 118, 210

RESPONSE: The Whetstone Mountain area is not available for oil and gas leasing under the preferred alternative. The existing lease in the area will expire in 1996, unless drilling occurs and the lease can be held by production.

RA201 Roadless Areas Flat Top Mountain

Do not allow oil and gas activity in the Flat Top Mountain Roadless Area.

Reviewer(s): 84, 91, 92, 105, 153, 183, 235

RESPONSE: The Flat Top Mountain Roadless Area (110 acres in analysis area) is not available for oil and gas leasing under the preferred alternative. It is located to the south of the Whetstone Mountain Roadless Area.

RA241 Roadless Areas Roubideau

We support the decision to not allow oil and gas activity in the Roubideau Roadless Area.

Reviewer(s): 3, 4, 5, 6, 8, 15, 23, 30, 36, 37, 47, 53, 62, 69, 80, 82, 92, 99, 102, 109, 113, 115, 117, 120, 125, 128, 129, 136, 139, 142, 143, 144, 146, 148, 149, 151, 158, 159, 166, 175, 177, 179, 183, 184, 190, 194, 195, 196, 203, 210, 211, 213, 215, 240, 242, 243, 255, 261

RESPONSE: Thank you for your comments.

RA241A Roadless Areas Roubideau

The Roubideau Roadless Area should not be protected with *No Lease* designation.

Reviewer(s): 1, 231, 237, 239

RESPONSE: Thank you for your comments.

RA242 Roadless Areas Tabeguache

We support the decision to not allow oil and gas activity in the Tabeguache Roadless Area.

Reviewer(s): 3, 4, 5, 6, 8, 15, 23, 30, 36, 37, 47, 53, 62, 69, 80, 82, 92, 99, 102, 109, 113, 115, 117, 120, 125, 128, 129, 136, 139, 142, 143, 144, 146, 148, 149, 151, 158, 159, 166, 172, 175, 177, 179, 183, 184, 190, 194, 195, 196, 203, 210, 211, 213, 215, 240, 242, 243, 255, 261

RESPONSE: Thank you for your comments.

RA242A Roadless Areas Tabeguache

The Tabeguache Roadless Area should not be protected with *No Lease* designation.

Reviewer(s): 1, 231, 237, 239

RESPONSE: Thank you for your comments.

RA243 Roadless Areas Kelso Mesa

Do not allow oil and gas activity in Kelso Mesa Roadless Area.

Reviewer(s): 3, 23, 92, 109, 128, 139, 142, 148, 159, 169, 179, 201, 204, 211, 215, 242, 243, 249, 255

RESPONSE: Thank you for your comments.

RA246 Roadless Areas Campbell Point

Do not allow oil and gas activity in Campbell Point Roadless Area.

Reviewer(s): 211, 242, 243

RESPONSE: Thank you for your comments.

RA247 Roadless Areas Johnson Creek

Do not allow oil and gas activity in Johnson Creek Roadless Area.

Reviewer(s): 3, 23, 92, 109, 128, 139, 142, 148, 159, 169, 179, 188, 201, 204, 211, 215, 242, 243, 249, 255

RESPONSE: Thank you for your comments.

RD01 Roads

Roads constructed for oil and gas can improve public access to a given area, for the benefit of many.

Reviewer(s): 165, 226

RESPONSE: The Forest Service agrees. However, in most cases, roads built for oil and gas operations will be closed to public travel.

RD02 Roads

No new roads should be built for oil and gas development.

Reviewer(s): 13, 33, 49, 51, 52, 54, 64, 67, 68, 76, 79, 84, 93, 106, 114, 121, 123, 124, 125, 131, 149, 151, 153, 156, 160, 167, 182, 193, 197, 198, 216, 217, 220, 236, 250, 251, 253, 255, 258, 262, 263

RESPONSE: In most cases, if there is not an existing road to the lease or proposed well site, a new road would be required. The lease grants a right to reasonable access on a lease. The APD approval constitutes approval of proposed on-leasehold rights-of-way. Off the lease, no rights exist. Access to a Federal leaseholding surrounded by Federal land is discretionary on the part of the surface management agency, in this case the Forest Service, and a special use permit is required.

RD03 Roads

The government should not subsidize road building or other oil and gas development.

Reviewer(s): 43, 97, 180

RESPONSE: The government does not subsidize road building or any other oil and gas activity. The operator pays for and constructs the road and other facilities needed in their operations.

RD05 Roads

The DEIS does not address cumulative effects of total miles of road for all purposes.

Reviewer(s): 43

RESPONSE: Cumulative effects of roads are addressed under the resources that would be affected, i.e., wildlife, Roadless Areas, etc. See pages IV-59 and IV-74.

RD06 Roads

Existing roads in the Clear Fork area should be rehabilitated.

Reviewer(s): 39

RESPONSE: The existing roads in the Clear Fork area are being used to access gas wells. The Forest Service is not aware of any roads in need of rehabilitation that are not being used.

RD07 Roads

The DEIS does not address cumulative effects of roads on land adjacent to the Forest.

Reviewer(s): 43

RESPONSE: See page IV-51 for a discussion of the cumulative effects of roads on land adjacent to the analysis area.

RD08 Roads

New oil and gas roads should be closed to the public.

Reviewer(s): 43, 45, 103, 225

RESPONSE: Most new roads will be closed to the public.

RD09 Roads

No new roads should be built or old roads opened in the Clear Creek/Clear Fork area.

Reviewer(s): 39, 48, 200, (Plus 62 form letters and 1113 petition signatures.)

RESPONSE: Most of the Clear Creek/Clear Fork area is currently leased. See the response to Comment #: RD02.

RD10 Roads

Roads accessing dry holes should be reclaimed immediately.

Reviewer(s): 22, 41, 103

RESPONSE: Reclamation of roads and the other area disturbed by oil and gas activity must be done in accordance with the Surface Use Plan of Operations.

RD11 Roads

New roads for oil and gas activity will result in increased traffic.

Reviewer(s): 47, 58, 124, 220

RESPONSE: During exploration, oil and gas activity will result in an average of approximately 13 vehicles per day, per well. This normally lasts for about 2 months. If the well is productive, operation and maintenance traffic averages 2 vehicles per day per well. This is in addition to the normal traffic a road may receive from other users. See Table II-1 on page II-2.

RD12 Roads

More roads will impact backcountry recreation.

Reviewer(s): 172, 236

RESPONSE: Roads built in areas currently unroaded and used for backcountry recreation will probably affect some of the recreation values that draw the users to those areas. A road may change the area enough that a recreationist may no longer have the same backcountry experience in that area.

RD13 Roads

Do not build more roads to save the expense of building and maintaining them.

Reviewer(s): 81, 94, 172

RESPONSE: The roads are built and paid for by the operator. Maintenance is paid for on a commensurate share basis by the users.

RD14 Roads

Building roads will degrade the water quality in areas with construction and the extra traffic will increase the dust problem along the main corridors.

Reviewer(s): 51, 107

RESPONSE: Some degradation in water quality is likely to occur adjacent to road construction projects. Mitigation measures specified in Appendix H and applied as necessary, will minimize the potential for long-term impacts to water quality. Impacts are generally greatest for the first three years following construction or until the disturbed area is revegetated. Dust abatement measures will be specified in the Surface Use Plan of Operations for an Application for Permit to Drill.

RD15 Roads

Increased traffic associated with oil and gas activities along main corridors will make travel more hazardous, especially for bicyclists.

Reviewer(s): 51

RESPONSE: Any increase in traffic increases the hazards for all road users. Use on specific roads by bicyclists and other users will be identified at the APD stage and mitigation measures may be applied to reduce the potential hazards.

RD16 Roads

New roads constructed for oil and gas activities will not serve any public interests other than those of energy and timber industries.

Reviewer(s): 57, 91, 105, 258

RESPONSE: Roads not closed to public use will likely be used by the public for numerous recreational endeavors, including sight-seeing, wildlife viewing, bicycle riding, hiking/walking, improved access to remote areas, snowmobiling, cross country skiing, etc. Most roads will be closed to motorized travel by the public.

RD17 Roads

The document does not discuss potential impacts to State highways resulting from oil and gas activities. The document should indicate the State highway system will be impacted beyond its historical use and to what extent.

Reviewer(s): 44

RESPONSE: See additional discussion added in Chapter IV on page IV-52.

RD18 Roads

The Colorado Department of Transportation should be listed as a reviewing and permitting agency for highway access. All new access points will require permits from the DOT and lease applicants should be made aware of this.

Reviewer(s): 44

RESPONSE: The Colorado Department of Transportation is included on the list of permitting agencies (Appendix K).

RD19 Roads

A given user group should not be required to subsidize correction of problems created by others, as in example of roads built for oil and gas activities correcting drainage or alignment problems of existing roads.

Reviewer(s): 41

RESPONSE: Roads built or rebuilt for oil and gas activities generally need to be of a higher standard to support the heavy vehicles used in the drilling phase of the operations. Road reconstruction presents an opportunity to correct drainage or alignment problems in existing facilities and generally serves the oil and gas activity traffic needs better. It may be determined in the site-specific NEPA documentation for the APD that repair of an existing facility that is causing adverse environmental impacts would need to be completed prior to any further disturbance in the area.

RD20 Roads

The Final EIS should specify who will build and maintain road access to a leasehold.

Reviewer(s): 225

RESPONSE: See pages IV-50 and IV-52.

RD21 Roads

Roads should be constructed to the highest standard to minimize surface degradation.

Reviewer(s): 225

RESPONSE: Forest roads are typically built to accommodate the intended use of the road. The highest standard road, paved or asphalt stabilized roads, would result in minimal erosion. However, it would be an inappropriate road standard given the amount of traffic and the typically short season of use that would incur the highest traffic volume. This does not preclude the use of an asphalt stabilized surface where it may be appropriate to protect other resource values, such as at stream crossings or around heavily used recreation sites for dust control. The standard of the road will be decided at the time the APD and SUPO is approved.

RD22 Roads

If timber sales follow oil and gas activity as a result of roading, the timber company should pay part of the cost of the roads.

Reviewer(s): 95

RESPONSE: The industry that builds the road pays for the road. If an oil and gas company builds a road to access their leasehold for drilling, they would pay for the construction of the road. There is no mechanism for later users of the road to share in the initial construction costs. If the road needs to be reconstructed for use by the timber sale operator, the timber sale operator would pay for the reconstruction. Maintenance costs would be shared based on use. If timber and oil and gas operators

needed access to the same area at the same time, an agreement would be reached wherein the road construction costs would be shared.

RD23 Roads

The DEIS fails to relate the addition of roads for oil and gas activity to the desired future condition given in the Forest Plan. Currently, enough roads exist to meet the roaded recreation demand through 2035 and the Forest has excessive roading, now.

Reviewer(s): 185

RESPONSE: The majority of roads will be closed to public travel, i.e., they will not be available for roaded recreation opportunities.

RD24 Roads General

The statement "potential for new road construction in entire analysis area" (p. II-51) is corrupt given the low probability of significant oil and gas finds.

Reviewer(s): 185

RESPONSE: The statement says that new road construction could occur just about anywhere in the analysis area if Alternative 4 was the selected alternative. We do not know where oil and gas operators will drill or find oil and/or gas.

RD25 Roads General

The DEIS does not answer the question of who will pay for the construction and maintenance of roads with mixed industrial use (p. I-26).

Reviewer(s): 185

RESPONSE: See the response to Comment #: RD22.

RD26 Roads

Roads should be subject to lease options, particularly if the roads might later be used to support timber harvest and heavy log truck traffic.

Reviewer(s): 185

RESPONSE: A *Timing Limitation* is the only lease option that could logically be applied to a road. This could be used where structural integrity of the road needs to be protected on a seasonal basis. See also the revised discussion on page IV-5.

RDW01 Roads Wildlife

New roads may disrupt migration corridors.

Reviewer(s): 43, 51, 132

RESPONSE: New roads alter habitat in migration corridors. If the road is closed to public use and use by the oil and gas operators during times of migration, the roads would not impact migrating animals. If the road is left open during migration, migration of animals could be affected. See also the discussion on page IV-82.

RDW02 Roads Wildlife

The DEIS does not address habitat fragmentation associated with proposed new road construction for all purposes.

Reviewer(s): 43

RESPONSE: The effect of habitat fragmentation differs according to the species involved. For animals like deer and elk, new road construction probably does not affect fragmentation if the road is closed to public travel. For other species, particularly the furbearers, habitat fragmentation from road construction can have significant effects if the roads are not closed to public use. Furbearers are more susceptible to trapping in areas that are roaded. Trappers using snowmobiles on roads have increased access and opportunity to trap furbearers (such as wolverines and pine martens). See also the discussion on page IV-59.

RDW03 Roads Wildlife

Placing roads in any timber region develops the area for much greater use by hunters and fishermen.

Reviewer(s): 108

RESPONSE: We agree. Roads built anywhere in the National Forest increase use in the area, even if the road is closed to travel with motorized vehicles. Hunters, hikers, mountain bikers, cross country skiers, and fishermen use the roadbed for access into areas previously unroaded.

RDW04 Roads Wildlife

You do not adequately describe the potential effects of additional roading and disturbance on bighorn sheep and black bear.

Reviewer(s): 185

RESPONSE: See pages IV-33 and IV-82 for discussions concerning bighorn sheep. Potential effects of roading on black bear are discussed on pages IV-9 and IV-56 through IV-59, under big game. The biggest potential effect to black bears as a result of additional roading is poaching. Closing roads to public travel should reduce the potential for poaching of black bears.

RECG01 Recreation General

Oil and gas exploration and/or development will compromise heavy recreation use areas.

Reviewer(s): 187

RESPONSE: Those areas of heavy recreation use have been grouped as recreation complexes. Recreation complexes are protected by *No Surface Occupancy* stipulations. The stipulation covers all of the recreation area as mapped in the DEIS and a quarter mile buffer around the recreation complexes (see page C-17). The effects on heavy recreation use areas are displayed on pages IV-54 through IV-56. The natural character of these high density use areas would generally be retained.

RECG02 Recreation General

The FEIS needs to address the audio impacts of oil and gas development, especially near Wilderness and areas offering primitive and semi-primitive recreation. Noise control limits need to be specified.

Reviewer(s): 22, 43, 220

RESPONSE: The nature of audio impacts is such that they are short-term and best addressed at the APD and SUPO stage of the process. Noise impacts will be addressed on a site specific basis. As you suggest, noise impacts may be greater in some areas (such as near Wilderness, campgrounds, etc.) than in other less sensitive areas.

RECG03 Recreation General

The need to preserve and promote primitive recreation opportunities is important in an age of continued urbanization.

Reviewer(s): 22, 30, 43, 111, 216, 221

RESPONSE: The Forest Service agrees. Some Roadless Areas in the analysis area are not available for oil and gas leasing under the preferred alternative. Wilderness is also not available.

RECG05 Recreation General

Oil and gas leasing/development will result in a decline in tourism due to environmental impacts.

Reviewer(s): 8, 34, 72, 73, 79, 96, 99, 156, 183, 205, 207, 210, 217, 246, 250

RESPONSE: Minimal effects would occur along scenic byways and other areas of concentrated recreation use, such as the ski areas and recreation complexes discussed in the EIS. Tourism is not expected to decline as a result of oil and gas leasing.

RECG06 Recreation General

We oppose oil and gas activities or timber harvests because they would impact recreationists.

Reviewer(s): 39, 48 (Plus 62 form letters.)

RESPONSE: The majority of recreationists would not notice oil and gas activities. Some increase in industrial traffic may occur, but it would not be significant. Campgrounds, ski areas, scenic corridors, and major trails would be protected from the direct impacts of oil and gas activity. The activity tends to be concentrated in the exploration phase.

RECG08 Recreation General

Oil and gas development would reduce backcountry recreational opportunities.

Reviewer(s): 8, 11, 29, 32, 34, 39, 39, 47, 79, 98, 105, 145, 149, 188, 200, 209, 210, 213, 225, 228, 232, 252, 259

RESPONSE: There would be a likely decrease in the amount of unroaded areas as a result of oil and gas development in currently roadless areas. The types of backcountry recreational opportunities would probably not decline, but the acreage available for backcountry recreational opportunities would be decreased. This could result in more people trying to have a backcountry experience in less available acreage.

RECG09 Recreation General

Existing and potential recreation based jobs will be lost as a result of oil and gas development in this area.

Reviewer(s): 98

RESPONSE: Oil and gas leasing and drilling is not new to this area. The amount of drilling will only increase slightly from the historical trend in drilling. The projection for the Reasonably Foreseeable Development scenario is an extension of trends in drilling. The amount of drilling will not drastically change in the next 15 years. See also response to Comment #: RECG05.

RECG10 Recreation General

The more land that is protected the more appealing the State is to tourism.

Reviewer(s): 80

RESPONSE: The areas that attract the majority of tourists to Colorado will not be significantly affected by oil and gas activities. Tourists are attracted to Colorado for skiing, hunting, sight-seeing, scenery, hiking, fishing and biking.

RECG11 Recreation General

Give Horse Ranch Park a *No Lease* designation.

Reviewer(s): 8, 21, 132, 183, 210

RESPONSE: As a result of public comment, the Kebler Pass corridor, which includes Horse Ranch Park, is not available for oil and gas leasing, i.e., it has a *No Lease* designation under the preferred alternative.

RECG12 Recreation General

What will be the effects of oil and gas development on unroaded recreation?

Reviewer(s): 185

RESPONSE: See response to Comment #: RECG08.

RECO01 Recreation Outfitters

The DEIS understates the economic impacts from oil and gas activity to outfitters and the public they serve.

Reviewer(s): 39, 71, 252

RESPONSE: Outfitters that are permitted within current unroaded areas may be affected if oil and gas development occurs in and around their permitted area. The effects on outfitters in Roadless Areas are discussed on pages IV-20 and IV-74.

RECO02 Recreation Outfitters

Outfitters will be put out of business as a result of oil and gas development and subsequent timber harvesting.

Reviewer(s): 39, 171, 200

RESPONSE: Some small businesses dependent on a roadless setting outside of Wilderness may be affected. See also the response to Comment #: RECO01. See the discussion on the effects to outfitters on pages IV-20, IV-63 and IV-74.

RECS01 Recreation Scenic Areas

Do not allow oil and gas activity in the McClure Pass area.

Reviewer(s): 10, 12, 23, 37, 139, 146, 151, 195, 201, 213, 224, 240, 244, 246, 262

RESPONSE: The McClure Pass areas has *Controlled Surface Use* and *No Surface Occupancy* stipulations to protect the scenic and recreational attributes of the area under the preferred alternative.

RECS02 Recreation Scenic Areas

Do not allow oil and gas activity in the Kebler Pass area.

Reviewer(s): 13, , 21, 24, 38, 49, 54, 73, 103, 118, 130, 134, 153, 158, 162, 167, 201, 224, 234, 252, 262

RESPONSE: As a result of public comment, Alternative 2 has been modified so that the Kebler Pass corridor is not available for oil and gas leasing, i.e., it has been designated *No Lease* under the preferred alternative.

RECS03 Recreation Scenic Areas

Oil and gas activity should not be allowed to disturb visual corridors.

Reviewer(s): 66, 89, 105, 106, 114, 130, 152, 153, 160, 197, 212, 217, 232

RESPONSE: Scenic Byways, Retention VQO and Retention VQO - Low VAC *Affected Environments* have been given *Controlled Surface Use* and *No Surface Occupancy* stipulations to protect the visual corridors. See pages C-2, C-3 and C-14.

RECS04 Recreation Scenic Areas

Scenic values will be lost in the Clear Fork/Muddy Basin area as a result of oil and gas and timber activities.

Reviewer(s): 33, (Plus 62 form letters and 1113 petition signatures.)

RESPONSE: Some loss of scenic values may occur in the Clear Fork/Muddy Basin area as a result of oil and gas and planned timber sale activity. The presence of natural openings and the lay of the land will absorb most oil and gas activity. The presence of drilling equipment will be short-term, typically lasting no more than 60 days.

STP01 Stipulations General

All special stipulations should be enforced - no modifications, waivers or exceptions.

Reviewer(s): 2, 3, 5, 10, 15, 18, 23, 36, 37, 38, 43, 46, 55, 62, 69, 77, 80, 82, 87, 88, 92, 99, 104, 109, 113, 117, 118, 120, 125, 128, 129, 130, 133, 139, 143, 144, 148, 149, 151, 166, 170, 172, 173, 175, 177, 179, 195, 196, 203, 206, 211, 213, 215, 222, 225, 228, 236, 240, 242, 243, 246, 248, 249, 252, 255, 259, 261

RESPONSE: All special stipulations will be enforced. In some cases, the special stipulations may not be needed because of a change in conditions, incorrect mapping, etc. In other areas, additional stipulations may be needed. For example, the mapping of the slopes > 60% is not very accurate; it is based on the USGS 3 Arc-Second digital elevation models. However, all slopes > 60%, whether they are mapped or not, will be stipulated *NSO*. If a slope > 60% exists in an area it will be stipulated *NSO*.

Modifications, exceptions, and waivers will be considered according to the regulations at 36 CFR 228.104. An operator submitting a Surface Use Plan of Operations may request the authorized officer to authorize the BLM to modify, waive or grant an exception to a stipulation included in a lease at the direction of the Forest Service. The modification, waiver or exception are subject to public comment in connection with the NEPA documentation required in the approval process for the Surface Use Plan of Operations.

STP02 Stipulations General

Oil and gas and timber activities should be scheduled so they do not conflict with hunting seasons or other public activities.

Reviewer(s): 39

RESPONSE: Timing of oil and gas activities could possibly be adjusted for short periods of time, i.e., limited activities during regular hunting seasons. However, public activities occur year round and some will likely be impacted by oil and gas operations or other Forest management activities.

STP03 Stipulations General

If stipulation waivers will be allowed they must be as narrowly and clearly defined as possible.

Reviewer(s): 132, 176

RESPONSE: Waivers will be considered as allowed by the regulations (36 CFR 228.104).

STP04 Stipulations General

The FEIS should specify allowable acreages of disturbed areas (including roads) and timing restrictions in which reclamation of disturbed sites must be done.

Reviewer(s): 178, 256

RESPONSE: Each well site and road location are different. The amount of acreage disturbed will vary by the terrain where the activities are proposed. The specific effects of the construction of a road and well site for a particular project will be determined in the approval process for the Surface Use Plan of Operations (a NEPA decision point). This EIS does not authorize ground disturbance.

STP05 Stipulations General

The document should address the likelihood of extensive use of stipulation exemptions, which would render stipulations ineffective.

Reviewer(s): 247

RESPONSE: Waivers, modifications and exceptions will be considered as allowed by the regulations (36 CFR 228.104). It is assumed that waivers, modifications and exceptions will occur. They may well render the stipulation technically ineffective, but that does not mean that significant adverse effects will occur as a result of waiving, modifying or granting an exception to a stipulation. Crossing Riparian areas, Wetlands and areas of High Geologic Hazard may be unavoidable in some cases to access a well site. Mitigation measures will be applied to protect these resources.

STP06 Stipulations General

Leasing stipulations need to be consistent with Naturally Occurring Radioactive Material (NORM) requirements so that these materials, especially drilling fluids, are handled in an environmentally sound manner.

Reviewer(s): 82, 247

RESPONSE: Operators must comply with all State and Federal laws regarding NORM requirements and the disposal of potentially toxic wastes at the time of use and disposal.

STP07 Stipulations General

Mandate that all development plans consider Resource Conservation and Recovery Act requirements for Subtitle D disposal in effect at the time of drilling.

Reviewer(s): 82

RESPONSE: See response to Comment #: STP06.

STP09 Stipulations General

Justification for *NL* or *NSO* restrictions are based on perceived environmental impacts and conflicts between resource uses, not necessarily factual or scientific data. Industry has shown operations can be compatible with other uses without *NL* or *NSO*.

Reviewer(s): 237

RESPONSE: In most cases, operations can be compatible with other uses. However, for certain sensitive areas, such as Roadless Areas, where we want to protect the roadless values, it would be extremely difficult for industry to operate in a Roadless Area and protect roadless values.

STP10 Stipulations General

Revegetation and disturbed sites should include species beneficial to wildlife for both food and shelter. Vertical and horizontal habitat should be considered.

Reviewer(s): 45

RESPONSE: Revegetation will consider wildlife needs. In most cases, native plant species will be planted in disturbed areas. The species mix will be specified in the rehabilitation plan, part of the SUPO.

STP11 Stipulations General

Directional drilling should occur to minimize amount of drilling.

Reviewer(s): 45

RESPONSE: Directional drilling will likely occur where the surface cannot be occupied because of *No Surface Occupancy* stipulations. Directional drilling is more expensive and riskier and may or may not minimize the amount of drilling. Theoretically, it could reduce the amount of ground disturbance. However, it is not practical everywhere.

STP12 Stipulations General

The final document should not recommend an alternative that is not consistent with the Grand Mesa travel management planning effort.

Reviewer(s): 164

RESPONSE: Grand Mesa travel management issues will need to be resolved within the context of the resource decisions developed from this analysis.

STP13 Stipulations General

No Lease should be the designation within 1/2 mile from any Wilderness boundary.

Reviewer(s): 16

RESPONSE: The Wilderness Bill does not specify a buffer around Wilderness. Multiple use management, including oil and gas activity, can occur right up to the Wilderness boundary.

STP14 Stipulations General

NSO should be used whenever possible to reduce the amount of roads needed and in important wildlife areas.

Reviewer(s): 16

RESPONSE: *NSO* is used in this document to protect resource values such as wildlife, Recreation Complexes, Sensitive Areas, areas of High Geologic Hazard, etc. It may or may not reduce the amount of roads needed, but will likely control where roads are located and ensure that they are located outside these areas of sensitive resource values, or if they are located in these areas ensure that proper and effective mitigation measures are applied.

STP15 Stipulations General

Standard Lease Terms should only be used where no environmental conflicts exist, such as near existing roads.

Reviewer(s): 16

RESPONSE: Generally, that is how *Standard Lease Terms* were applied in this document, i.e., where no environmental conflicts exist.

STP16 Stipulations General

The Final EIS should provide specific discussion about transport and onsite management of hazardous materials and emergency preparations for accidents involving hazardous materials.

Reviewer(s): 41

RESPONSE: All operations are required to have a Spill Prevention Control and Countermeasure Plan. The SPCC plan will be required prior to approval of the APD and SUPO. See also the Forest's "Oil and Hazardous Spills Contingency Plan" (Appendix M).

STP17 Stipulations General

Potential resource conflicts resulting from oil and gas development are best addressed with site specific mitigation measures and timing restrictions, not broad restrictions like *NSO* and *CSU*.

Reviewer(s): 126

RESPONSE: The Forest Service agrees that potential resource conflicts resulting from oil and gas development are best addressed with site specific mitigation measures and timing restrictions. However, at this stage in the process we do not know exactly where oil and gas activities will be proposed. We have included in the appendix, mitigation measures that may be required to protect different resources. *NSO* and *CSU* restrictions are applied to the different *Affected Environments* based on past experience with road and well pad construction activities and the effects that typically result. The specific mitigation measures will be applied at the time an operator submits an APD and a Surface Use Plan of Operations.

STP18 Stipulations General

Wouldn't it be easier to not locate wells near elk calving areas instead of putting more restrictions on the lessee?

Reviewer(s): 168

RESPONSE: *Controlled Surface Use* and *Timing Limitations* will be applied to elk calving areas to minimize impacts from oil and gas activities when these areas cannot be avoided.

STP19 Stipulations General

The document needs to elaborate on contingency plans that would be implemented if a major spill were to occur.

Reviewer(s): 241

RESPONSE: The Forest's Oil and Hazardous Spills Contingency Plan is included as Appendix M. The operator is also required to have a spill contingency plan. See also the response to Comment #: STP16.

STP20 Stipulations General

There should be no areas leased under *Standard Lease Terms*.

Reviewer(s): 96, 252

RESPONSE: Under the Preferred Alternative 13% of the analysis area is available under *Standard Lease Terms*, only. *Standard Lease Terms* will be adequate to protect resource values in these areas.

STP21 Stipulations General

As a means of addressing environmental database needs, the EPA suggests using a Lease Notice or equivalent approach to require water quality monitoring be done for project-level planning prior to ground disturbance.

Reviewer(s): 78

RESPONSE: *Standard Lease Terms* allow the Forest Service to require special studies or inventories. A Lease Notice is not necessary. Water quality monitoring needs to be done over a long time period to obtain a reliable baseline of quality.

STP22 Stipulations General

The FEIS should disclose the types of monitoring information that will be required by the USFS and BLM for resource protection at the project level.

Reviewer(s): 78

RESPONSE: Specific monitoring information will be identified when the operator submits an APD and SUPO for approval. Further NEPA analysis is required at that point in the process. It would be more appropriate at that time to identify monitoring needs.

STPC01 Stipulations Controlled Surface Use

Controlled Surface Use stipulations are not really protective measures.

Reviewer(s): 180

RESPONSE: *Controlled Surface Use* stipulations are protective and mitigative measures that strictly control certain aspects of an operator's activities in areas of special values or resource concerns. See the discussion on page I-16 for examples of the use of *Controlled Surface Use* stipulations.

STPN01 Stipulations No Surface Occupancy

If Alternative 3 - No Lease is not selected consider extensive use of the *NSO* stipulation.

Reviewer(s): 146

RESPONSE: Stipulations will be applied to those *Affected Environments* that need protection beyond that provided by *Standard Lease Terms*. In the FEIS, *NSO* stipulations were applied on approximately 151,835 acres, or about 16% of the analysis area. *No Lease* was applied on 138,270 acres, or about 15% of the analysis area. See Table II-6, Acres of Lease Options by Alternative.

STPN02 Stipulations No Surface Occupancy

Did you consider how oil and gas resources would be developed under *NSO* areas?

Reviewer(s): 178

RESPONSE: The oil and gas resources in those large blocks would be inaccessible except by directional drilling. The limitations on directional drilling made it evident that the large blocks of *NSO* in Roadless Areas were not logical. For that and other management reasons, most *NSO* in Roadless Areas has been changed to *No Lease*. The other *Affected Environment* where *NSO* occurs in large blocks,

summer range (Concentrated Use), was left *NSO* given the nature of the resource and the conditions under which we will consider waivers, exceptions and modifications.

STPN03 Stipulations No Surface Occupancy

NSO stipulation denies access to valuable oil and gas resources.

Reviewer(s): 178

RESPONSE: Generally that is true. Access, however, may be gained through directional drilling, where feasible. In areas stipulated *NSO*, the surface resource has been determined to be more valuable than the oil and gas resources.

STPN04 Stipulations No Surface Occupancy

Did you consider where pipeline collection systems would be installed and where existing pipelines occur when defining *NSO* areas?

Reviewer(s): 178

RESPONSE: Pipelines, in most cases, will be installed along the road corridor that accesses the well site. We realize that pipelines will also be constructed outside the road corridor. This is thought to be the exception rather than the rule.

STPN05 Stipulations No Surface Occupancy

The document needs to be consistent in acknowledgment of exceptions to *NSO* stipulations in wetlands wherever they are discussed. Exceptions should be specified concerning what will and will not be allowed.

Reviewer(s): 78

RESPONSE: The document has been reviewed and revised as necessary to ensure consistency in the discussion of exceptions to *NSO* in Wetlands.

STPT01 Stipulations Timing Limitations

Timing Limitations may not be adequate to mitigate impacts to wildlife because they only control oil and gas activities and may not control the potential increase in other human activities resulting from improved access.

Reviewer(s): 256

RESPONSE: In most cases, roads accessing well pads will be closed to public travel, not only during the time period specified in the stipulation, but year-round. Human travel would be allowed only by non-motorized means.

STPT02 Stipulations Timing Limitations

Timing Limitations may not be adequate to mitigate impacts to wildlife because if a well becomes permanent so does its associated disturbance.

Reviewer(s): 256

Wildlife is most susceptible to human disturbance at critical times during their life cycle (birthing, breeding, nesting, etc.). See also the response to Comment #: AEW03.

STPT03 Stipulations Timing Limitations

Timing restrictions within Roadless Areas would be as applicable as elsewhere.

Reviewer(s): 225

RESPONSE: The major factor that makes a Roadless Area roadless, is the absence of roads. In most cases, a road is required to provide access to an oil or gas operation. A *Timing Limitation* would not mitigate the presence of a road. Although use could be restricted during certain times of the year, the road would still be there, giving the impression to the recreationist of the presence of man and his machines.

TM01 Timber

Timber sales should not be offered as a result of new oil and gas roading.

Reviewer(s): 8, 32, 41, 43, 46, 54, 61, 72, 79, 80, 91, 93, 94, 95, 102, 105, 117, 131, 133, 135, 173, 198, 199, 206, 210, 225, 235, 249, 253, 255, 256

RESPONSE: Before a timber sale would be held in an area previously unroaded and containing timber that was previously not suitable for timber production because of economics (mainly high road costs), the Forest Plan would need to be amended. The amendment process would involve the public. Those areas where the timber is already suitable and timber sales are scheduled could have the road system constructed by the oil and gas operator. At this point in the process, we know where suitable timber exists, but do not know where oil and gas operations will occur.

TM02 Timber

In view of the national deficit, it is economically unwise to continue to lose money from timber cutting.

Reviewer(s): 156, 217

RESPONSE: This issue is beyond the scope of this document.

TM03 Timber

Do not allow any timber harvest in the Clear Fork/Muddy Basin area.

Reviewer(s): 200 (Plus 62 form letters.)

RESPONSE: Any decision to harvest timber in the Clear Fork/Muddy Basin area is beyond the scope of this document. Timber harvest is already scheduled in part of this area. The scheduled sales are subject to harvest, regardless of the decisions made as a result of this oil and gas leasing EIS.

TM04 Timber

Raising cutting levels as a result of oil and gas access would betray the public trust resulting from the reduced cutting level proposed in the Plan Amendment.

Reviewer(s): 46, 87

RESPONSE: The cutting level in the Plan Amendment was based on the suitable timber base. Timber that is potentially suitable would have to be added to the Forest's timber base through another Plan Amendment. Cutting levels could rise as a result of oil and gas access. The increased ASQ would have to be addressed in an amendment to the Forest Plan. It is beyond the scope of this document to suggest an increased ASQ.

TM05 Timber

The FSEIS for the Forest Plan Amendment does not address the effects of timber harvesting following oil and gas access. The cumulative effects of timber harvesting resulting from oil and gas access needs to be addressed in this document.

Reviewer(s): 16, 46

RESPONSE: The Forest's ASQ would not increase as a result of this document. The timber harvest for the construction of the facilities needed for oil and gas operations would be counted as part of the Forest's timber target. The cumulative effects of these activities were discussed on pages IV-38 and IV-85 - IV-86.

TM06 Timber

The document does not adequately discuss why particular locations are presently considered uneconomical for timber harvest.

Reviewer(s): 41

RESPONSE: It is beyond the scope of this document to address timber in specific locations and why the timber there is considered uneconomical. Generally, timber harvest is considered uneconomical in areas where the cost to construct roads is high. See the Forest Plan, Table II-18 on page II-52 and Table F-2 on page F-3.

TM07 Timber

The three Roadless Areas proposed for protection under Alternative 2 have limited timber resources while large amounts of timber are found in Roadless Areas proposed for leasing. This seems to more than just a consequence.

Reviewer(s): 13

RESPONSE: The three Roadless Areas proposed for protection (*No Lease*) in the DEIS are among several of the Roadless Areas with limited timber resources. Many of the Roadless Areas that have more of a timber resource are also the areas where timber sales are scheduled according to the Forest Plan timber amendment. There would be no justification to close areas to oil and gas activity where timber sales are currently scheduled. Several of the other Roadless Areas with limited timber resources are available for oil and gas leasing. These areas include Campbell Point, Johnson Creek and Kelso Mesa.

TM09 Timber

The Forests motivation to allow oil and gas activity in currently undeveloped areas is to access timber.

Reviewer(s): 185

RESPONSE: The Forest's motivation is to provide opportunities for the exploration and development of oil and gas resources; resources used by the American public in numerous ways. Timber accessed by oil and gas activity could not be harvested until it is added to the Forest's suitable timber base. Adding timber to the Forest's base is beyond the scope of this document and would have to be handled in an amendment to the Forest Plan.

TM10 Timber

How much timber might be harvested as a result of oil and gas activities?

Reviewer(s): 185

RESPONSE: See the revised discussion on page IV-85.

TM11 Timber

Page IV-41 tries to say the cumulative effects on vegetation as a result of 47 wells will be minimal. What is the effect of additional timber harvest following oil and gas activity - 110,000 acres proposed in 15-year timber plan, plus what?

Reviewers: 185

RESPONSE: See the response to Comment #: TM10.

WI01 Wilderness

Do not allow oil and gas activity in Wilderness.

Reviewers: 17, 70, 132, 152, 186, 229, 251

RESPONSE: Oil and gas activities, such as drilling and road and well pad construction are not allowed in designated Wilderness areas. Some activities such as exploration may be allowed with terms and conditions to ensure that activities are conducted in a manner compatible with the preservation of the Wilderness environment (FSM 2323.7). Gathering mineral information may be allowed in designated Wilderness. Activities that may be allowed include surface mapping, excavation and sampling with hand tools, seismic, gravity, magnetic, heat flow, resistivity and other geophysical or geochemical surveys; and stream sediment surveys. Activities must involve only very minor surface disturbance and must be compatible with the preservation of the Wilderness environment.

Letters Received from Federal, State and Local Agencies and Organizations

Copies of letters received from Federal, State and local agencies and organizations follow. Individual comments have been identified in the left margins. These comment numbers correspond to the comments in the previous section.



DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Centers for Disease Control
Atlanta GA 30333

October 13, 1992

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ROOM 2200C
655 PARKET STREET
LAKEWOOD, CO 80215-5517

Oil and Gas Leasing Analysis
ATT: Robert L. Storch
Forest Supervisor
Grand Mesa, Uncompahgre and Gunnison National Forests
2250 Highway 50
Delta, Colorado 81416

Dear Mr. Storch:

We have completed our review of the Draft Environmental Impact Statement (DEIS) for Oil and Gas Leasing, Grand Mesa, Uncompahgre and Gunnison National Forests. We are responding on behalf of the U.S. Public Health Service.

We note that oil and gas operations are currently operating within the study area and adverse impacts have been prevented from occurring to the groundwater quality and levels. It is stated that if the required stipulations, regulations, standard engineering practices and appropriate mitigation measures are followed, additional oil and gas development activities should not result in long term cumulative impacts to groundwater. However, our specific concern involves the potential risks associated with toxic spills at the well pads or in transportation to and from the sites. Our review did not reveal special contingency plans that would be implemented to minimize effects of potential spills. Although it is stated that any major spill must be immediately reported to the Forest Service and BLM, we suggest that the FEIS elaborate on existing contingency plans that would be implemented if a major spill were to occur.

STP19

Thank you for the opportunity to review and comment on this document. Please ensure that we are included on your mailing list to receive a copy of the Final EIS, and future EIS's which may indicate potential public health impact and are developed under the National Environmental Policy Act (NEPA).

Sincerely yours,

Kenneth W. Holt
Kenneth W. Holt, M.S.E.H.
Special Programs Group (F29)
National Center for Environmental
Health and Injury Control

SUBJECT: ECS - Review of Draft Environmental Impact Statement
Impact Statement
SCS Environ. Document 1329
Draft Oil and Gas Leasing
Environmental Impact Statement,
Grand Mesa, Uncompahgre and Gunnison
National Forests

TO: Robert L. Storch, Forest Supervisor
Oil and Gas Leasing Analysis
Forest Supervisor's Office
Grand Mesa, Uncompahgre and Gunnison National Forests
2250 Highway 50
Delta, Colorado 81416
FILE CODE: 190-15-13

The Staff Forester and State Soil Scientist have reviewed this document. We have no additional comment at this time.

DUANE L. JOHNSON
State Conservationist

cc: Lee E. Hill, State Resource Conservationist, Lakewood, CO
James B. Newman, Director, Ecological Sciences Division,
Washington D. C.



United States Department of the Interior

OFFICE OF THE SECRETARY
 OFFICE OF ENVIRONMENTAL AFFAIRS
 DENVER FEDERAL CENTER, BUILDING 56, ROOM 1018
 P.O. BOX 25067 (D-108)
 DENVER, COLORADO 80225-0607

October 8, 1992

ER 92/787

Robert L. Storch, Forest Supervisor
 Grand Mesa, Uncompangre, and
 Gunnison National Forests
 2250 Highway 50
 Delta, Colorado 81416

Dear Mr. Storch:

The Department of the Interior (DOI) has reviewed the Draft Environmental Impact Statement (DEIS) for Oil and Gas Leasing Analysis; Grand Mesa, Uncompangre, and Gunnison National Forests (Forests); Delta, Garfield, Gunnison, Mesa, Montrose, Ouray, and San Miguel Counties, Colorado, and has the following comments.

Fish and Wildlife Resources

The Fish and Wildlife Service (FWS) recommends that Alternative 5 be selected because it prevents new oil and gas leases in "Roadless Areas" and "Semi-Primitive Non-Motorized Areas" and protects wildlife and natural resource values. Also, in order to protect wildlife values, FWS concurs that existing leases should not be renewed in these areas when lease permits expire or are relinquished.

If the Forest Service does not choose Alternative 5, at a minimum, the following "Roadless Areas" should not be available for leasing:

- 181 Raggeds
- 185 Electric Mountain
- 191 Priest Mountain
- 193 Battlement Mesa
- 194 Nick Mountain
- 195 Kannah Creek
- 196 West Elk
- 200 Whetstone Mountain
- 241 Roubideau
- 242 Tabequache
- 243 Kalso Mesa
- 246 Campbell Point
- 247 Johnson Creek

- RA181
- RA185
- RA191
- RA193
- RA194
- RA196
- RA200
- RA241
- RA242
- RA243
- RA246
- RA247

ALT501

RA07

Robert L. Storch

2

STP01 | All appropriate controlled surface use, no surface occupancy, and timing restrictions should be enforced. FWS recommends "no lease" in tundra/alpine habitats, in high to moderate geological hazard sites, and in the Crag Crest area. They also recommend that the Forest Service strictly enforce no surface occupancy in riparian areas as regulated under 36 CFR 228. The controlled surface use, no surface occupancy, and timing restrictions should be applied to areas where threatened, endangered, candidates, and sensitive species may occur. If threatened or endangered species do occur in proposed lease areas, and the Forest Service determines that the projects may adversely affect listed species, then formal Section 7 consultation with the FWS will be required.

National Park Resources

Air Quality

AEG10 | The air quality analysis in the DEIS does not address possible impacts to national park system resources. Three national park system units are located near the three Forests: Colorado National Monument (Class II), Curecanti National Recreation Area (Class II), and Black Canyon of the Gunnison National Monument (Class I). Impacts to the air quality of these three units should be discussed and the Final EIS (FEIS) should include a map locating these units.

MAP01 | There has been, and is now, limited oil and gas development in these National Forests. The Reasonably Foreseeable Development Activity analysis indicates that as many as 67 new wells could be drilled in the next 15 years if exploratory drilling is successful in each of the high potential area basins. No cumulative air quality analysis was included in the DEIS comparing present air quality from existing sources and the potential contribution from the new oil and gas development. The Bureau of Land Management (BLM) has determined that an individual oil well can be a major source of air pollution, emitting more than 250 tons per year of one or more regulated air pollutants such as sulfur dioxide, nitrogen oxides, volatile organic compounds, carbon monoxide, particulate matter, or hydrogen sulfide (See Williston Basin Regional Air Quality Study, November 1990. This document is available at the BLM's Dickinson District Office, 2933 Third Avenue West, Dickinson, North Dakota 58601.) The FEIS should include a cumulative air quality analysis.

AEG11 |

AEG12 | There were no specific air quality mitigating measures included in the DEIS, only references to "Standard Lease Terms" under the "Stipulations" section (yet no standard lease terms were included). There are air quality mitigating measures that, when applied, can help to reduce or minimize air pollutant emissions from various oil and gas development sources and their impacts on the air pollution sensitive resources (air quality-related

Robert L. Storch

3

values) of any nearby class I areas. Any questions regarding air quality should be addressed to Erik Haug, National Park Service Air Quality Division, at (303) 969-2078.

Curecanti National Recreation Area

The DEIS states (Abstract and page I-3) that "low" and "no potential" areas are not being considered for future leasing. This includes most of the Forest near Curecanti National Recreation Area. It also states that current or potential wilderness areas are not included (page IV-8). However, the map addendum shows these areas (in white) as proposed for standard leasing terms. The map in the FEIS should differentiate these areas from both the areas of high and moderate potential being proposed for standard leasing terms (in white) and the high and moderate potential areas proposed as off limits to leasing (in red).

MAP02

The areas of greatest concern are the sections of land in T. 49 N., R. 6 W. near Cimarron Point that are managed by the Gunnison National Forest. Fourteen of the sections are categorized in the DEIS as having moderate hydrocarbon potential. This rating appears to be unfounded. Surface geological maps of this area indicate a thin sedimentary carapace of the Cretaceous Mancos Formation, Dakota Group, and Jurassic Morrison Formation overlying exposed crystalline basement. Regional dip is away from the steep faces exposed at Black Canyon, making it improbable any seal or trap remains intact or not flushed. Reservoir quality of the Dakota Group is compromised by the presence of the proximal facies of the Burro Canyon Formation. This entire assemblage in turn is capped or intruded in places by Tertiary lavas and ash flow tuffs, making source over-maturation likely. In light of these highly nonprospective qualities, the National Park Service (NPS) believes a "no potential" classification would be more appropriate for this area.

AEGE01

Should the Forest Service decide not to change its ranking of these sections, the NPS believes that it would be best if all sections are placed under controlled surface use, and where preferred by the Forest Service, no surface occupancy, as opposed to the present proposal of only portions of each of these sections receiving such protection. This is because a major stream (Crystal Creek) flows through the area and another stream (Mesa Creek) flows within one-half mile of the area. All surface flow enters these two waterways and they, in turn, enter the reservoir which is the water supply for the Curecanti National Recreation Area (Area), its visitors, and its residents. Should a chemical release or oil spill occur, it is likely that it would eventually enter the reservoir and degrade the water quality.

AEMW03

Another reason for the added stipulations is that the DEIS does not map the animal migration routes and staging areas

AENW08

Robert L. Storch

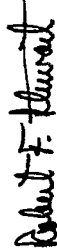
4

(principally elk and deer), nor does it fully analyze them. Additional protection would help to ensure that wildlife using both the Area and Forest Service lands are protected.

Mineral Resources

Mineral resources, other than oil and gas and coalbed methane, are not discussed in the DEIS. However, the proposal for oil and gas leasing apparently would not directly impact other mineral resources. In fact, reopening the Forests to oil and gas leasing may make some areas of the Forests more accessible for mineral exploration. However, the decision to make some areas restricted or closed for leasing could lead to similar restrictions for those same areas on exploration and development activities for other mineral resources. Therefore, the possible long-term impacts on other mineral resources in the areas proposed to be restricted or closed to leasing should be addressed in the FEIS.

Sincerely,



Robert F. Stewart
Regional Environmental Officer

cc: FWS/Denver
FWS/Golden
NPS/Denver
BOM/IFOC



UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE



FISH AND WILDLIFE ENHANCEMENT
Western Colorado Sub-Office
529 25th Street, Suite B-113
Grand Junction, CO 81505-6199

PHONE: (907) 245-2778

FAX: (907) 245-5933

IN REPLY REFER TO:

FWE/CO:FS:GMUG MF
MS 65412 GJ

FS: 2670

August 19, 1992

Robert Storch, Forest Supervisor
Grand Mesa, Uncompahgre, Gunnison National Forests
2250 Highway 50
Delta, Colorado 81416

Subject: Comments on Preliminary Draft Environmental Impact Statement for
Oil and Gas Leasing on the Grand Mesa, Uncompahgre and Gunnison
National Forests

Mr. Storch:

The Fish and Wildlife Service (Service) has reviewed the subject preliminary
draft EIS and provides the following comments. Unless the content of the
draft EIS is significantly altered, these comments should be regarded as
applicable to the draft EIS.

ALT501 | The Service prefers alternative 5. This alternative prevents new oil and gas
leases in Roadless Areas and Semi-Primitive Non-Motorized Areas. Existing
leases would not be renewed in these areas if lease permits expired or were
relinquished. The Service prefers this alternative because we believe that
areas with Roadless Area designation should remain roadless for their
wildlife, natural resource, and scenic values.

RA01 | If the Forest Service does not choose alternative 5, at a minimum, the
following Roadless Areas should not be available for leasing:

- RA181
- RA185
- RA191
- RA193
- RA194
- RA195
- RA196
- RA200
- RA241
- RA242
- RA243
- RA246
- RA247
- 181 Raggeds
- 185 Electric Mountain
- 191 Priest Mountain (areas a,b,c,d,f,h,i)
- 193 Battlement Mesa
- 194 Wick Mountain
- 195 Kannah Creek
- 196 West Elk
- 200 Whetstone Mountain
- 241 Roubideau
- 242 Tabeguache
- 243 Keiso Mesa
- 245 Campbell Point
- 247 Johnson Creek

STP01 | All appropriate controlled surface use (CSU), no surface occupancy (NSO), and
timing restrictions (TR) should be enforced. The Service recommends "no

AEAT01 | lease* in tundra/alpine habitats, in high to moderate geological hazard sites,
AEGH01 | and in the Crag Crest area. We also recommend that the Forest Service
AERC03 | strictly enforce NSO in riparian areas as regulated under 35 CFR 228. The
AER01 | CSU, NSO, and TR should be applied to areas where threatened, endangered,
AETE01 | candidate and sensitive species may occur. If threatened or endangered,
AETE02 | species do occur in proposed lease areas these areas should be prevented from
having oil and gas activities. Potential impacts to threatened, endangered,
and candidate species will be more closely analyzed upon receipt of the
biological assessment for the subject oil and gas leasing.

If the Service can be of further assistance, please contact Terry Ireland at
the letterhead address.

Sincerely,

Keith L. Rose
Keith L. Rose
Assistant Colorado State Supervisor

pc: FMS/FWE Golden
FMS/FWE Salt Lake City
COOW, Grand Junction



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VIII

999 18th STREET - SUITE 500
DENVER, COLORADO 80202-2466

OCT 30 1982

Ref: 8WM-EA

Robert L. Storch, Forest Supervisor
USDA Forest Service
Grand Mesa, Uncompahgre, and Gunnison National Forests
2250 Highway 50
Delta, Colorado 81416

Re: Grand Mesa, Uncompahgre, and Gunnison
National Forests - Draft Environmental
Impact Statement for Oil and Gas Leasing

Dear Mr. Storch:

In accordance with our responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act, the Region VIII office of the Environmental Protection Agency (EPA) has reviewed the Draft Environmental Impact Statement (DEIS) for Oil and Gas Leasing in the Grand Mesa, Uncompahgre, and Gunnison National Forests (GMUG), Colorado, issued by the U.S. Forest Service (USFS) and the Bureau of Land Management (BLM). We offer the following comments for your consideration in preparing the Final EIS.

Information Adequacy Concerns

As a result of recent informative discussions with the Forest Service concerning a number of oil and gas leasing documents, the EPA has gained a better perspective of the general approach being used by the FS in conducting these analyses.

The EPA recognizes that lease analysis documents attempt to provide base information for conducting impact analyses concerning potential development sites dispersed over large geographical areas. Often, this must be performed without specific knowledge of where planned development activities may occur. Further, existing data bases are often inadequate to sufficiently characterize aquatic, terrestrial, and airshed resources, nor the degree to which they are at risk.

Given those conditions, we believe, as the GMUG EIS states, that a leasing document is best suited for a more broad-scale, programmatic level of analysis. This analysis should, at minimum, present an inventory of affected resources (for example, identification of watersheds/significant tributaries) and impact analyses in which the existing resource tolerances/impairments are identified. This should be beneficial in narrowing the focus of subsequent project-level analyses when more definitive

information regarding planned locations is available. However, in past practice, due to Agency resource limitations and time constraints once the Application for Permit to Drill (APD) has been submitted, we recognize it has frequently been difficult to collect and analyze sufficient baseline data, prior to ground disturbance, to ensure the effectiveness of proposed mitigation planning.

As a possible means of addressing environmental database needs, the EPA suggests consideration of the following in preparing the Final EIS:

- o Based on discussions with the Manti-La Sal National Forest and USFS Region 4, draft language of a lease notice for water quality monitoring has been prepared for inclusion in the forest's oil and gas leasing Final EIS and is shown as an example below. The EPA believes the use of a "lease notice" or an equivalent approach serves to provide timely notice of project-level monitoring requirements that should be incorporated into development planning. It also should provide a more realistic timeframe for acquiring pre-ground disturbance baseline data in areas where such information is lacking. In addition to the example shown below, the Shoshone National Forest and USFS Region 2 are currently developing a version of monitoring notices/stipulations for the Shoshone's lease analysis.

STP21

LEASE NOTICE

This lease was issued based on limited available information regarding water resources that may be affected by oil and gas operations. No activities can be approved that would violate the "Clean Water Amendments Act of 1972" as amended and associated Federal and State regulations. In order to assure compliance with the applicable laws and regulations regarding protection and non-degradation of water quality, the lessee may be required to collect flow and quality baseline information for any surface and subsurface waters that could be adversely affected, prior to approval of proposed operations. The lessee will be required to establish a monitoring program capable of identifying and measuring any effects to water flow and quality that may occur as a result of operations.

Requirements for baseline data collection and water monitoring will be determined on a site-specific basis.

The EPA appreciates the opportunity to review and comment on the Draft EIS. If you may have questions related to our comments, please contact Larry Kimmel at (303) 293-1697. Enclosed are additional detailed comments concerning issues in the document.

Sincerely,

Robert R. DeSpain, Chief
Environmental Assessment Branch
Water Management Division

Enclosure

cc: Pam Case, USFS Region 2
Corky Ohlander, USFS Region 2
Mike Hammer, USFS Region 2
Greg Bevinger, USFS Shoshone National Forest
Carter Reed, USFS Manti-La Sal National Forest

o Because of the broad scope of the analysis area and resources involved, the leasing document has the potential for being very useful in identifying:

1. Locations of terrestrial, water, or biological resources which have a potentially greater importance or sensitivity to impacts, and
2. Locations of resources where existing knowledge of the resource or its sensitivity is currently lacking.

NP18

The final EIS should provide an inventory-type of resources summary from which subsequent site-specific analyses can be readily tiered. Existing data in areas where development is most likely to occur, particularly for existing leases, should be more fully analyzed to characterize the quality of resources at risk and presented in a summarized format in the FEIS.

This information should be helpful in determining baseline and monitoring requirements for individual leases as well as for assessing cumulative impacts. We highly recommend referencing the Shoshone National Forest's Oil and Gas Leasing EIS for the Forest's approach in cumulative effects analysis.

o The existing database and past drilling history should be useful for establishing specific resources monitoring programs. Although site-specific monitoring programs are required at the APD stage, the final EIS should disclose the types of monitoring information that will be required by the USFS and the BLM for resources protection at the project level.

STP22

Document Rating

Based on the procedures EPA uses to evaluate the environmental impacts and the adequacy of information provided in EISs of the proposed action and alternatives, the EPA Region VIII rates the Draft Environmental Impact Statement (DEIS) for Oil and Gas Leasing on the Grand Mesa, Uncompahgre, and Gunnison National Forest as category EC-2 (Environmental Concerns, Insufficient Information). This rating indicates that EPA has identified potential environmental impacts which should be avoided in order to fully protect the environment. Additionally, the DEIS does not provide sufficient information to fully assess environmental impacts that should be avoided and lacks information concerning monitoring requirements for protection of aquatic, terrestrial, and air resources.

STPN05
 DETAILED SCOPING COMMENTS BY EPA REGION VIII;
 DRAFT EIS FOR OIL AND GAS LEASING IN GRAND MESA, UNCOMPAGRE, AND
 GUMNISON NATIONAL FORESTS

General Comments:

1. Chapter I - Purpose and Need does not clearly state the underlying "purpose and need" for the proposal as defined by NEPA (40 CFR 1502.13). The purpose and need should specify the need to which the Forest Service is responding and what the alternatives including the proposed action are designed to address. The Decisions to be Made (p. I-6) and "real DECISIONS TO BE MADE" also do not seem to reflect the purpose as defined on p. I-1. The Final EIS should provide a concise statement of purpose and need.

2. With respect to resources protection, Alternative 5 appears to be the most protective of the development alternatives. This alternative differs from the preferred alternative, Alternative 2, in its treatment of Roadless Areas and Semi-Primitive Non-Motorized (SPNM). Alternative 2 applies a Standard Lease Term (SLT) to such areas, while Alternative 5 makes those areas administratively unavailable (No Lease). It would appear that applying a Controlled Surface Use (CSU) stipulation to Roadless Areas would provide a more protective alternative than the SLT provision used in Alternative 2 that would still allow reasonable access to those areas. On Figure II-2, which shows lease restrictions for Alternative 2, it appears that a major portion of the Roadless Areas already overlap with areas designated for either NSO or CSU restrictions.

3. On page I-14, the document states "The No Surface Occupancy (NSO) stipulation is intended for use only when other stipulations are determined insufficient to adequately protect the public interest. No Surface Occupancy means just that. No roads, buildings, well pads, and pipelines would be allowed. No disturbance or use of the surface would be allowed in those Affected Environments where the No Surface Occupancy stipulation is selected."

If that definition of NSO were strictly applied, no impacts could occur such as those described on p. S-16 for aquatic/riparian/wetland habitats, where NSO is stipulated. The definition of NSO, as stated in this section, appears misleading given that, within compliance of NEPA, the Forest Service may modify, waive, or grant an exception to a stipulation including the NSO (pages I-15 and I-16). The fisheries and wetlands NSO discussions on page IV-15 clarify permitted exceptions to NSO, such as stream crossings, that may result in potential impacts. For consistency, we

recommend that a brief acknowledgement of exceptions be noted, whenever that may be relevant to the discussion of NSO.

4. The document notes that 220,000 acres are currently under lease and 40 wells are projected for those existing leases. Given our understanding that those wells are projected to be drilled within the 951,450 study area for each option including Alternative 3 (No Lease), the Environmental Consequences Summary (pages II-50 through II-53) indicating "No effect from O&G activity" is a confusing statement. This would seem to indicate that the oil and gas lease analysis is being conducted only for the 7 wells projected for new leases, rather than being based on the total impacts of the range of 40-47 wells. In addition, Table S-3 (p. S-13) shows '0 acres' in the Standard Lease Term category for Alternative 3, which should contain the acreage of existing leases. The Final EIS should clarify these issues.

CE01

5. The impact analysis should use historical information regarding past oil and gas activities to project actual impacts, such as sedimentation, spills and accidents. Such information serves to determine the effectiveness of previously used mitigation procedures and lease stipulations in protecting the resources.

AEG24

6. It is not clear whether impacts from reasonably foreseeable connected actions, such as timber harvests referenced on page IV-46, have been considered in this analysis. Although the DEIS notes that those activities will require subsequent site-specific analyses, NEPA also requires that the current analysis consider the effects from all reasonably foreseeable actions.

TM05

7. Page H-22 - The discussion regarding the Abandonment and Rehabilitation plan seems to imply that the plan is agreed upon at the end of the development process rather than in the Surface Use Plan of Operations, prior to ground disturbance. This should be clarified in the FEIS.

OGM04

8. Page H-17 - The document states "No disposal of wastewater will be allowed by subsurface injection" What materials/fluids are considered as applicable to this restriction? How will disposal be accomplished alternatively? The water quantity discussion should also discuss the disposal of produced water.

OGM05

9. Page H-21 - The FEIS should note that pipeline trenches need to be constructed in a manner so as to not change the natural surface and groundwater flow regime.

OGM06

Resources Monitoring:

The EIS contains only limited information in Appendix H regarding mitigation and monitoring requirements. Lease conditions should be as specific as possible for each resource in outlining the monitoring requirements under which the lease is to be granted. The EPA recommends that those requirements include:

1. Baseline information that is sufficient in temporal and geographic extent to quantitatively predict impacts;
2. Monitoring information that is quantitatively sufficient to determine whether the specific predictions of impact were reliable and the extent of deviation from these predictions.
3. Monitoring parameters, collection and analytic procedures, frequencies and quality assurance/quality control (QA/QC) that are compatible with the cumulative impact locations set up by the USFS. The Forest should address criteria to be used for determining compliance/remediation.

Surface Water Quality:

1. Aquatic resources information should be characterized and displayed in summary form on no larger than a third order river basin approach. The analysis would be enhanced by accompanying maps presented on a scale that allows assessment of the resources and their sensitivities by no larger than a third order river basin.

AEF05

2. The above summary should include:

- name of waterbody and name of 3rd order basin stream
- length or size of waterbody
- stream order
- state assigned beneficial use of waterbody
- note whether the waterbody is currently meeting standards and its beneficial use
- presence of any threatened and endangered species or species of special concern
- any existing stresses on stream
- indicate whether the stream has particular importance as a spawning or nursery area

Where information is not available this should be so indicated.

3. Page IV-14 - The water quality section notes that exceptions to No Surface Occupancy may apply in which there would be potential impacts to water quality. This conflicts with the definition of NSO on p. I-14 which appears to allow no

exceptions.

This section also states that "Sediment would be the most significant potential water quality effect." Although sediment can be a significant water quality and aquatic habitat concern, we would also emphasize that other water quality parameters such as metals, Ph, and temperature are indicators for determining the degree of impairment or stress that a waterbody is currently experiencing as well as its sensitivity to further impacts.

In addition, while sediment may be controlled through use of Best Management Practices (BMPs), less predictable events such as a pipeline or vehicular spill of hazardous and/or toxic material could result in significantly more adverse habitat and water quality impacts. The Forest Service provides a good discussion of those potential effects on page IV-62. The risk of catastrophic events may be best minimized through prior planning including development of effective stipulations, mitigation, and monitoring/contingency programs.

4. The FEIS should emphasize concern over the predictive assessment and the monitoring of cumulative impacts on waterbody water quality, aquatic life, and dependent riparian and wildlife resources. This should emphasize stream basins that may be affected by several factors, including forestry, grazing, and oil and gas development, and the development of databases to calculate loading of potential contaminants as a basis for determining acceptable levels from each contributing activity.

5. Pages S-8 and S-9 - The Connected Actions discussion indicates that construction of new roads for oil and gas development provides the opportunity to harvest more timber than would otherwise occur. Normally the timber management EIS ROD has a defined harvest objective. To increase that objective, or move the planned timber harvest from one area to another, would seem to require reanalysis of the timber management EIS ROD. Of particular concern, the new roads may open areas of high potential for water quality impacts from timber harvest.

Air Quality:

The Draft EIS does not adequately address the following potential air quality impacts from oil and gas leasing in the study area and should be discussed in the FEIS.

AEF30

1. Emissions of sulfur dioxide (SO2) from waste gas flaring and tail gas incineration from oil production and natural gas

processing operations are not addressed. These emissions could be of a considerable magnitude, depending on the level of production. Emissions of SO2 could have adverse effects on down-wind Class I Prevention of Significant Deterioration (PSD) Areas. Such impacts may include direct impacts on flora, increases in acid deposition and impacts on visibility. The emissions may cause the Class I or II PSD increments to be exceeded. The West Elk Wilderness is listed in the DEIS as an adjacent Class I area. This and any other Class I areas within 50 kilometers are of particular concern. In addition, secondary impacts due to increased economic activity and population growth due to the leasing and the impact of this growth on the Class I and II PSD increments is not included.

2. The impact of fugitive hydrogen sulfide (H2S) emissions are not discussed in the Draft EIS. Such emissions create strong rotten egg odors in low concentrations, and are lethal in high concentrations.

Wetlands and Riparian Areas:

- 1. Page S-19 - The "Effects of Alternatives on Wetlands and Floodplains" does not summarize the effects of the alternatives. It is not clear what this section means.
- 2. Page I-8 - The first paragraph indicates decisions are being made to a map resolution of about 40 acres. Does this imply that the wetland/riparian areas of the analysis area are mapped to a resolution of 40 acres?
- 3. Page III-50 - The riparian discussion is confused by what appears to have been a conversion of a typical wetland definition to a riparian, but not wetland, description. In particular, the soils discussion in the riparian description appears to be discussion of a jurisdictional wetland soil.
- 4. Page III-52 - The Forest Service provides an excellent discussion of wetland resources. It should also be noted that the EPA was one of the authors of the 1989 Federal wetlands manual.
- 5. Page IV-13 - The "Floodplains" discussion regarding potential impacts is limited to water quality, but should also note potential impacts to habitat. The CSU discussion does not mention that pipelines would be allowed in floodplains. If pipelines are allowed in floodplains, there is a greater potential for impacts due to discharge of pollutants to the floodplains and waters of the United States.

The "Aquatic/Riparian/Wetland Habitats" discussion implies that the actual impacts to the resource are dependent on the activities approved in the Surface Use Plan of Operations. As noted previously, this should be clarified in context of the NSO stipulation applied to this resource.

6. Page IV-64 - The cumulative effects discussion of wetlands indicates some riparian resources in the analysis area are currently in poor condition and may be further impacted as a result of the proposed action and its indirect impacts. The FEIS should note the cause and degree of such existing impacts and planned restoration, if applicable. It would also be beneficial to highlight known impacted resources, requiring special protection, on maps that would be available at the leasing stage.

7. Page IV-80 - Based on the discussion throughout the DEIS, the inference that only Alternative 1 would adversely affect wetlands is misleading, since none of the construction alternatives totally prohibit well development in riparian areas.

8. Page C-8 - The NSO stipulation should include reference to the necessary construction techniques and BMP's for stream crossings. The NSO should reference whether roads/pad etc. will be allowed in isolated wetlands. Roads should not be allowed which would intercept and move the water supply for wetlands. The stipulation should clearly state that only roads and pipeline crossings will be allowed in wetlands. The stipulation should clearly state that drill pads, staging/storage areas, etc. will not be allowed in riparian/wetland areas.

9. Page H-19 - The requirement that pads will not be constructed in riparian areas or floodplains should be expanded to include related development features such as sump pits, tank batteries, etc. It may be beneficial to summarize resource protection requirements such as this within the body of the EIS as well as in the Appendix.

For consistency, in the second sentence of the discussion on "Pits", "should not" should be changed to "pits shall not be constructed in either riparian or aquatic ecosystems."

Ground Water Quality:

- 1. The DEIS provides a useful tabular hydrogeologic summary. The ground water discussion could be improved in the FEIS with the addition of cross-sections and maps to identify potentially impacted aquifers.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
1215 Jefferson Davis Highway
Suite 1204
Washington, D.C. 20540



2. The document notes that current use of groundwater is relatively low. Describe the reasonably foreseeable future uses of ground waters for the analysis area.

3. What state/local regulations governing use and protection of ground water currently apply and how are these regulations to be included in the decision-making process for this area? How will proposed activities be coordinated with the Colorado Department of Health and the Colorado Oil and Gas Conservation Commission?

OGM01

4. What ground waters present in the area serve as discharge / recharge zones and what measures will be used to protect them?

AEMW04

MEMORANDUM FOR: David Cottingham
Ecology and Environmental Conservation Office
Office of the Chief Scientist
FROM: Rear Admiral J. Austin Yedger, NOAA
Director, Coast and Geodetic Survey
SUBJECT: DEIS 9208.02 - Leases for Mineral Extraction:
Grand Mesa, Uncompahgre, and Gunnison National
Forests, Colorado

The subject statement has been reviewed within the areas of Coast and Geodetic Survey's (C&GS) responsibility and expertise and in terms of the impact of the proposed actions on C&GS activities and projects.

All available information about geodetic control points in the vicinity of the project is provided on the computer diskette(s) accompanying this memorandum. Geodetic control information for Delta, Garfield, Gunnison, Mesa, Montrose, Ouray, and San Miguel counties is provided on the diskette(s).

This information should be reviewed for identifying the location and designation of any geodetic control monuments that may be affected by the proposed project. If there are any planned activities which will disturb or destroy these monuments, C&GS requires not less than 90 days' notification in advance of such activities in order to plan for their relocation.

GS01

C&GS recommends that funding for this project include the cost of any relocation required for C&GS monuments. For further information about these monuments, please contact the National Geodetic Information Branch, N/CGI74, Rockwall Building, Room 24, National Geodetic Survey Division, NOAA, Rockville, Maryland 20852, telephone 301-443-8631.

GS02

Attachment

cc: N/CGI132 - R. Cohen
N/CGI17 - J. Spencer



SEP 5 1992

STATE OF COLORADO



DEPARTMENT OF TRANSPORTATION

4201 East Arkansas Avenue
Denver, Colorado 80222
(303) 757-8011

October 7, 1992

Ms. Margaret Dubas
State Clearinghouse
1313 Sherman Street, Room 521
Denver, Colorado 80203

Dear Ms. Dubas:

The Colorado Department of Transportation has completed its review of the Draft Environmental Impact Statement for the Oil and Gas Leasing Analysis in the Grand Mesa, Uncompahgre and Gunnison National Forests and has the following comments.

The Draft EIS lists the State highways which go through the analysis area and those which provide access to the area. However, we can see no discussion of potential impacts to these highways. We realize it is difficult to assess all the impacts when the exact locations of leasing and development are not known but some consideration should be given to the possible impacts to the highway system when selecting areas where oil and gas leasing will be allowed.

We are particularly concerned about the increase in access points to the State highways and the increase in traffic on the highways which could be caused by oil and gas leasing. This document should indicate if the State highway system will be impacted beyond its historical use and if so, to what extent. Also, in all documents such as this the Department of Transportation should be listed as a reviewing and permitting agency for highway access. All new access points will require permits from the Department. All applicants for oil and gas leases should be made aware of this.

RD17

RD18

NPO2 Thank you for the opportunity to provide comments on this document.

Very truly yours,

R. Kenneth M. Gambrell
R. Kenneth M. Gambrell
Manager
Office of Environmental Services

REG/hs

cc: Robert L. Storch, USFS
Steve Chapman/Carl Watson, Region 5
Larry Abbott, Region 3

STATE OF COLORADO

Department of Local Affairs



Ray Bower
Commissioner
Larry Edlberger
Executive
Director

DIVISION OF LOCAL GOVERNMENT

Harold A. Knott, Director

October 9, 1992

Mr. Robert L. Storch
Forest Supervisor
U. S. Forest Service
Grand Mesa, Uncompahgre and
Gunnison National Forests
2250 Highway 50
Delta, CO 81416

SUBJECT: Oil and Gas Leasing - Grand Mesa, Uncompahgre
and Gunnison National Forests
Draft Environmental Impact Statement

Dear Mr. Storch:

The enclosed comments on the above-referenced Draft Environmental Impact Statement have just been received from the Colorado Department of Transportation.

Please consider this transmittal as an official addition to the letter we sent you on October 8, 1992.

Thank you for your attention.

Sincerely,

Margaret Dubas
Margaret Dubas, Staff Assistant
Colorado State Clearinghouse

/md

enclosure

1313 Sherman Street, Room 521, Denver, Colorado 80203 (303) 866-2156 FAX (303) 866-2251



STATE OF COLORADO
 Roy Romer, Governor
 DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WILDLIFE
 AN EQUAL OPPORTUNITY AGENCY
 Perry D. Olson, Director
 6000 Broadway
 Denver, Colorado 80216
 Telephone: (303) 297-1192

October 9, 1992

Mr. Robert L. Storch
 Forest Supervisor
 Grand Mesa, Uncompahgre and Gunnison National Forests
 2250 Highway 50
 Delta, CO 81416

RE: Draft Oil and Gas Leasing Environmental Impact Statement

Dear Mr. Storch:

The Division of Wildlife has reviewed the GMUG DRAFT Oil and Gas Leasing EIS. We offer the following comments on the document: First of all, we would like to compliment the Forest Service and the staff for the excellent job in preparing this document. The document is well organized and easy to read. Wildlife concerns were covered with great detail and accuracy. Tom Holland and Jeff Cameron's input to the evaluation is obvious and well done. We appreciate the significance of having concerned biologists on the interdisciplinary team.

Our agency has raised serious questions on the impacts of oil and gas exploitation in this area for over ten years. In particular we are concerned about the impacts of road development and human encroachment associated with the long term use of the new roads. The cumulative impacts of oil and gas exploration and development, logging, woodcutting, recreation and other general uses will have significant impacts on wildlife. This is particularly true in the areas which are currently roadless. Priority should be given to leases along existing roads and in areas where impacts will be reduced. Roadless areas should be avoided, particularly in light of the minimal drilling that is outlined for much of the area in the EIS. If this is true, the recreational, aesthetic and wildlife values which will be lost as a result of major road construction for a few wells is not good land stewardship. Roads should be managed for the operation and maintenance of the well heads and lines only.

OG29
 RA04
 RD08

DEPARTMENT OF NATURAL RESOURCES: Kenneth Salazar, Executive Director
 WILDLIFE COMMISSION: William R. Hegberg, Member - Eldon W. Cooper, Chairman - Felix Chavez, Member - Rebecca L. Frash, Member
 Louis F. Swift, Member - George VanDusenBerg, Member - Larry M. Wright, Member - Thomas M. Ewe, Member

STATE OF COLORADO

DIVISION OF PARKS AND OUTDOOR RECREATION
 Colorado Natural Areas Program

1113 Sherman Street, Rm. 618
 Denver, Colorado 80203
 Phone (303) 866-3437
 FAX (303) 866-3206



Roy Romer
 Governor
 Jane A. Mathews
 Director
 James D. Von Loth
 Program Administrator
 Ken Salzer
 Director / DNK

October 19, 1992

Robert L. Storch, Forest Supervisor
 Grand Mesa, Uncompahgre and Gunnison National Forests
 2250 Highway 50
 Delta, Colorado 81416

RE: Draft Environmental Impact Statement Oil and Gas Leasing Analysis

Dear Mr. Storch:

The Colorado Natural Areas Program (CNAP) appreciates the opportunity to review the Draft Environmental Impact Statement Oil and Gas Leasing Analysis (DEIS) for the Grand Mesa, Uncompahgre and Gunnison National Forests (GMUG). CNAP is particularly interested in any identified, registered or designated state natural areas which might be affected by oil and gas-related activities.

Tabeguache proposed Research Natural Area is the only site within the analysis area that is either identified, registered, or designated with the CNAP. This 655 acre area is a registered natural area with the CNAP. State designation will depend on final establishment as an RNA by the Forest Service.

A | The Preferred Alternative of the DEIS proposes no lease status for the Tabeguache area. The E | Colorado Natural Areas Program wholeheartedly supports this alternative; the no lease status R | fits perfectly with the intended uses of an RNA. CNAP commends the Forest Service on N | recognizing the importance of the Tabeguache Research Natural Area and Roadless Area by A | assigning them a no lease status.

We look forward to reviewing the Final EIS and to working with the GMUG on the establishment and designation of the Tabeguache Research Natural Area. Please contact me at 866-3202 x331 or Janet Coles at x330 if we can offer any assistance.

Sincerely,

James D. Von Loth

James D. Von Loth
 Administrator/Biologist

Colorado Natural Areas Council
 Robert B. Kelly, Member - Helen Traylor, Member
 Jane Traylor, Colorado Board of Parks and Outdoor Recreation
 Tina Irwin, Member - Linda Smith, Colorado Wildlife Commission
 Alden Harjeski, Member - John Wilcox, Colorado Board of Land Commissioners

Printed on recycled paper.

Town of Crested Butte

P.O. Box 39

Crested Butte, Colorado 81224

-A National Historic District-

Phone: (303) 349-5338
 FAX: (303) 349-6626

October 7, 1992

Oil and Gas Leasing Analysis
 Forest Supervisor's Office
 Grand Mesa, Uncompangre and Gunnison National Forests
 2250 Highway 50
 Delta, CO 81418

Dear Mr. Storch:

The Town of Crested Butte has reviewed the 1992 Draft Oil and Gas Leasing Environmental Impact Statement. We would like to make comment on the Draft EIS based on the reasons people live in and visit Crested Butte.

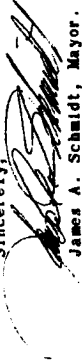
The primary economy of the Town of Crested Butte is tourism in the winter and summer. Activities on the National Forest affect our residents who chose to live in close proximity to the forest, and the guests of the town who also visit the forest. Therefore, we are very concerned about forest activities.

During our review of the draft Environmental Impact Statement about Oil and Gas Leasing, it became apparent that the preferred alternative, number 2, will have many long range and negative impacts to the forest in addition to the average 10 acre disturbance to sites for oil and gas drilling. The most important impact to the town is opening up 18 of 21 roadless areas by allowing roads to be built for oil and gas drilling. We foresee many additional spurs from these roads for other activities including timbering which will affect the pristine environment found in the roadless areas.

We understand that the lease options are designed to minimize the impacts of oil and gas drilling but we also understand that lease options can be waived by the Forest Service, which will minimize their affect.

Therefore, the Town Council of Crested Butte unanimously encourages the Forest Service to choose Alternative 3 "No additional Oil and Gas Leasing" on the Grand Mesa, Uncompangre and Gunnison National Forests.

Sincerely,



James A. Schmidt, Mayor.

ALT301

10-9-92
 GMUG Oil & Gas EIS
 Page Two

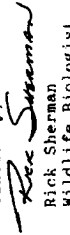
Other primary concerns we have include protection of riparian and wetland areas, avoidance of critical areas during important biologic periods such as birthing, nesting, nursing and wintering. Construction avoidance dates outlined in the document are good. We recommend that lessees be made aware of all wildlife concerns at the time of leasing and should be required to formally commit to wildlife mitigation as part of the lease. Mitigation work should occur concurrently with construction work. Off-site mitigation is acceptable if work can be done in areas which will help relieve big game damage in agricultural areas as a result of activities associated with oil and gas development on the forest. This work should be coordinated with the Habitat Partnership Committee. We will be happy to discuss mitigation work with your staff and the proponents.

Development should be geographically staggered when possible so that acceptable buffer areas exist between construction sites. Directional drilling should occur to minimize disturbance. Vegetation on disturbed sites should include species which are beneficial for wildlife in both food and shelter values. Vertical as well as horizontal habitat should be considered during reclamation planning.

We would appreciate being involved anytime new units are opened up for development. Working together with the proponents will assist our agencies in developing plans which will meet our respective goals.

Thank you for the opportunity to provide input on the EIS and to review the Draft. Please feel free to contact us if you have any questions on these comments or if we can be of further assistance.

Sincerely,



Rick Sherman
 Wildlife Biologist

cc: Clark
 McLain
 Morris
 Young



Mesa County Department of Public Works
Division of Planning

FOREST SERVICE
DELTA
RECEIVED

(303) 244-1636

750 Main Street P.O. Box 20,000 • Grand Junction, Colorado 81502-5022

13 October 1992

Oil and Gas Leasing Analysis
Forest Supervisor's Office GMUG National Forests
2250 Highway 50
Delta, CO 81416

RE: Draft EIS - Oil and Gas Leasing

Dear Mr. Storch:

Thank you for the opportunity to comment on the Draft Oil and Gas Leasing EIS by the U. S. Forest Service. The document is well written and includes a thorough analysis. Mesa County has an excellent working relationship with the Bureau of Land Management through an intergovernmental memorandum of understanding which includes permitting oil and gas drilling activities. Now the Forest Service is taking responsibility for leasing oil and gas resources on the GMUG, we look forward to coordinating oil and gas permitting with your office.

Mesa County recognizes the value of oil and gas resources to the local, state, and national economies. We are committed to working with all involved parties to ensure our natural resources are utilized in a manner which has the least negative impact on the residents and environment of Mesa County. The preferred alternative, Alternative #2, appears to address most of our concerns. We commend the attempt to maintain Kannah Creek, Priest Mountain, and four other roadless areas as natural communities. However, some additional roadless areas in Mesa County may deserve the status of "no surface occupancy", e.g. Clear Creek, Area 186, "the most roadless Roadless Area" where "Continued oil and gas development... could alter the character of the area so much that it would lose its remoteness, solitude and overall roadless character." (Page III-65 DEIS). Also, please note the map on page III-113 of the DEIS "Roadless Areas (North Half)", Figure III-8a includes errors in labels and the legend, e.g. Area 189 (Hightower) is not in the legend, and is Battlement Mesa Area 183 or 193 ?

Another concern is how this DEIS will be affected by the current travel management planning effort for the GMUG. The Final EIS should not recommend an alternative which would result in conflicts between forest trail users and oil and gas resources.

Thank you for your time and consideration of these comments.

Sincerely,

Keith B. Fife
Keith B. Fife, AICP
Assistant Director of Planning

303 • 641-0248
GUNNISON, COLORADO 81260

Gunnison County, Colorado

Board of
COUNTY COMMISSIONERS

November 24, 1992

Robert L. Storch, Supervisor
Grand Mesa, Uncompahgre and Gunnison
National Forests
2250 Highway 50
Delta, Colorado 81416

RE: Draft EIS, Oil and Gas Leasing in the Gunnison National Forest and Gunnison County

Dear Mr. Storch:

The Gunnison County Board of Commissioners is opposed to any activity which would present a long term or short term threat to the Kehler Pass scenic corridor or to designated wilderness areas. The Board is likewise opposed to any activity which could threaten the municipal watershed of the Town of Crested Butte. Inasmuch as it is unlikely that any oil and gas exploration could be carried out without endangering these values, the "no lease" alternative is preferable for those areas.

We recognize that certain roadless areas, specifically the northern end of units 181 and 182, 184 and 186 have a high potential for oil and gas production. We do not propose an outright ban of oil and gas exploration in these units. The Board does oppose the use of oil and gas roads for general motorized penetration into roadless areas. Wherever possible, exploration roads should be closed, obliterated and reclaimed. Roads which must remain open should be limited and carefully controlled. The values of roadless areas cannot be ignored or underestimated.

Sincerely,

GUNNISON COUNTY BOARD OF COMMISSIONERS

Fred R. Fiehl
Fred R. Fiehl
Chairman
Mario V. Petri
Mario V. Petri
Vice Chairman
R.A. Santarelli
R.A. Santarelli
Commissioner

COURTHOUSE SQUARE 200 EAST VIRGINIA GUNNISON, COLORADO 81260

ARCO Oil and Gas Company

Circle 3 District
 P.O. Box 7970
 Denver, Texas 79702
 Telephone 915 688-5570
 October 12, 1992

Oil and Gas Leasing Analysis
 ATTN: Robert L. Storch, Forest Supervisor
 Grand Mesa, Uncompangre and Gunnison National Forests
 2250 Highway 50
 Delta, CO 81416

RE: DRAFT - Environmental Impact Statement
 Grand Mesa, Uncompangre and Gunnison National Forests

Dear Mr. Storch:

ARCO Oil and Gas Company appreciates the opportunity to comment on the draft of "Oil and Gas Leasing Environmental Impact Statement" for the Grand Mesa, Uncompangre and Gunnison National Forest. We have some concerns and suggestions listed below that we offer for your consideration.


RA195A ARCO feels that just because some roadless areas have been mentioned in recent legislation, unless they are actually included in wilderness areas No Lease stipulations RA241A should not be automatically attached to those areas.

OG24 We question the use of the term "no potential", just because there is no present potential does not mean there will be no future potential. Technology can and is changing, giving industry more opportunities to find additional reserves. A current example is the development and increasing use of 3-D seismic. Oil and gas potential is being identified in areas previously thought to have none.

AEG17 We also question the use of the phrase "expecting no impact"; impacts on the environment can be minimized but we feel there is no such thing as no impact. Anytime any activity occurs some type of impact to the environment takes place. The key is to minimize adverse impacts.

RA191D ARCO feels that possibly more acreage in the Flat Top area might be considered for Controlled Surface Use leasing instead of No Surface Occupancy or No Lease. The area is considered "high potential" in your draft. However, we submit this comment realizing we are not familiar with the topography of the area.

ALT701 ARCO in general concurs with the selection of "Alternative 2" as the preferred plan. We believe this will meet the National Forest objectives and will still allow the industry to develop the minerals. If you have any questions about our comments please contact me at 915/688-5338 or Elizabeth A. Casbeer at 915/688-5570.

Yours very truly,

 Elizabeth A. Casbeer
 Regulatory & Compliance Coordinator

EAC/ESS
 xcc: R/C Files

IPAMS
 Independent
 Petroleum
 Association
 of
 Mountain
 States

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Robert L. Storch, Forest Supervisor
 Grand Mesa, Uncompangre, and Gunnison National Forests
 2250 Highway 50
 Delta, Colorado 81416

Dear Mr. Storch:

The Independent Petroleum Association of Mountain States (IPAMS) is a non-profit, non-partisan trade association representing the interests of independent oil and natural gas producers, royalty owners, industry consultants, and service/supply companies operating in a ten-state Rocky Mountain area: New Mexico, Wyoming, Colorado, Montana, North Dakota, Utah, Nebraska, South Dakota, Nevada, and Arizona.

IPAMS submits these comments in response to the Draft Environmental Impact Statement Oil and Gas Leasing Analysis for the Grand Mesa, Uncompangre and Gunnison National Forests. IPAMS welcomes the progress of the oil and gas leasing program initiated by the Forest Service. However, we maintain some concerns regarding the DEIS and the final decision.

The domestic oil and natural gas industry is in a state of crisis. The rig count is at a forty-year low. The major oil and gas companies are leaving the U.S. to develop resources abroad, due largely to unreasonable and burdensome regulations. The independent companies that are left have survived the lean times; they are the future of the domestic industry. Independents drill about 85 percent of all domestic wells -- both exploratory and development, onshore and offshore. They produce about 31 percent of all U.S. crude oil and approximately 60 percent of all natural gas and find more than half of all new oil and gas reserves in the United States.

potential areas under No Surface Occupancy, Controlled Surface Use and No Lease stipulations and conditions. This in effect renders the Forest Service leasing program immaterial to operators. In addition, IPAMS reminds the Forest Service that detailed NEPA analysis takes place again at the Application for a Permit to Drill stage.

In closing, IPAMS objects to the current direction the Forest Service is taking with this Draft Environmental Impact Statement for Oil and Gas Leasing in the Grand Mesa, Uncompangre and Gunnison National Forests. IPAMS would be pleased to offer any further input or answer questions regarding the draft document. Thank you for this opportunity to comment.

Sincerely,



Alexander Woodruff
Director of Regulatory Affairs

Robert Storch
9 October 1992
Page 2

Oil and gas leasing on federal lands is increasingly becoming a regulatory nightmare. While IPAMS recognizes and respects the critical imperative of maintaining a healthy environment, the Forest Service with its multiple use mandate must recognize and encourage the development of oil and gas on federal lands.

Natural gas abounds in the Rocky Mountain states. The Rockies contain more natural gas than Texas and the Gulf Coast area combined. If these vital resources are to be developed, access to and development on public lands will play a crucial role. Exploration and production of petroleum reserves must be a reasonable venture on public lands. The Forest Service needs to remain a competitive lessor to facilitate this goal. Operators simply cannot stand the immense pressures of overregulation. They will either take their business elsewhere or go out of business.

After careful consideration of the alternatives, IPAMS finds that the only reasonable alternative is Alternative 4. Standard lease terms and conditions are designed to protect the environment. No surface occupancy and controlled surface use stipulations are broad ranging restrictions placed on leases. Typically, they do not solve the problem or strike a balance between development and preservation. IPAMS believes that potential conflicts are best addressed with site specific mitigation measures and timing stipulations. For example, timing stipulations can be implemented during crucial elk calving periods.

Given the low amount of predicted surface disturbance, approximately 503 acres over the next 15 years, IPAMS recommends that the Forest Service adopt Alternative 4 and work closely with the lessees to ensure that proper environmental considerations are carried out. Locking up large tracts of land and denying access to those areas with restrictive stipulations violates the multiple use mandate of the Forest Service.

While IPAMS recognizes that the Forest Service must balance a number of management goals, the Service's "preferred alternative," Alternative 2, is unacceptable to the oil and gas industry. Alternative 2 places many high oil and gas

ALT401

STP17

ALT403

ALT205



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Page 2
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October 12, 1992

**Oil & Gas Leasing Draft EIS
Grand Mesa, Uncompahgre and Gunnison National Forests**

Robert L. Storch, Forest Supervisor
Grand Mesa, Uncompahgre and Gunnison National Forests
2250 Highway 50
Delta, Colorado 81416

Dear Mr. Storch:

Texasco has reviewed your oil and gas leasing Draft Environmental Impact Statement [DEIS]. We offer the following comments:

GENERAL COMMENTS

Texasco comments you for conducting a forest wide analysis and combining the "availability" and "specific lands" leasing decisions [43 CFR 228.102 (d) and (e)]. This is the most efficient use of your budget dollars to complete oil and gas leasing analysis.

We agree with the overall direction of the DEIS in encouraging exploration, development and production of oil and gas in an environmentally responsible manner. We do have some specific concerns as discussed below.

AFFECTED ENVIRONMENT

Oil and Gas Potential

We disagree with your classification of the elongated area straddling the Delta-Mesa County line in Grand Mesa National Forest as "moderate potential". Why does this area have any less potential than the surrounding high potential area when readily available surface geology suggests the sedimentary section in both areas is the same?

Texasco believes Grand Mesa and adjoining northwestern portion of Gunnison National Forests have high oil and gas potential. Tertiary and Upper Cretaceous conventional gas and coalbed methane reservoirs are the most important targets. Production from these reservoirs occurs just north of the forest boundary in Mesa County.

NP15

OG25



Impacts of Projected Development Scenarios on Affected Environments

Your "foreseeable development scenario" of 47 wells to be drilled over the next 15 years appears to be fairly reasonable. However, we question your statement that a typical well will disturb 10.7 acres of land. Based on our experience a typical well might disturb at most 1-2 acres. This is significant because anticipated impacts will decrease as assumptions are shown to be exaggerated.

OG26

Socio-Economic Impacts

The DEIS generally minimizes the socio-economic impact of lost opportunities for oil and gas development. This will be discussed in further detail in our discussion of alternatives.

AEE001

ALTERNATIVES & ENVIRONMENTAL CONSEQUENCES

Preferred Alternative

Your "Preferred Alternative" proposes to increase areas for No Lease [NL] and No Surface Occupancy [NSO] by 221,850 acres or 21 % from your current management approach. We believe there are a number of "special management areas" that are included in the NL and NSO category that can be protected and managed with less severe restrictions, such as:

- roadless areas
- sensitive areas
- visual quality areas
- wildlife breeding areas
- recreation areas

These "special management" areas are subjectively defined with little factual data to indicate oil and gas activity has any significant impact on associated resource values. Alternative 4 [Standard Lease Term] provides sufficient management authority over surface operations to adequately protect these resource values. Timing and CSU stipulations may also reduce potential negative impacts.

ALT401

Justification in the DEIS for NL or NSO restrictions is based on assumptions that oil and gas activity will cause the following:

- temporary loss of biodiversity
- wildlife habitat loss
- damage to "unprotected" sensitive areas
- toxic spills
- impairment of visual resources
- interference with recreational experiences

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Grand Mesa National Forest, et al.
Page 3
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STP09 These assumptions arise out of "perceived" conflicts between various resource uses on public lands and are not necessarily based on factual or scientific data. Tenaco and other operators have proven over time that oil and gas operations may be conducted in a manner that is compatible with other resource uses and that NL or NSO restrictions are generally unnecessary.

Moreover, unless the DEIS points to evidence that such negative impacts are likely to occur, the mere fact that some potential for occurrence exists is not sufficient justification for imposing such severe restrictions, particularly in areas of moderate to high to oil and gas potential.

RA195A We are particularly concerned about your treatment of "roadless areas". Under your Preferred
RA241A lease category because they have been mentioned in the Colorado Wilderness Bill. The fact that
RA242A these areas are included in proposed wilderness legislation should not automatically lead to NL or NSO area restrictions. The proposed legislation may never become law and the areas are meanwhile managed as "de facto" wilderness.

Alternatives 3 and 5

ALT304 The objectionable features of Alternative 2 (Preferred Alternative) are amplified further in
ALT504 Alternatives 3 and 5. Alternative 3 would impose 100% no leasing and Alternative 5 would impose NL or NSO restrictions on 427,500 acres (45%) of the leasing analysis area. These restrictive approaches are unjustified for the same reasons discussed above and are clearly inconsistent with Forest Service policy to impose the "least restrictive" measures that will adequately protect all resource values.

Alternatives 1 and 4

ALT402 Tenaco prefers Alternative 4 because it would allow for leasing in the entire analysis area with application of "Standard Lease Terms". We believe that standard lease terms provide the Forest Service with enough authority and discretion to impose reasonable mitigation measures adequate to protect all resource values in the area. Our second choice is Alternative 1 [No Action Alternative] which is your current management approach.

In discussing "socio economic" impacts associated with the SLT Alternative [Alternative 4] you conclude in table S-4 that an average of 10 or more jobs for 3 months will create additional \$4,000 State revenue and \$8,000 in County Revenue [total of \$12,000] from drilling on new leases. In the same table you estimate Alternative 3 [No Lease] will average 10 "full time" drilling jobs and create \$32,000 in State revenue and \$64,000 in County revenue [total of \$96,000] from drilling on "existing leases".

DEIS
Grand Mesa National Forest, et al.
Page 4
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AEEC02 This analysis is not only skewed in favor of non-development but is inaccurate. First, you incorrectly assume the SLT Alternative will not involve drilling on "existing leases". Second, economic impacts described under the SLT Alternative are significantly understated. Revenues to the State and County are only a small portion of total economic benefit to local communities from the creation of jobs.

CONCLUSION

OG28 You indicate in the DEIS your purpose is to encourage exploration, development and production of oil and gas resources while adequately protecting all resource uses in the analysis area. However, your recommendations and approach are inconsistent with this stated purpose and will actually discourage companies from drilling for oil and gas on National Forest System lands. Increasingly, energy companies are shifting capital overseas where opportunities for exploration and development of oil and gas resources are more accessible.

Unless the government puts more focus on encouraging development through land use planning and other regulatory means, our national security will continue to be threatened due to overdependence on foreign oil and economically the US. will remain at a competitive disadvantage worldwide.

Tenaco appreciates this opportunity to comment. Please contact Mr. T. M. Belton at 303-793-4371 if you need further information.

Sincerely,

E. C. Burritt
Chief Geologist

TMB:

portion of this project without considering it as a part of the whole.

The geologic Piceance Basin, which covers all the land where this coalbed methane can be found, covers a much greater area than the geographical Piceance Basin, and includes most of the GMUG land proposed for leasing. It extends from the north edge of the West Elk Mountains to the north and west as far as the White River and beyond, covering a total area of some 9000 square miles. The gas in this deposit is different from that in most fields. Instead of being trapped in impervious domes (where the gas can be removed directly through a well), it is dissolved instead in water which permeates the coal beds underlying the entire basin.

The means by which the gas in coalbed methane deposits is recovered is far more complex. First of all, it is the water in which the gas is dissolved, and not just the gas itself, which must be brought to the surface. Since natural gas is soluble in water in large quantities only at high pressures, it is released automatically when the water emerges from a well, and can easily be reclaimed. Then where does the problem lie?

Unfortunately, natural gas is not the only thing that is dissolved in this water. It also contains great quantities of salt. Some twenty years ago, when I was working for a water engineering firm in Denver, we were given the job of analyzing the water from three such wells. We were astounded that it contained more than seven percent dissolved salt, almost all in the form of sodium chloride and sodium bicarbonate. What was just as surprising was the fact that the pressure of the water was so high that the wells could not be capped. They were left to flow freely for several years, constituting at the time the greatest single source of pollution in the entire Colorado River basin.

The Forest Service now reveals that other deposits have been found to contain as much as fifteen percent salt, more than four times as much as the ocean. It has been known for years that sodium, the major constituent of these salts, is the primary contaminant of Colorado River water. The sodium content from natural and manmade releases (the latter coming primarily from the leaching of salt-heavy irrigated land) is already so high that the water is only marginally usable for irrigation purposes by the time it reaches its ultimate goal in California's Imperial Valley, southern Arizona, and especially Mexico. Any additional sodium released into the water of this river could destroy its usefulness altogether.

How much salt are we talking about here? DOE has expressed its intention to recover all of the coalbed methane in the deposits; in fact, it would hardly be reasonable not to. An accurate estimate of the total amount of salt which would be brought to the surface in the process depends on data which are not yet available: the extent and thickness of the coalbeds, the amount of water found in the aquifer, and the salt content at each point



Oil and Gas Leasing Analysis
Forest Supervisor's Office
Grand Mesa, Uncompahgre, and Gunnison National Forests
2250 Highway 50
Delta, CO 81416

P.O. Box 4371 • Poonla, CO 81428

21 October 1992

Gentlemen:

The Draft Oil and Gas Leasing Environmental Impact Statement submitted by your office on July 30, 1992 has been examined by officials of the Black Canyon Audubon Society, who have found the document to be entirely irrelevant. First of all, it fails to provide an accurate description of either the scope or the nature of the oil and gas leasing program supposedly covered by the EIS. Secondly, it fails to define the major environmental impact which will result from the implementation of this project. And third, it does not specify which measures, if any, are planned for the mitigation of this impact.

To begin with, the amount of land proposed to be opened to oil and gas leasing is many times greater than that needed to satisfy the projected demand for less than fifty new gas wells over the next fifteen years. In a similar vein, the Trans-Colo-rado Pipeline, for which the Bureau of Land Management has prepared a comparable EIS, could not be justified if it were to serve only the limited number of gas wells foreseen by this document. And yet both agencies have treated their respective EIS coverages as if the two projects were separate and independent entities. As a result, the true environmental impacts of the overall program have been obscured.

How are these two projects really related to each other, and what is their real purpose? This question can be answered by examining certain recent pronouncements made by yet a third U.S. Government agency. The Department of Energy has enthusiastically extolled the potential benefits of developing coalbed methane deposits in the Piceance Basin of northwestern Colorado. They cite not only the huge amount of natural gas which is found in this enormous field (which they correctly depict as one of the largest in North America), but they also point out that both the high pressures and high temperatures of the water in which this gas is dissolved can also be tapped as significant sources of energy.

Both the GMUG leasing program and the Trans-Colorado Pipeline are integral parts of this greater enterprise. Therefore it would be unrealistic to assess the environmental impacts of any

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in the basin. It can be stated with certainty, however, that the amount of salt to be removed can be measured in billions of tons. Perhaps this figure becomes more comprehensible if we put it on a volumetric basis: it would be measured in cubic miles!

There is no doubt that dealing with this amount of salt will constitute the biggest toxic waste disposal problem in the history of the world. By comparison, getting rid of all the world's nuclear wastes would be child's play (in fact, all the world's nuclear waste could be satisfactorily stored in the midst of this salt pile). Considering the sensitivity of the Colorado River basin to the addition of any excess salt, it would be difficult to overestimate the seriousness of this problem.

What do the various government agencies involved plan to do with this salt? Neither the Forest Service nor the Bureau of Land Management have even addressed this issue. Apparently they regard the leasing of the land and the construction of the pipeline as projects unrelated to the central issue of the coalbed methane extraction for which both of these projects are mere accessories. But someone must accept responsibility for the overall effects.

It is apparent that the Department of Energy has no plans for reinjecting the saline water back into the wells from which it is extracted. Otherwise they could not claim the natural water pressure as an auxiliary energy source. Reinjecting the water would require considerably more energy than could ever be derived from this feature. Moreover, there is no evidence that the technology for reinjection under such high pressures exists. It would involve the use of extremely powerful equipment, made of materials able to resist a very corrosive liquid, designed to prevent even the slightest leak, and built and maintained to assure absolute reliability.

In similar gas fields in the San Juan Basin, the waste water was injected into shallower aquifers instead. This process was a failure, since it resulted in the contamination of numerous water wells drilled into the same aquifer. The conditions imposed in the Piceance Basin would be much more severe: the amount of water to be disposed of is much greater, the salt content higher, and the terrain more uncompromising. The Piceance Basin is broken up into many high plateaus and deep canyons. A suitable reservoir would have to lie below all of this. It must also be totally impervious to the flow of groundwater. Otherwise the salt is sure to find its way back into the river in some way. The prospects for finding a site for such measures are extremely remote.

Could the water be stored in evaporation ponds? Once again, the magnitude of the salt supply enters in. Any attempt to do it this way would essentially result in the creation of a second Great Salt Lake. But the relative stability of this lake depends on the fact that it is located in a basin where the average rainfall is only a tiny fraction of the evaporation rate. In the Piceance Basin, average rainfall exceeds evaporation. And even

if a site could be found where this was not true, such storage would be only temporary. During the El Niño years of 1982-84, the all of this region experienced precipitation more than double the average. A repeat of this event (which is sure to come) would flood any storage reservoir and release the salt into the Colorado River. It must be noted that the effects of dumping so much salt on downstream lands would be the same whether it occurs a little bit at a time or all at once.

How about purifying the water? Unfortunately, sodium is one of the most persistent of all dissolved elements. Its thermodynamic properties dictate that it is actually easier to remove the water from the salt than to remove the salt from the water! This is what is done in commercial desalination plants. The energy cost is so high in such processes that it is doubtful that all of the coalbed methane in the basin would be sufficient to supply enough energy to desalinate the water in which it is dissolved.

Could the water be piped somewhere else for disposal? The ocean is too far away. Besides, this wastewater is likely to be so badly contaminated that even the ocean would become polluted. Great Salt Lake is a possibility, however. It contains about 25 percent salt already and would actually be diluted by this added flow. It is also subject to severe natural variations in the input of fresh water from tributary streams. But the facilities needed for such an undertaking would be enormous. The outflow from each well would have to be collected, with each pipe then being fed into a large pipeline leading to the lake. This pipeline would have to be traverse some extremely rugged country, and the water would eventually have to be pumped over the Wasatch divide. Every component of the system -- pipes, pumps, and everything else -- would have to be made of noncorrosive materials. Each component would also have to deliver the highest reliability to prevent spills.

Of these possible (and impossible) alternatives, which one has the government selected? There is no evidence that DOE or anyone else has even approached the problem! In the absence of any indications to the contrary, one can only assume that present plans call for the waste water simply to be allowed to flow naturally into local drainages and thence into the mainstream of the Colorado River!

What effect would this have on the water resources of the region? To begin with, it would make the water useless for either domestic or irrigation purposes. It would wipe out most or all of the agriculture in the orchard region of the North Fork of the Gunnison River, the Grand Valley surrounding Grand Junction, the Moab Valley, the Imperial Valley of southern California, adjacent portions of Baja California in Mexico, and, most important of all, the portions of Arizona where most of the state's three and one-half million people live.

While it is hard to believe that anyone could be so irresponsible, we must remember that the Los Angeles basin, where all



Colorado
Environmental
Coalition

777 Grant Street, Suite 606
Denver, Colorado 80203-3518 • (303) 837-8701

October 13, 1992

Robert Storch
Forest Supervisor
Grand Mesa-Uncompahgre-Gunnison National Forests
2250 Highway 50
Delta, CO 81416

RE: Draft Oil and Gas Leasing
Environmental Impact Statement
Grand Mesa-Uncompahgre-Gunnison National Forests

Dear Supervisor Storch,

The following comments on the subject Draft Environmental Impact Statement (DEIS) are submitted on behalf of the Colorado Environmental Coalition (CEC). CEC is a not-for-profit conservation organization with over 1,500 individual members and 40 member groups whose combined membership exceeds 50,000 individuals in Colorado. CEC, its member groups, and its individual members have had a long running interest in the wise management and protection of natural values on Colorado's public lands, including the GMUG National Forests. We have been active participants in the oil and gas planning process from pre-leasing decision documents through applications for permit to drill on both Bureau of Land Management and National Forest lands.

CEC would like to compliment you and your staff on the content and readability of the subject DEIS. The idea of breaking down the Forest into various "affected environments" helps considerably in making this programmatic document relate better to on-the-ground resources and actual impacts. By analyzing the impacts of the five lease options for each affected environment the DEIS presents realistic management options, and their impacts, from which the reader can choose. The tables in Chapter II that compare the impacts of various lease options and program alternatives for each affected environment are a tremendous aid in understanding the impacts of various management schemes.

I. LEASING ANALYSIS AREA

CEC is pleased with the realistic leasing analysis area developed by your staff, per Interim Directive 2820-91-1. It is refreshing to see some common sense applied in the development of oil and gas leasing EISs in Region 2. It should go without saying that the Forest Service should not expend its limited planning

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Member, Community Shares of Colorado

this gas is destined to be used, has long pursued a policy of building its power plants far away in the Indian country of Arizona and New Mexico. In this way they have been able to lower air pollution in their own region by exporting it to others. Why not do the same with water pollution, even if it would affect a portion of their own state? Can we really expect the natural gas industry to be concerned about what happens to other people when there is such an enormous profit to be made? And how about the Department of Energy itself? This is the same agency that is presently trying to cover up environmental crimes committed by its own officials and its contractors, and uncovered by a grand jury investigating problems at Rocky Flats. As unbelievable as it may seem, we cannot ignore the possibility that such a scenario could be planned.

Does this mean that the coalbed methane in the Piceance Basin can never be safely extracted? Possibly. But there are other alternatives which can be investigated. One of these is the aforementioned water pipeline to Great Salt Lake. Even more reasonable would be the development of technology allowing the removal of the gas from the water underground, without ever bringing the water to the surface. This would not be easy. It would involve the sinking of shafts, instead of wells, so that the necessary equipment could be delivered to the site. It would necessitate the concurrent use of a number of such shafts in a way which would allow the water to circulate underground. It would require the development of various kinds of seals and automatic valves which would prevent any leaks of the pressurized water. And it would demand that all items be made of corrosion-resistant materials, and that all mechanisms be capable of the utmost reliability.

It remains to be seen whether or not such technology can be developed, and whether the cost of producing gas in this way will be economical. But the alternative process, to simply go ahead with the construction of a pipeline and the leasing of vast amounts of public land without first solving the horrendous problem of disposing of the salt, is something which simply cannot be allowed to happen.

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Respectfully,

James R. Guadagno, Ph.D., P.E.
Black Canyon Audubon Society
P.O. Box 1371
Paonia, CO 81428

cc: Western Colorado Congress
Colorado Environmental Coalition
Rep. Ben Nighthorse Campbell
Colorado Water Conservation District
Embassy of Mexico

general knowledge of biological diversity concepts, it is obvious that each and every roadless area plays an important role in maintaining and protecting the overall biological diversity of the Forest. For example, the DEIS states on page IV-22 that oil and gas activity on the Battlement Mesa roadless area "could significantly reduce the habitat effectiveness of the area with direct effects on the Rocky Mountain bighorn sheep herd itself." Other severe impacts to specific wildlife populations, and to biological diversity in general, would likely occur on other roadless areas currently proposed for leasing under Alternative 2.

III. ALTERNATIVE 5 SHOULD BE THE PREFERRED ALTERNATIVE

CEC believes protection of all the remaining roadless areas on the Forest is critical. Therefore, CEC supports Alternative 5 in the DEIS, which is identical to Alternative 2 except that it makes semi-primitive non-motorized areas and all roadless areas not just a few, no lease. CEC is pleased to see Alternative 5 considered in the DEIS since we believe it accurately reflects the public's desire to protect what remaining roadless areas exist on the Forest.

The DEIS discusses the impacts of opening, or not opening, roadless areas in the analysis area to oil and gas leasing. On Page II-53 the summary comparison of program alternatives states that the same level of projected activity is forecasted for Alternatives 2 and 5, but that under Alternative 5 activity would shift to other areas available for leasing. Thus industry would not be limited in producing oil and gas resources from Forest lands, but would simply shift its production off roadless areas to other areas of the Forest. Page II-54 states that the costs to industry of Alternative 5 is the same as Alternative 2. Apparently, a win-win opportunity exists on the Forest where oil and gas development can be allowed without impacting roadless areas under Alternative 5.

The DEIS describes substantial impacts to roadless areas if they are opened to oil and gas leasing as proposed in Alternative 2. On Page II-50 the summary comparison of program alternatives states that under Alternative 2 there will be, "some loss of biological diversity of wildlife species, especially in areas opened for logging following O & G activities." Page II-50 states there will be similar impacts to recreational opportunities, namely a potential decrease in backcountry recreation opportunities. The analysis in the DEIS clearly indicates that there will be numerous detrimental impacts to roadless areas and their accompanying values on the Forest if they are leased.

It is time that the GMUG National Forests recognize the value of all roadless areas on the Forest and protect all of them from unnecessary and undue development. Opening the majority of roadless areas in the analysis area to oil and gas leasing, as

resources attempting to analyze the impacts of future oil and gas development in low and no potential areas where no industry interest or activity has been previously shown. Besides the obvious misdirection of planning resources, opening entire forests to oil and gas leasing places critical lands at undue risk to speculators and creates conflicts with oil and gas interests where none should exist.

CEC believes the leasing analysis area, roughly 950,000 acres or 2/3 of the entire Forest, is a realistic starting point to begin an oil and gas leasing analysis for the Forest. We do not see why industry would have a problem with this approach. If interest in leasing outside the analysis area is indicated in the future by industry, CEC understands the Forest will do a NEPA document/plan amendment with public input to analyze the impacts of oil and gas activity on those lands. Although the oil and gas industry has insisted in the past that entire forests must be made available for immediate oil and gas leasing, CEC and the Colorado environmental community believe there has to be a balance between protecting all the various Forest uses and opening lands to oil and gas activity.

II. PROTECTING ROADLESS AREAS

Apparently you and your staff recognize the importance of protecting roadless areas since Alternative 2, the preferred alternative, proposes no lease and no surface occupancy designations for some roadless areas. There should be little question in anyone's mind regarding the importance of protecting Roubideau, Tabeguache, and Kannah Creek as no lease areas not only because of their potential inclusion in the National Wilderness Preservation System, but also because of their outstanding primitive recreation opportunities and, in the case of Kannah Creek, important watershed values.

In addition to these no lease areas, Alternative 2 proposes no surface occupancy for some roadless areas, including Battlement Mesa, parts of Priest Mountain, and Kebler Pass. CEC could support no surface occupancy designation for these roadless areas, and many others, if stipulation waivers in the future are prohibited (see Stipulation Waivers section below). In our opinion, a NSO stipulation that cannot be waived can protect roadless areas. If waivers of NSO stipulations are not prohibited, however, we believe the only way to protect the values of roadless areas is through a no lease designation.

The descriptions of specific roadless areas in the analysis area contained in Chapter III of the DEIS and the brief discussion of the environmental consequences of leasing roadless areas in Chapter IV show that virtually every roadless area would continue to retain its natural integrity if oil and gas leasing, and connected logging activities, were not allowed. With the limited information disclosed in the DEIS for each roadless area and a

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animals. These areas, especially where they are adjacent to other Roadless Areas or wilderness, are especially important as potential habitat for extirpated populations of once native species....Species like the goshawk, pine marten lynx, (sic) wolverine and others are very dependent on [roadless areas] as the core area of their home ranges. Entering into these areas, combined with all the other Forest activities going on in adjacent areas, would continue the loss of habitat for these species, which is necessary for their survival" (pp. IV-39, 40).

If the Forest wishes to raise the Allowable Sale Quantity, a Plan Amendment would have to be done. This amendment would have to thoroughly analyze the impacts of the increased cutting and roading and other activities on biological diversity. It is not true, as stated on Draft Oil and Gas EIS p. IV- 21, that the effects of timber harvesting following oil and gas access were disclosed in the FSEIS for the Timber Amendment. That FSEIS only disclosed the impacts of various proposed levels of cutting. Note that the "Significant Cumulative Effects of the Alternatives" section of that FSEIS, pp. IV-58-63, does not even mention oil and gas development, nor do the sections on roadless areas (p. IV-32, 33) and biological diversity (p. IV-3-6).

V. LAND AVAILABILITY AND LEASING SPECIFIC LANDS DECISIONS

The regulations implementing the management of oil and gas resources on National Forest lands are very clear that two decisions must be made before leasing can be allowed. These decisions are the "lands administratively available for leasing" decision (36 C.F.R. 228.102(d)) and the "leasing specific lands" decision--the "d" and "e" decisions (36 C.F.R. 228.102(e)).

The introductory sections of the DEIS make numerous references to making the "d" and "e" decisions. For example, Page S-3 states that the leasing analysis in the DEIS will result in three decisions, including the "d" and "e" decisions. Yet the subject DEIS is fatally flawed because it treats the "d" and "e" decisions as one identical decision throughout the document. It must be more than coincidence that the "d" and "e" decisions for each affected environment in the DEIS are identical. Namely, it appears that these two decisions are not looked at separately at all, but are instead conveniently combined in the subject DEIS to the disregard of Forest Service regulations. This approach of combining the "d" and "e" decisions is very confusing to the public and brings the credibility of the Forest Service into question since it has so irrationally and intentionally convoluted its own regulations.

After reading the body of the DEIS in Chapters 3 and 4 it becomes obvious to the reader that the information presented only addresses the "d" decision and has little, if any, site-specific

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proposed in Alternative 2, does little, if anything, to advance oil and gas activity on the Forest while risking the destruction of almost all the remaining roadless areas on the Forest. Because of these impacts, CEC feels the Forest should make Alternative 5 the preferred alternative in the FEIS and not lease roadless areas.

IV. INCREASING THE ALLOWABLE SALE QUANTITY OF TIMBER VIA ROADING FOR OIL AND GAS DEVELOPMENT

CEC most strongly opposes any increase in the allowable sale quantity (ASQ) of timber. The ASQ is too high already, as the entry of many roadless areas will be required to meet the full ASQ. Thus we are appalled at the suggestion on p. II-7 of the DEIS and elsewhere that oil and gas development might lead to additional lands seeing timber cutting.

These lands would be in areas that are currently roadless. Protection of roadless areas was a key issue in the recently-completed Timber Amendment to the Forest Plan. Almost 100 people who commented on the draft Timber Amendment were specifically concerned about this issue. (See p. VI-33 of the Final Supplemental Environmental Impact Statement.)

Also, many people opposed the levels of logging that were proposed in the draft Timber Amendment. (See pp. VI-10, 40 of the FSEIS.) Scheduling additional logging in roadless areas invaded by oil and gas development would move toward the logging levels and roadless area invasion to the levels that the public found absolutely unacceptable in the DSEIS. Remember that the environmental community did not administratively challenge the Timber Amendment because the levels of logging proposed were considerably less than what was proposed in the draft. Raising logging levels via a back-door method, i.e. oil and gas exploration, would thus violate the public trust.

Note also that many people who commented on the DSEIS expressed concern about biological diversity (See FSEIS p. VI-11.) It is significant that the FSEIS did not perform any analysis of biological diversity, nor did it even propose to inventory the GNUM Forest's old growth, in spite of the rather large amount of cutting it scheduled. The Forest could thus be decreasing the biological diversity without ever having analyzed the subject. Increasing the cutting and entry of roadless areas would exacerbate this situation. The Draft Oil and Gas EIS even notes the importance of roadless areas for biological diversity:

"Alternatives which will result in the issuance of oil and gas leases in existing roadless areas will have the greatest adverse impact and loss of biological diversity in natural ecosystems. These areas are refuges of natural plant and animal populations that provide genetic variability, species and community variety of plants and

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specific ground rules in advance. Any stipulation waivers must be as narrowly and clearly defined as possible.

VII. REASONABLY FORESEEABLE DEVELOPMENT SCENARIO

Page E-4 of the DEIS states that the Reasonably Foreseeable Development scenario was formulated by incorporating, "historical trends, USGS resource estimates, mineral ownership patterns, location of existing pipelines, and current activity." CEC realizes that developing an RFD scenario is only a "best guess". But in order to make the best guess possible, CEC believes there are other factors that the Forest must consider in order to develop an accurate RFD scenario. These factors are: the effects of Congressionally authorized tax credits for "unconventional" development, such as the recent tax credits for proposed gas sources like coal-bed methane; the location of proposed pipelines in the future; future trends in energy use in the United States; and the effect of "market shocks" on domestic oil and gas activity such as artificially decreased supplies of fossil fuels from the Middle East.

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The FEIS and ROD for this oil and gas leasing analysis should state what will happen if oil and gas activity on the Forest exceeds the levels outlined in the RFD scenario. CEC assumes that the Forest has a legal obligation to not authorize any oil and gas activity above and beyond that level of activity outlined in the RFD scenario. If the Forest receives additional well proposals beyond what is estimated in the RFD scenario, CEC believes the Forest cannot legally allow additional on-the-ground disturbances until the Forest-wide oil and gas impact analysis is revised.

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The RFD analysis in Appendix E alludes to coal-bed methane activity on the Forest. One of the assumptions for the "Drilling Activity Forecast" states that any coal-bed methane wells drilled on the Forest due to any development tax credits are included within the RFD forecast. CEC adamantly opposes the grouping together of conventional and coal-bed methane wells. Coal-bed methane wells typically have a far greater impact on the environment and other Forest resources because of the enormous amounts of produced water that are created. Assuming a coal-bed methane well on the Forest is the same as a conventional well is incorrect and leads to the impacts of oil and gas activity on the Forest being unduly minimized.

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The additional impact of coal-bed methane wells needs to be addressed in the impact analysis for oil and gas leasing on the Forest. The DEIS is woefully inadequate regarding impacts from coal-bed methane wells. As stated above, the anticipated number of coal-bed methane wells is not even separated out in the RFD scenario in the DEIS. Consequently, the impacts of such activity are not analyzed in Chapter 4 of the DEIS. This situation must be rectified in the Final EIS.

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Information to justify making an informed and justified "e" decision. Making the "e" decision for specific lands in a pre-leasing document, especially with no site-specific impact analysis, is arbitrary and capricious and is a violation of Forest Service regulations governing oil and gas planning. "(a) such time as specify that the "e" decision shall be made, (36 C.F.R. 228.102(e)). Because no specific lands are now being proposed for leasing, but instead the Forest Service is simply considering all specific lands are being considered for leasing." (36 C.F.R. 228.102(e)). Because no specific lands are now being proposed for leasing, but instead the Forest Service is simply considering all lands in the analysis area generally, the Forest Service is premature in making the "e" decision for the GMUG National Forests at this time. The preamble to the regulations reinforces this conclusion. It says that the Forest Service "will" make the "e" decision "(w)hen those tracts are identified ..." (55 Fed. Reg 10429).

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Given the lack of site-specific information in the DEIS for specific land parcels, it is doubtful that the Forest Service will have a rational basis for making an informed, defensible "e" decision. Page I-17 of the DEIS states, "The Forest Supervisor may decide to authorize lease of all the lands described as "administratively available" in the Leasing Analysis, or to lease only a portion of the "available" lands." CEC wonders when and how such decisions will be made, since the subject DEIS provides no basis for making such an "authorization" decision on lands in the analysis area.

The final EIS must either include additional site-specific impact analyses and make distinct and separate "d" and "e" leasing decisions, or it must call the existing analysis in the DEIS by what it really is, the "d" decision, and state that the "e" decision for lands on the Forest will be made in future NEPA documents.

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VI. STIPULATION WAIVERS

The preferred alternative in the DEIS depends upon numerous stipulations to protect other Forest resources from undue damage from oil and gas development activities. However, pages I-15 and I-16 of the DEIS discuss how these protective stipulations can be waived. CEC objects to the use of stipulation waivers because they undermine public participation in the oil and gas development process and undercut the disclosure made in prior impact analyses such as the subject DEIS. As a result, CEC would urge that stipulation waivers be tightly and narrowly restricted, if not absolutely abolished.

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The stipulations outlined in Appendix C, especially the no surface occupancy stipulations, must clearly state that there shall be no waivers or else set clearly definable standards under which waivers would be granted. Clear standards benefit both environmentalists and oil and gas developers because they lay out

STP08



The Colorado Mountain Club

2530 West Alameda Avenue Denver, Colorado 80219
 (303) 922-6313, Trip Sign-ups, 9-2 PM; 7-9 PM, M, T, Th.
 (303) 922-6976, Business Calls Only, 9-5 PM.
 (303) 922-3708, General Information, 24 Hours
 1-800-633-4417 (business hours)
 (303) 922-7680 (FAX)

October 13, 1992

Bob Storch, Forest Supervisor
 Oil and Gas Leasing Analysis
 Grand Mesa/Uncompahgre/Gunnison National Forests
 2250 Highway 50
 Delta, Colorado 81416

Dear Supervisor Storch,

Following are comments from the Colorado Mountain Club regarding the Draft Oil and Gas Leasing Environmental Impact Statement.

GENERAL COMMENTS

The Club compliments the GMUG on an exceptional well-written document. The issues and impacts are clearly laid out. The Summary and Chapter IV are remarkable in the depth and clarity of discussion regarding impacts from the proposal. The Forest is candid about what it knows and does not know about the areas. The maps are useful and convey as much information as possible. The Summary clearly explains the impacts.

The Club has three main concerns:

1) The social/economic impacts of Alternative 5, no leasing in roadless areas, are the same as those of Alternative 2, the preferred alternative, while the environmental impacts are much worse. There is no justification for choosing the preferred alternative over the less environmentally damaging alternative 5.

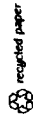
2) The analysis of biodiversity appears to suffer from the "more is better" approach rather than a recognition of the need to protect large interior forests and thereby protect threatened, endangered sensitive and forest interior species. Biodiversity has to be analyzed on a forest-wide as well as a site-specific level.

3) In order to truly understand impacts to biodiversity the EIS must contain a map and a discussion of forest fragmentation and how each alternative would affect forest fragmentation

SPECIFIC COMMENTS

1) The Club appreciates and supports the GMUG position that alpine/tundra areas and wetlands are categorized as "no surface occupancy" (NSO).

Groups: Aspen • Boulder • Denver • Denver Juniors • Denver Wilderness Kids • El Pueblo • Enos Hills • Fort Collins • Friends of Utevalde • Glenwood • Gore Range • Longs Peak • Pikes Peak • San Juan • Shining Mountain • Wolf County • West Elk • Western Slope



VIII. ALPINE/TUNDRA AREAS

CEC supports the NSO stipulation in the preferred alternative for alpine/tundra areas in the analysis area, assuming the stipulation cannot be waived as discussed above in these comments. We believe, however, that the DEIS is deficient in analyzing the impacts of oil and gas activities on alpine/tundra areas by not discussing recreation use as one of the "environmental factors". Alpine areas, because of their high altitudes and scenic vistas, are popular dispersed recreation areas. The FEIS needs to correct this deficiency by analyzing the impacts of oil and gas activity on recreation use and opportunities in alpine/tundra areas.

AEAT02

AEAT03

IX. AQUATIC/RIPARIAN/WETLAND HABITATS

CEC supports the NSO stipulation in the preferred alternative for aquatic/riparian/wetland habitats in the analysis area, assuming the stipulation cannot be waived as discussed above in these comments. These fragile, scarce, and biologically important areas need the strongest protection possible to prevent detrimental impacts from oil and gas activity. However, parts of both Chapter II and Chapter IV state that a NSO stipulation would not allow "most" oil and gas activities, not all oil and gas activities including roads and pipelines. CEC believes that no surface occupancy of these particular lands should not be limited just to well pads, but should apply to all associated oil and gas activities including roads and pipelines. The NSO stipulation loses much of its meaning if it still allows certain impacting activities associated with oil and gas development on these lands.

AER04

X. CONCLUSION

CEC appreciates this opportunity to comment on the subject DEIS. We look forward to reviewing the FEIS. If there are any questions on these comments, please do not hesitate to call us.

NP02

Sincerely,

Todd Robertson

Todd Robertson
 Public Lands Coordinator
 Rocky Smith
 Forest Mgt. Coordinator

Bob Storch
October 13, 1992

2

2) ALL UNENTERED AND RELATIVELY UNDEVELOPED ROADLESS AREAS SHOULD BE CATEGORIZED AS NO LEASE.

RA195 The Club also appreciate and supports the CRUG position that Kannah
RA241 Creek, Roubideau and Tabouache roadless areas are designated as no
RA242 lease. However, it is painful to turn to Table S-2, p. S-11 and
see all the other roadless areas with "standard lease terms" (SLT)
under the Forest's preferred alternative. The Club believes that
all currently unentered roadless areas and all roadless areas
relatively non-impacted by human development should be designated
as no lease. The DEIS gives no good reasons not to do so.

3) ALTERNATIVE 5 SHOULD BE THE PREFERRED ALTERNATIVE

ALT501 The Alternative Consequences Summary is excellent and clearly lays
out the impacts of each alternative. In comparing alternative 2,
the preferred alternative, to alternative 5, no leasing in roadless
areas, the impacts from alternative 2 are measurably greater in
their effects on roadless areas:

AEG05 Biological Diversity - "Loss of biological diversity of
wildlife species, especially in areas opened for logging
following O&G activities"

RD11 Roads - "Potential for new road construction in entire
analysis area. Road reconstruction would generally increase
standard of existing road. Road use would increase during
exploration and development stages."

RECG08 Recreation Opportunities - "Potential for ROS class to be
changed to more developed class in dispersed recreation and
roadless areas. Potential decrease in backcountry
recreational opportunities."

AER02 Aquatic/Riparian/Wetland Habitats - "Potential impacts
...resulting in vegetation removal and increased sediment
loads, which would decrease spawning habitat, result in
macroinvertebrate and fish fry mortality. Increased potential
for toxic spills entering waterways."

AEW02 Wildlife - "Potential for habitat loss, disturbance and
displacement to less desirable habitats on areas with SLT.
Impacts compounded in areas opened for logging after O&G
activity."

Table S-4, pgs. S-12 to S-18, DEIS

Unentered roadless areas have social and ecological values that can
not be replaced or imitated when lost. The forest should make
every effort to protect these areas. According to the DEIS, page
S-17, there would be no loss of leasing opportunity with

3

Alternative 5 because "The projected activity would shift to areas
available for oil and gas leasing"

4) THERE IS A DISCREPANCY BETWEEN THE MAPS AND THE CHARTS
REGARDING THE STIPULATIONS TO BE REQUIRED FOR ROADLESS AREAS

MAP03 Table S-2, Display of Alternatives P. S-11 lists SLT for most of
the roadless areas under alternative 2. Figure II-2, the colored
map, in the Map Errata booklet shows NSO and CSU for most of the
roadless areas. Which is it?

ALT203 5) NEITHER STANDARD LEASE TERMS (SLT) NOR CONTROLLED SURFACE
OCCUPANCY (CSU) ADEQUATELY PROTECT UNENTERED ROADLESS AREAS

Much of the roadless areas open for leasing under Alternative 2 is
governed by Controlled Surface Use (CSU). Chapter IV, beginning on
page IV-1 clearly lays out the impacts from CSU:

- A net loss of old growth timber, a loss of habitat for old
growth dependent species
- some quality degradation of dispersed recreation experience
and setting would take place
- some reduction in quality of recreational experience and
setting would take place
- in 3A, semi-primitive non-motorized management areas, CSU
would generally allow the construction of roads, well pads,
and pipelines
- do little to mitigate the effects of oil and gas activity
near the Crag Crest National Recreation Trail

Standard lease terms, also described from page IV-1, include the
above impacts but also lead to more severe impacts on roadless
areas:

- heavy impacts to soil resources
- the greatest potential of all leasing terms for impacts to
water quality
- a major portion of partial retention VQR areas would not
meet their adopted visual quality objective.
- developed recreational sites would potentially be
significantly impacted from oil and gas activity with a
potential decrease in use

Bob Storch
October 13, 1992

4

- some quality degradation of dispersed recreation experience and setting
- a change in the inventoried Recreation Opportunity Spectrum (ROS)
- Disturbance to big game and degradation of habitat could occur to any of the big game species found in the area
- would not mitigate all of the most detrimental impacts to crucial wildlife habitat
- impacts to upland game, small game, furbearers, non-game wildlife could result in nest or den abandonment, actual destruction of nesting and denning sites and habitat and the elimination of one or more of a species key habitat components necessary for the survival of the species
- provide little or no protection to any of the Management Indicator Species
- in roadless areas results in direct loss of roadless character; loss of opportunity to be designated wilderness; impact on opportunities for high quality, guided hunting and camping experiences
- potential air quality impacts

Controlled surface use gives more protection than standard lease terms, but given the above information, the Club can not understand why the Forest believes it is necessary to open unentered roadless areas to leasing. The question is particularly relevant because under Economic and Social Setting on the same table the impacts for alternative 2 and alternative 5 are identical:

"Average of 10 more jobs (above No Action figure) for 3 months; additional \$4,000 State revenue; additional \$8,000 county revenue from drilling on new leases."

NEPA states that:

"Federal agencies shall to the fullest extent possible:

...use all practicable means, consistent with the requirements of the Act and other essential considerations of national policy, to restore and enhance the quality of the human environment and avoid or minimize any possible adverse effects of their actions upon the quality of the human environment."

40 CFR Sec. 1500.2 (f) emphasis added

Bob Storch
October 13, 1992

5

Both alternatives 2 and 5 have the same social/economic effects, yet the GMUG's preferred alternative has more adverse environmental effects than alternative 5. The Forest Service is required to maximize net public benefit. Alternative 5 clearly does this by protecting important public environmental resources and providing employment and a product at the same level as the Agency preferred alternative. Because Alternative 5 gives more protection to environmental resources without affecting social/economic resources, Alternative 5 should become the preferred alternative.

ALI1503

6) THE ANALYSIS OF BIODIVERSITY IS NOT CONSISTENT AND APPEARS TO STRESS THE "WORN IS BETTER" APPROACH RATHER THAN PROTECTION OF UNIQUE COMMUNITIES SUCH AS FOREST INTERIORS AND UNENTERED ROADLESS AREAS. BIODIVERSITY MUST BE ADDRESSED AT THE FOREST LEVEL IN THIS DEIS

The unentered roadless areas are the key to preserving biodiversity. There are plenty of edge species, plenty of species which do well with human development, plenty of robins, jays and magpies on the forest. The concern is for the threatened, endangered and sensitive species, the interior forest species, species which do not do well with human disturbance, the warblers and songbirds. How the GMUG treats the unentered roadless areas in its oil and gas leasing program will determine biodiversity on the forest.

a) The Club is alarmed to see the statement on page I-25 under Miscellaneous Issues:

"The following will be addressed at the APD (project level) stage":
Old-growth/biodiversity will be tiered to the Forest Plan (if we can do this and still address the issues).

Biodiversity must be addressed at the Forest Plan level. If the Agency waits until a site-specific analysis, the whole issue of preserving large tracts of interior forests and thereby protecting T&E, sensitive and interior species can no longer be considered. The lease will have been issued and if industry wishes it will sue to develop its private property rights regardless of what the Forest Service says.

Biodiversity must be addressed in this DEIS. The Forest Plan does not do an adequate job. This oil and gas DEIS contains a much better analysis of wildlife impacts and impacts to sensitive species, and from the point of view of biodiversity can not satisfactorily be tiered to the much older Plan. The old Plan in no way addresses the issue.

On page I-2, roadless and undeveloped areas, wildlife and wildlife

Bob Storch
October 13, 1992

and protection of unique wildlife habitat and sensitive species must then be related to the issue of forest fragmentation.

The Colorado Mountain Club would be pleased to discuss these comments with the ID team at any time. We would like to work further with the GMUG on these issues before the document is finalized.

Sincerely,

Anne Vickery

Anne Vickery
Conservation Director

EMC.

cc. C.M.C West-Slopp
C.M.C Glenwood
C.E.C

Bob Storch
October 13, 1992

habitat, and cumulative impacts to wildlife are listed under "Major Issues". These are all subsets of biodiversity. If biodiversity had not been adequately addressed by the Forest Plan, the issues would not now be considered "major issues". If these have been identified as "major issues" in a forest-wide EIS, they can not adequately be addressed at the site-specific level.

b) The discussion of biodiversity on pages III-3,4 is good as far as it goes but the GMUG must take the next step and apply these concepts on a forest-wide level. The discussion of Management Indicator Species and T&E and Sensitive Species, pages III-4&III-47 and III-99 is excellent, but this must be related to a forest-wide analysis as to what large areas on the forest are still available for these species. Songbirds should be added to this discussion (see enclosed article).

7) THE GRAND MESA SHOULD BE ADDED TO THE LIST OF SENSITIVE AREAS

The Grand Mesa is threatened with impacts from timber cuts, roads and oil and gas leasing in roadless areas and extensive, uncontrolled motorized vehicle use. There needs to be a cumulative analysis of this area, from the McClure Pass road to the western edge of the mesa.

AEG19

8) FOREST FRAGMENTATION, BIODIVERSITY, LOSS OF ROADLESS AND UNENTERED AREAS SHOULD BE ADDED TO THE LIST OF IRREVERSIBLE COMMITMENT OF RESOURCES

NP14

This DEIS clearly spells out specific impacts to wildlife, wildlife habitat, old growth, roadless areas and sensitive forest interior species from oil and gas leasing. Once roaded, it is almost impossible for the Forest Service to exercise enough control to return areas to a more or less natural state. Once roaded for either timber or oil and gas, each activity encourages the other and encourages widespread motorized recreational use. The Agency can not now control the existing motorized recreational use.

The resources of large interior unentered forests, biodiversity, roadless and unentered areas, wildlife and wildlife habitat will suffer irreversible impacts of alternative 2 is chosen. The document must say so.

9) THE FINAL EIS MUST LOOK AT THE ISSUE OF FOREST FRAGMENTATION

Protection of large interior forest areas and large unentered areas is the only way to protect the unique ecological communities which do not relate well to human development. The GMUG needs to map, at a gross level, the remaining unentered and roadless areas in order to get a handle on forest fragmentation. This map should be in the FEIS. With this map in the document, the analysis of biodiversity



COLORADO OUTFITTERS ASSOCIATION

P.O. Box 440021 • Aurora, Colorado 80044 • (303) 368-4731

September 25, 1992

Daryl Gusey
GMUG NATIONAL FORESTS
2250 Highway 50
Delta, CO 81416

Dear Mr. Gusey:

RD06 The Colorado Outfitters Association is opposed to any new roads or opening of old roads in the Clear Creek (Clear Fork) area of the Gunnison National Forest.

REG06 We are opposed to oil and gas leases or timber harvests which would severely impact hundreds and possibly thousands of recreation days.

OG13 This area is heavily used by outfitter clients and others from the general public. In keeping with the Chiefs recreation strategy we request that gas, oil and timber interests be served some where else.

Sincerely,
Dennis Bergstad
Dennis Bergstad,
Executive Director

cc: Bob Storch
Elizabeth Estill
Bill Wallace
Dick Pennington
Chuck Davies
Pete Wingle

FOREST RESCUE
Crested Butte, Colorado

October 6, 1992

Jeff Burch
Oil and Gas Leasing Analysis
Grand Mesa, Uncompahgre, and Gunnison National Forests
2250 Highway 50
Delta, 81416
CO

Dear Sir:

ALTJ01 The purpose of this letter is to express our adamant opposition to the adoption of Alternative Two, the Preferred Alternative, in the Oil and Gas Leasing Analysis Draft Environmental Impact Statement. Crested Butte Forest Rescue requests that you adopt Alternative Three, the No Lease Alternative.

Also, many locations within the analysis area are not designated either Roadless or 3A Management Areas, yet they exhibit great potential for solitude and wilderness experience. These areas are needed to serve as buffers for designated wilderness, and as additional areas for wildlife habitat and biodiversity.

AEF15 The Forest Service has no comprehensive inventory of these undesignated areas, many of which contain old-growth trees and their irreplaceable habitat. By releasing these areas to indiscriminate road construction, we could lose what we don't even know we have.

AEF16 Oil and gas exploration roads will expand the timber base suitable for harvest. Areas currently uneconomic for timber harvesting will be made economic. The Forest Service's DEIS expresses ignorance at just how much of the forest will be opened by the new roads. Should we approve something the result of which we are ignorant?

RA191 Roadless Areas of special concern to Crested Butte
RA194 Forest Rescue include Priest Mountain, Springhouse Park, all
RA195 areas within the West Elk and Ragged Roadless Areas.
RA200 Whetstone Mountain and Flat Top Mountain. The construction
RA201 of new roads within the GMUG would not serve any public
RD16 interests other than those of the energy and timber industries.

NP02 Thank you for this opportunity to comment.

Sincerely,
Forest Rescue
Crested Butte,
Colo. 81224

"Turn it up"

HIGH COUNTRY CITIZENS' ALLIANCE

10/13/92

Supervisor Bob Storch
Oil & Gas Leasing Analysis
GMUG National Forest
2250 Highway 50
Delta, CO 81416

Dear Mr. Storch,

When outraged citizens protest the erection of an oil rig in Horse Ranch Park, will the GMUG National Forest close the area to all public use? Will the GMUG follow the example of the San Juan National Forest, which closed 35,000 acres of land in the HD Mountains? Here, it would be tough. You would have to close Kehler Pass road to make the closure effective. You would have to significantly detract from the tourism and recreation industry of the Gunnison County community.

Since such protests are quite likely, should an oil rig go up along Kehler Pass, we can reasonably state that the US Forest Service is setting up a situation with high potential for social conflict. This is a significant effect on the environment which the Oil and Gas Leasing DEIS has not disclosed.

Over the past 15 years, Crested Butte citizens have fought hard to protect the scenic beauty and ecological integrity of Horse Ranch Park and Kehler Pass. In 1978, we brought a US Senator to the Park to protest a plan to dump Anax mine tailings there. The plan was dropped. In the 1980 Colorado Wilderness Bill, Congress brought the boundary lines close to the Kehler Pass Road. In the early 1980s, our community defeated a proposal for a powerline across the pass. In 1989, we defeated the proposal to log the adjacent aspen forests. These events demonstrate the depth of community commitment to this area.

We are similarly disposed to protect the land around Whetstone Mountain. Part of the proposed leasing area there is in the Crested Butte drinking watershed. The Town of CB has fought long and hard to protect this watershed.

HCCA recommends that the GMUG implement a No Leasing policy for the Kehler Pass corridor and lands adjacent, and for Whetstone Mountain Ridge-Wildcat Creek.

HCCA is also concerned generally about the fate of roadless areas on the GMUG. The GMUG has steadfastly refused to give these lands the real protection they deserve. We have noted many times the unique values of these lands. For one, they offer semi-primitive, backcountry recreation to motorcyclists and mountain bicyclists who cannot use Wilderness. If GMUG continues to fail to protect roadless areas, pressure will build to make them Wilderness. Roadless areas a critical to avoiding fragmentation of the forests and ecosystems on GMUG. They are critical to watershed protection.

HCCA therefore endorses Alternative 5 of the DEIS.

P.O. BOX 1066, CRESTED BUTTE, COLORADO 81224. 303/349-7104

STP01

We note, however, that Alternative 5 could have been constructed less stringently if the waiver provisions of USFS regulations were more stringent. It does no good to declare an area No Surface Occupancy if a decision-maker can later waive that stipulation. There is no real protection when waivers are allowed. If waivers were prohibited, then oil companies could have access to resources lying under sensitive NSO lands through horizontal drilling. These kinds of concerns are equally valid for other stipulations designed to protect surface values. It's a shame that USFS regulations don't allow more of a compromise. If NSO's and other stipulations were not waivable, HCCA might assent to NSO leasing in roadless areas and other areas of critical environmental or social concern.

We therefore recommend that you change the regulations to eliminate waivers of stipulations.

HCCA also endorses the comments submitted by Forest Rescue and the Town of Crested Butte. They have endorsed Alternative 3, No Leasing on the GMUG. We, too, believe No Leasing is necessary due to the inability of government to stand up to the mighty power of international oil companies. Yet we are willing to accept compromise embodied in Alternative 5. We also endorse concerns about particular areas and procedures expressed by Forest Rescue and the Town of Crested Butte.

Thank you for your consideration of these comments.

Sincerely,

Gary Sprung
HCCA President

0622

RECS02

RA2001

RA02

ALT501

Letter, Oil and Gas Leasing Analysis

Page 2

Sierra Club Uncompahgre Group
 c/o Vicki Mercer, P.O. Box 806, Palisade, Colorado 81526

October 12, 1992

Oil and Gas Leasing Analysis
 Grand Mesa, Uncompahgre, and Gunnison National Forests
 2250 Highway 50
 Delta, CO 81416

To Whom It May Concern:

The enclosed contains the Sierra Club Uncompahgre Group's comments on the Draft Environmental Impact Statement on Oil and Gas Leasing on the Grand Mesa, Uncompahgre, and Gunnison (GMUG) National Forests.

The Forest Service recognizes that Alternative 3 is the environmentally preferred alternative (page II-13). Sadly, our country seems incapable of choosing environmentally preferred alternatives. In the case of this particular EIS, the failure to do so stems from our unwillingness to address energy conservation issues in the most environmentally sound manner. We fully regret this dismal state of affairs, and believe it must change soon for the sake of our beleaguered planet and all of its inhabitants.

The Sierra Club Uncompahgre Group recognizes the demand for oil and gas from public lands. Therefore, we support Alternative 5 with modifications indicated herein. Our support for Alternative 5 is a compromise. We believe the Forest Service's Preferred Alternative is much worse, and fails to provide the public the greatest benefit (a stated purpose shown on page I-2). Clearly, Alternative 1, No Action, is unacceptable, because maintaining the status quo exposes the GMUG forests to continued mismanagement vis-a-vis oil and gas leasing.

Our most serious concern is that the Forest Service's Preferred Alternative will encourage new road construction to intrude into so much roadless acreage. The motivation for opening roadless areas to oil and gas leasing appears to be to increase logging in the GMUG Forests. The Preferred Alternative will certainly do no more to help the nation become more self-sufficient in energy than Alternative 5.

The Forest Service seriously overstates "lost opportunities" for oil and gas exploration and production if roadless areas are not available for oil and gas exploration and development (page II-17). The Plan is for a period of 15 years only; it is not perpetual. Roadless areas could be opened up in future. But once roadless, these areas can never become roadless again and will

ALT203

ALT302

OG08

never recover to their prior condition. This is especially true since the Forest Service intends for oil and gas exploration in roadless areas to directly result in increased logging. We reject the notion that it is acceptable for our generation to preclude options and availability of resources for future generations.

We must also comment on the content of the GMUG Gazette, Volume 2, Number 1, which the Forest Service states "is published in the public interest, as a means of providing a brief explanation of complex issues addressed in the Oil and Gas Draft EIS". A publication which fulfills these stated goals is highly desirable. However, we are distressed that the issue was used to promote the Forest Service's Preferred Alternative, rather than to introduce complex issues contained in the EIS.

Sincerely,



Vicki Mercer
 Executive Committee Member
 Sierra Club Uncompahgre Group

Enclosure

legitimately open for oil and gas exploration and drilling (e.g., signs, gates). Page S-15 states that "road use would increase during exploration and development stages". Increased road use will result in additional road maintenance costs, and we question whether these costs have been adequately anticipated.

C. Areas of Extreme Environmental Sensitivity

Page S-6 shows that oil and gas activities will affect areas of extreme environmental sensitivity, including aquatic/riparian/wetland habitats, alpine tundra areas, roadless areas, sensitive areas, recreation complexes, watersheds of special interest to municipalities, elk calving areas, and bighorn sheep lambing and breeding areas. We seriously question whether impacts have been adequately anticipated and whether mitigative factors are adequate to protect these public resources. The impacts shown for Aquatic/Riparian Wetland Habitats are certainly unacceptable (page S-16). Furthermore, our support for Alternative 5 applies if, and only if, the Forest Service agrees to never waive "no surface occupancy" stipulations for such areas.

STP01

D. Rehabilitation

It is unclear to us if the Forest Service has estimated rehabilitative costs, and whether such costs are included in its economic analysis. The Final EIS should certainly address these costs. The Sierra Club Uncompahgre Group also submits that rehabilitative processes must address the following provisions:

1. Well sites and roads should be returned to the natural contour and to indigenous vegetation.
2. There should be protection against subsequent surfaces or groundwater contamination by salt water and other toxic elements from plugged wells (whether dry or exhausted).
3. There should be clearly defined and enforceable language which speaks to drillers' responsibilities for rehabilitation. Leases should stipulate the types of penalties for failure to fulfill rehabilitation processes. The Final EIS should state whether these penalties would include civil and/or criminal prosecution.
4. Bonds or escrowed amounts must be adequate to allow the Forest Service to rehabilitate areas should a lessee undergo financial failure and lack the resources to fulfill its contractual commitments.

OGM01

OG06

OGM03

E. Other Issues

1. The Forest Service's Preferred Alternative encompasses 1/3 of the 3 million acres contained in the GMUG (page ii). This is an excessive amount of public land for one use, especially given stresses the GMUG Forest endures from all of the other multiple uses which the Forest Service promotes.

Page I-12 states that lease rights provide that drilling and development take precedences over rights government may subsequently grant other users. The Draft EIS states that the Forest Supervisor may decide to authorize lease of all lands described as "administratively available" (page I-17). We believe this is totally contrary to the concept of managing public lands in the "best interests of the public". The Forest Service should guarantee that no more than a limited acreage will be unavailable for other appropriate uses of these public lands.

ALT03

A. Roadless Acreage Intrusion Issue

We object to the Forest Service's claim that its Preferred Alternative provides the greatest resource protection (page S-19). An additional 349,650 acres of roadless areas (relative to Alternative 5) could become subjected to roads. The resulting resource degradation new roads and timber harvesting will cause is not justified.

ALT06

It seems that the Forest Service prefers access to roadless areas in order to increase timber harvesting. We find this entirely unacceptable. Page S-18 shows that Alternative 5 yields the similar effects on the oil and gas industry as the Forest Service's preferred alternative (Alternative 2), without the corresponding negative impacts on the environment within roadless areas. Page II-4 (last paragraph) also shows that the number of wells drilled for Alternative 2 and 5 remain the same. We see absolutely no increased benefit to oil and gas exploration and development to go into roadless areas. In addition, costs of going into current roadless areas will be higher, and would surely reduce economic benefits.

RA04

Pages S-9 and I-24 states that the Forest Service's preferred alternative provides an "opportunity", through development of roads not now roaded, to access timber stands otherwise uneconomical to reach and add to the Forest's timber base and harvest more timber than would otherwise occur because of increased road access. We view increasing the timber harvest yield in the GMUG Forests more of a nightmare than an opportunity. Page S-17 states that the impacts of the Forest Service's Preferred Alternative will be compounded in areas opened for logging after oil and gas activity. We believe that the impacts caused by increasing timber harvesting in current roadless areas, pursuant to the Forest Service's preferred alternative, is unacceptable.

TW01

Page I-16 states that proposed activities must not unduly harm the environment or disproportionately interfere with other uses of NFS lands. We submit that the Forest Service's preferred alternative does unduly harm the environment and disproportionately interferes with other uses of NFS lands. The added impacts are unjustifiable, given that Alternative 5 provides virtually the same benefit to oil and gas exploration and development. Among the unjustifiable impacts are a potential decrease in backcountry recreation opportunities (page S-16).

RECG08

Page II-6 shows that the total number of acres disturbed (503 acres) over the next 15 years is constant for all alternatives. This cannot possibly be accurate, given that activities in roadless areas is bound to disturb more acreage than Alternative 5 (which excludes roadless areas from oil and gas exploration and development).

CE02

Page II-9 states that timing restrictions of other activities in current roadless areas would not apply. We submit that timing restrictions within roadless areas would be as applicable as elsewhere. Also, timing of road construction is appropriate, to minimize erosion and reduce wildlife impacts (second bullet). See also page II-12, next to last paragraph.

STP03

B. Road Construction and Maintenance

Page II-3 states that standard lease terms allow road construction on the leasehold. The Final EIS should specify who will build and maintain road access in the leasehold. Also, poor road construction is a primary cause of surface degradation from resource extraction processes. Therefore, roads should be constructed to the highest standards to minimize surface degradation. Measures should also be taken to prevent casual recreational use while roads are

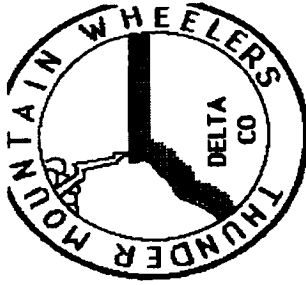
RD20

RD21

RD08

Sierra Club Uncompahgre Group's Comments
 GMUG Forests, Draft Oil and Gas EIS

Page 3 of 3
 October 12, 1992



Kim Kokesh, President
 Thunder Mountain Wheelers
 860 E Highway 92
 Delta, Colorado 81416

October 6, 1992

Oil and Gas Leasing Analysis
 Grand Mesa, Uncompahgre, Gunnison NF
 2250 Highway 50
 Delta CO 81416

On behalf of our 140 members, we officially endorse and support your Oil and Gas Leasing DEIS.

The members of our organization enjoy many varieties of outdoor recreation, including all types of motorized recreation. As such, it is our belief that roadless areas should only occur in designated Wilderness Areas; country so uniquely beautiful and special so as to deserve preservation through Congressional action. None of the areas considered for oil and gas leasing have these qualities, including the areas that are proposed to receive the "no-lease" designation.

We believe all lands outside formal Wilderness Areas should be available for activities that will benefit all of the people. Oil and gas leasing is one of those activities.

The only change we would suggest to the recommended alternative would be to NOT protect the Kannah Creek, Roubideau, and Tabeguache areas with "no lease" designations. In our opinion, none of these areas have the qualities to be preserved as roadless, ie wilderness, and should be opened to the public for commercial use and motorized recreational enjoyment.

Sincerely,

KIM KOKESH

2. AEG23 The Summary (page S-15) underestimates the impact of oil and gas development on vegetation. The Summary should reflect that plugged wildcat wells have been known to leak oil and saltwater and contaminate soils, causing situations where vegetation is unable to grow, as indicated on page II-3 (#11).

3. OGRHF01 We question the use of assumptions based on continuing drilling at the same conservative levels of 1986-1990 (page II-4). These assumptions will prove to be false if a gas transmission line is in place. We believe that any assumptions used to anticipate impacts (page S-8) should be established as rules governing allowable oil and gas exploration and development. The Forest Service should guarantee that assumptions used in preparing the Draft EIS will not be exceeded. Any deviation in practice would go beyond the impacts considered and allowed under the EIS.

NP16 The Oil and Gas Leasing Plan should stipulate that management of leases will limit drilling activity to Analysis Assumptions #1, which specifies 3% of the regional activity, and does not exceed projected disturbance of 503 acres. The Forest Service should also limit the number of wells to 47 wells over the next 15 years (7 on new leases), which is an assumption given on page I-23 and page II-4.

4. AEEG04 Page S-18 states that "any alternative could affect consumers if oil and gas prices are kept lower or higher due to increased or decreased supplies of these items". This statement begs us to ask "how" the alternatives could affect consumers. The statement as is says absolutely nothing, and is furthermore not supported anywhere within the Draft EIS. The EIS fails to address economic issues; there is no supporting in-depth analyses. Such analyses should include the adverse economic effects of low oil and gas prices, particularly on alternative energy and energy conservation economic sectors of the U.S. economy, and on the high cost to consumers as a result of pricing policies which favor pollution control over pollution prevention.

5. OG11 Page I-1 states that "the Federal Government seeks to reduce its dependency on oil and gas from other nations by continuing to locate and develop its reserves". Conservation and alternative energy would do more to reduce dependency on oil and gas imports. The Forest Service should at least give some recognition to these higher objectives.

ALT201

RA06

RA195A
 RA241A
 RA242A

Western Colorado Congress

Main Office
7 North Cascade Suite A
P.O. Box 477
Monte Vista, CO 81402
(303) 248-1878

Southeast Office
820 East Seventh Street
Suite B
P.O. Box 2461
Durango, CO 81302
(303) 258-8588

October 28, 1992

Robert Storch
Forest Supervisor
Grand Mesa, Uncompahgre and Gunnison National Forests
2250 Highway 50
Delta, CO 81416

Re: Draft Oil and Gas Leasing Environmental Impact Statement

Dear Mr. Storch:

Western Colorado Congress (WCC) and the Western Slope Energy Research Center (WSERC) submit the following comments on the Draft Oil and Gas Leasing Environmental Impact Statement (DEIS) for the Grand Mesa, Uncompahgre and Gunnison (GMUG) National Forests. WCC appreciates the opportunity to submit our comments on the DEIS after the official comment period has ended. Given that oil and gas issues are a relatively new occurrence on the GMUG Forests, WCC would have preferred an extended comment period to allow the public more time to analyze this complex and lengthy document. However, the informal extension of the comment period has undoubtedly allowed for more public response to this important document.

WCC is an organization of individuals and nine community groups from Glenwood Springs to Pagosa Springs. WCC has over 1,200 members, many of whom use and enjoy the GMUG National Forests. Since 1983, WCC has been very active in the planning process for the GMUG Forests. In 1988, WCC provided written comments on the Draft Plan Amendment and DSEIS for the GMUG Forests and again in 1991 on the Final Plan Amendment and FSEIS. In 1986, WCC negotiated an agreement with the Forest Service to limit aspen cutting on the GMUG Forests and in 1988 WCC participated in the creation of the Keystone Agreement. In addition, WCC has been involved in numerous timber sales in its ten-year history.

WCC has also been active in oil and gas issues, mainly in southwestern Colorado. WCC has worked to lessen the impacts of oil and gas drilling on private landowners who do not own the mineral rights to their property. More recently, WCC has been involved in oil and gas leasing in the HD Mountains on National Forest land. WCC believes that the Environmental Impact Statement for drilling in the HD Mountains was inadequately prepared and therefore WCC is opposed to Amoco's drilling.

WCC applauds the Forest Service on the clarity of the DEIS. Dividing the Forest into "affected environments" and then presenting the impacts of the alternatives on each of these "environments" provides a much clearer picture to the reader. WCC has much less appreciation for the *GMUG Gazette*. The Forest Service's use of printed propaganda to attempt to gain public acceptance for the Preferred Alternative is highly questionable and improper. WCC appreciates that the Forest Service has tried to

Member group of Community Shares of Colorado

present the issues in a format that is easier to read than the DEIS. However, it is inappropriate to use the *Gazette* as a tool to manipulate public opinion before the comment period has ended and the decision made.

Despite the Forest Service's cheerleading for the Preferred Alternative, it was revealed in a recent article in the *Crested Butte Chronicle* and *Pilot* that the majority of the comments received so far by the Forest Service for the DEIS have not favored the Forest Service's Preferred Alternative. Most responses have indicated support for Alternatives 3 or 5. Also, in an article which appeared in the *Grand Junction Daily Sentinel*, it was stated that outfitters and guides have submitted over 1,000 signatures to the Forest Service in support of Alternative 5. The Forest Service must adequately address the concerns of the citizens of the Western Slope before a Final EIS can be released.

NP14

In a recent phone conversation with a WCC member, you said that you would like to have a Final EIS out by the end of the year. Also, in the aforementioned article in the *Chronicle* and *Pilot*, Forest Service Planner Jeff Burch echoes this desire. WCC believes that there is no way that the Forest Service can mitigate public concerns with the DEIS before the end of the year and asks that you reconsider your timeline taking into account the volume of response that this DEIS has generated.

In general, the DEIS does a good job of describing the consequences of oil and gas leasing on specific environmental factors and forest resources. It is startling however, to realize that the impacts described are the result of only 47 new wells being drilled on the forest, and of those, only 7 on new leases (see Analysis Assumptions at S-8). What is even more frightening is that the Forest Service could look at these impacts based on said assumptions and then designate Alternative 2 as "Preferred". If industry should express interest in drilling more than 47 wells, then the entire analysis will be wasted.

ALT206

WCC appreciates this opportunity to comment on the DEIS and looks forward to reviewing the Final EIS. Have a safe and happy holiday season.

Sincerely,

Jerry Swingle
Jerry Swingle
President

NP17

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I. INTRODUCTION

Western Colorado Congress (WCC) is a citizens organization of over 1,200 members and nine community groups spread throughout western Colorado. WCC was formed in 1980 and has been involved in forest management issues since 1983. WCC's membership includes Western Slope residents who use water originating on the Grand Mesa, Uncompahgre and Gunnison (GMUG) National Forests to meet domestic and agricultural needs. Our members also gather firewood, graze sheep and cattle, hunt, fish, and enjoy the beauty of the GMUG National Forests.

For the reasons outlined below, WCC cannot support the Forest Service's Preferred Alternative.

II. SPECIFIC DEFECTS, OMISSIONS, ERRORS

- AENW05 | 1. The springs that provide municipal water to the Town of Peoria were not identified on a large scale map the Forest Service displayed at the Peoria Town Hall meeting this fall. All municipal watersheds should be unavailable for leasing.
- AEMW07
- AERC04 | 2. Some Major Recreation Trails such as Bell Creek (#634), Horse Ranch Park (#630) and Rugged (#820) are not identified in Fig. III-17.
- AERC05 | 3. Much more of the Analysis area than is shown at Fig III-16 would be considered Dispersed Recreational Area by anyone familiar with the Forest.
- AEW12 | 4. Some Big Game Winter Range areas are not indicated at Fig. III-21. Such areas include that portion of Coal Creek within the Analysis Area and along the Forest boundary south of the North Fork of the Gunnison River. Historically there was more winter range on the Forest, but pressures from human activities such as timber harvesting, longer hunting seasons, etc. have helped change wildlife behavior and range utilization patterns. Also, there are more areas than those indicated in Figs. III-22 and III-24.
- AEG28 | 5. We assume that the S.L.T for wildlife summer range under Alternative 5 at Table S-2 is a printing error.

III. THE CUMULATIVE IMPACTS TO THE AFFECTED ENVIRONMENTS UNDER THE PREFERRED ALTERNATIVE ARE UNACCEPTABLE

- 1. Biological Diversity
Alternative 2 would cause the loss of 12 Roadless Areas "as existing natural

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- 1. Biological Diversity
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ATTACHMENTS

- 1. Comments from Steve Hinchman

communities and as potential reintroduction for threatened or endangered species if oil and gas development does occur" (DEIS IV-39). These areas are critical habitat for a large variety and number of species, some of which are already experiencing declines in population due to habitat loss and/or fragmentation. Industry may argue that Wilderness Areas already provide the attributes of roadless areas. Most Wilderness Areas, however, are in the alpine to sub-alpine zones while roadless areas tend to range from transition to sub-alpine zones; areas conducive to greater biological diversity. The importance of Roadless Areas to biological diversity and the detriments are clearly identified in the DEIS at IV-40:

The leasing of any Roadless Area to oil and gas activity will significantly change the natural character of the area because of the road access that is necessary to conduct oil and gas activities. The cumulative impact resulting from the subsequent connected actions of timber harvest, increased human use, recreational developments, and trapping as a result of the road will forever change the area as a natural community. Species like the goshawk, pine marten, lynx, wolverine and many others are very dependent on these areas as the core of their home ranges. Entering into these areas, combined with all the other forest activities going on in adjacent areas, would continue the loss of habitat...which is necessary to their survival.

AEIG05

Clearly, Alternative 3 is the best choice when it comes to maintaining biological diversity, followed by Alternative 5.

The DEIS correctly equates the decline of such natural communities with increasing species extinction (DEIS IV-38). The Forest Service is obligated to make management decisions that will at least maintain: 1) the relative abundance and distribution of natural communities, and 2) the plant and animal species which are components of those communities. It is therefore most concerning that decision-makers could prefer an alternative that will exacerbate the problems of species extinction, habitat loss and fragmentation and decline of natural communities. Given the recent storm of controversy over the northern spotted owl, why would the agency choose a course of such vulnerability?

2. Water Quality

The effects of the Preferred Alternative on water quality described in the DEIS are very disturbing, particularly in light of the very low levels of development projected in the RFD scenario. Special concern arises with the likely concentration of wells in the watersheds tributary to Muddy Creek. In addition to being tributary to the high quality fisheries of the Gunnison River, this creek is the source of irrigation water for over 8,000 acres of farmland in the North Fork Valley. It provides water to the federally-constructed Paonia Reservoir, which was built for flood, control, irrigation storage, recreation and fishery. This water is high in sediment washed from the very lands being proposed for leasing, lands that are of moderate to high geologic hazard. To create the "reasonably high risk" of increased sediment loading to Muddy Creek as well as the "expectation"...of occasional spills of waste water and fuel" (DEIS IV-46) by extensive leasing is brazenly foolish. The negative effects would impact not only hundreds of recreational boaters and those who fish as well as fisheries and aquatic life. It would contribute perhaps significantly to the salinization of the Colorado River Basin. It would also violate the State of Colorado's stream quality program and perhaps the Clean Water Act.

AEIMV08

Another significant concern is with the likelihood of groundwater contamination. The DEIS identifies some of the potential problems but is hazy on the probability of severe situations such as interzonal migration. It may be more instructive to examine the effects of oil and gas development in the San Juan Mountains in recent years and presently. Last year it was discovered that roughly one-quarter of wells tested in La Plata County in southwestern Colorado had contamination from oil and gas drilling. Thus it is disingenuous to state that "holes must be constructed to preclude the interzonal migration of fluids" (DEIS IV-47). Such holes have resulted in the irreversible loss of water resources in a nearby area of Colorado. Statements at DEIS IV-47 exemplify the BLM's and Forest Service's attitude that virtually all impacts are mitigable: "Oil and gas operators are regulated to protect fresh water zones..." and "Priority for the administration of water disposal or injection wells rests with the State of Colorado..." and "Because of the controls required for reporting and cleaning up of any spills or leaks, potential impacts to groundwater are expected to be minimal." We only wish it were so: that because there exists a law or regulation, or because mitigation measures are required, management decisions and activities would not have destructive results and multi-national corporations would not cause incidents like the contaminated wells near Durango, or the Exxon Valdez spill or the Bhopal disaster.

Elsewhere, however, the DEIS admits that mitigation may fail: under the Preferred Alternative "the stipulations associated with areas with slopes 40-60% (GSU) and moderate geologic hazard (CSU) may have the potential to cause some long-term significant impacts to riparian areas and floodplains." (DEIS IV-63). Again, this conclusion is based on the assumption that only 47 wells will be drilled over the next 15 years. How much greater and more widespread will such long-term significant impacts be if the number of wells is three, eight, or twenty times greater?

AEIG23

The DEIS should discuss coalbed methane production separately. The potential for production and subsequent disposal and pollution problems of extremely saline water is higher with coalbed methane than with deep sands gas. It is difficult for the public to evaluate the little coalbed methane information because Fig. 8 is totally illegible.

OGCBM6

One would think that experience would lead to more detailed discussions of some items. For example, why didn't the DEIS display the likely quantity of production water from wells already drilled on the Forests? It would be useful to have some quantitative parameters when dealing with such things as discharges of produced water into surface waters (streams), injection wells, and concentration of toxins in production water. The DEIS states that "oil and gas operators...currently operating in the study area...have not adversely impacted groundwater quality or groundwater levels" (IV-47). We wonder about the basis for and the validity of this statement. (Several years ago an oil slick was observed on the Paonia Reservoir but its source was never determined, although a pump jack was operating at the time upstream on Muddy Creek.)

OGCBM8

3. Visual and Recreational Resources

Again we see the proposed sacrifice of amenity resources to commodity output. The DEIS finds that Alternative 3 followed by Alternative 5 are best at protecting both recreation and visual resources. Unfortunately, the analysis is based on two interlocked and highly suspect systems: the Visual Quality Objectives and the Recreation Opportunity Spectrum. (Virtually no one among GIMUG personnel can explain these arcane systems.)

The VOCs appear to have been adopted without NEPA documentation. One result, we believe, is that many areas classed as modification or maximum modification should be

AEV01

AEV01 classed as retention or partial retention. Furthermore, we believe it is a mistake to now make leasing decisions that will forever change the character of much of the Forest based on decisions made without the public participation inherent in NEPA.

RECG08 The conflicts with most types of recreation and particularly the reduction in dispersed back-country recreation opportunities resulting from the Preferred Alternative are unacceptable.

4. Wildlife

While the DEIS identifies the potentially severe impacts to various wildlife populations, it would have us believe that mitigation will minimize these impacts. The degree of mitigation is made suspect by a tendency to fudge the intent of the Preferred Alternative. For example, under Big Game Winter Range and Elk Calving Areas the DEIS equates the efficacy of Timing Limitations and Controlled Surface Use with that of No Lease (DEIS IV-74). That this is untrue is supported elsewhere in the DEIS at Table S-2 where we see that of 21 Identified Roadless Areas, 15 would have standard lease terms resulting in the "severe disruptions", "stress", "overcrowding", disruption of life cycles, "animal mortality", "permanent displacement", and "cumulative population losses" to big game described at DEIS IV-74 and 75. Clearly there will be severe and perhaps permanent impacts to big game under Alternative 2 that can only be avoided by not leasing their critical habitat. (We again point out that Figs. 21, 22 and 24 did not identify all the respective areas they should have).

We are glad to see that a Forest Service NEPA document finally acknowledges that management actions can cause "additional pressure [to] be placed on private lands to provide secure wildlife habitat." Such movement onto private lands have resulted in millions of dollars of losses to farmers, ranchers, increased road kills and vehicle damage, and increased stress on human populations. That implementation of Alternative 2 would likely exacerbate this situation is unacceptable.

The above discussion of impacts to biological diversity also applies to wildlife.

We strongly urge the GIMUG Forest Supervisor to read the sections on wildlife in the DEIS, particularly IV-56, before issuing the ROD.

5. Economics

The DEIS understates the significance of the potential loss of guide and outfitter businesses at IV-60. Hunting is one of the top three economic generators in the North Fork Valley and is very important to the communities near the study area. We oppose the loss of these businesses and decline of quality hunting that would be induced by adoption of the Preferred Alternative.

The impacts to water quality could adversely affect thousands of acres of economically important irrigated land. The burden of protecting the quality of water resources rests squarely with the Forest Service.

6. Roadless Areas

It would be difficult to see how a reasonable person could read the DEIS and then choose to lease any roadless areas. The analysis is compelling: no roadless areas should be leased and as leases expire on Roadless Areas they should not be leased again. Unfortunately, Alternative 5 does not do enough to protect roadless areas.

Much of the roadless area is already leased presumably under Standard Lease Terms. (Given the description of impacts under STL-5, it was a grave error to have leased these areas at all, let alone leased with STL-5.) The Forest Service needs to find a way to regain control over these leased roadless areas. The DEIS is confusing in describing what Alternative 5 really entails. At Tables S-2 and II-5 it appears that under Alternative 5 there would be no leased Roadless Areas. The DEIS should have displayed which leases in Roadless Areas have producing wells, when current leases expire, etc. Instead the public is left with the impression that the possibility exists of protecting all roadless areas by not leasing them. It is a key flaw in the DEIS that existing leases tend to distort the leasing options displayed. It is difficult to sort out how they also distort the impacts to the affected environments.

The GIMUG planners should review the comments received for the Draft and Final Supplemental EISs for the 1991 Timber Amendment. There, the concern with development of roadless areas and pushing roads further into the Forest was overwhelming.

Additionally, the DEIS discovers that even with the various stipulations imposed under timing restrictions and controlled surface use oil and gas leasing will adversely affect many other resources on the Forest. Vegetation suffers because of the opening of previously unsuited timber lands. "Whether oil and gas construction activities occur, the soil resource would be impacted," (DEIS IV-42). Areas released with Standard Lease Terms would see "disturbances in sensitive soil areas that would result in unacceptable soil resource damage" and "areas [that would be] irretrievably and irreversibly altered." (DEIS IV-42). The DEIS states that the Allowable Sale Quantity (ASQ) for timber may increase, but in order for the ASQ to increase, the agency must first initiate the NEPA process and amend the Forest Plan.

IV. THE DEIS VIOLATES THE NATIONAL ENVIRONMENTAL POLICY ACT

By using a Reasonably Foreseeable Development scenario that is unrealistic, the Forest Service has skewed the analysis. Fundamental to any EIS are the assumptions chosen upon which to base the analysis. In this case, the Forest Service and Bureau of Land Management have assumed that "drilling activity... will continue at the same conservative levels of 1988 to 1990" (DEIS E-4). While this could be the case, GIMUG planners should have at least considered other levels of activity for the reasons stated in Appendix A of these comments. While the environmental consequences of implementing Alternative 2 are bad enough at the assumed development level of 47 new wells, they are unimaginable at a potential development level of hundreds or even thousands of wells.

On the other hand, if we accept the RFD, then there is certainly no reason to lease an additional several hundred thousand acres (and particularly 200,000 acres with Standard Lease Terms) since the seven wells on new leases could be drilled on a few small leases.

V. THE DEIS IS INSUFFICIENT FOR THE DECISIONS REQUIRED BY 36 CFR, SUBPART E, 228.102
The intent of the agency is to issue a Record of Decision with the Final Oil and Gas

Response to the Draft GMUG Oil and Gas EIS

The Oil and Gas Reform Act puts the responsibility for leasing oil and gas on the National Forest on the US Forest Service. The first leases in Region II were contested and due to the requirements of NEPA, all the Forests in Region II are producing EIS documents on oil and gas activities. According to NEPA, the public has a right to know what the likely effects on foreseeable development will be. Further, the U. S. Forest Service must manage this resource along with all the other uses on the forest, and prevent this resource from overwhelming the forest.

A comparison between this document and reality can lead only to one conclusion. This document does not in anyway examine the relationship between future foreseeable demand and the likely effects that demand will have on the ground in the GMUG forest. We are presented daily with articles and advertisements in the media touting the future of natural gas. In the last week two examples that stand out to me are:

- 1) An ad in House and Garden that California's PG&E is converting its fleet of vehicles to run on natural gas.
- 2) The passage of the new "Energy Policy" legislation that calls for accelerated development of all phases of natural gas development.

The Reasonable Foreseeable Development level used as the basis for this document is unrealistic by any set of criteria and represent a total waste of time and money. It is my understanding the level of RFD used here comes from the geologist at the BLM, who are held in high regard by the prepares of this document. However, if the means of selecting 7 new leases was not the loss of a dart, it must have been a linear extrapolation of activity during a time of very low activity. The method used did not take into account even a casual examination of the trends in the marketplace that will effect the future price of natural gas and hence the level of pressure for development of production capacity for the same.

Some factors NOT considered in the document are:

- 1) The trend in commercial power generation toward natural gas as the fuel of choice for new power plants. This is evidenced by the conversion of existing nuclear plants in California and Colorado to natural gas.
- 2) Electric Utilities are building more natural gas fired power plants than plants using any other fuel.
- 3) Statements by the Utility Data Institute that one half of all new power plants built in the US in the next 10 years will use natural gas.
- 4) The current construction of the Trans Colorado Pipeline which will link the existing and proposed wells in the Piceance Basin with other major pipelines that serve the metro areas and powerplants of the entire nation. This will obviously greatly increase the market ability of gas produced on the GMUG forest, and consequently the likely hood increased development here.
- 5) Natural gas produces less pollution than coal or oil in terms of sulfur oxides and carbon dioxide. There is a global movement to curtail the production of both of these emissions that will enhance the

Leasing EIS that will address two decisions: 1.) "which lands are administratively available for leasing and under what stipulations" (d), and 2.) to authorize the BLM to offer leases for specific lands (e). There is nothing in the DEIS that prepares the Forest Supervisor for making an informed decision.

In summary, the impacts to the various Forest resources under the Preferred Alternative are unacceptably severe, even at the unrealistic development levels assumed in the DEIS. At a more realistic higher level of development, the impacts would be much greater. If we accept the RFD levels of the DEIS, there is no reason to lease more than a few thousand acres to meet industry's interest. And there is certainly no need to lease any Roadless Areas. As leases in Roadless Areas revert to the government, those areas should be made unavailable for leasing.

VI. ADDITIONAL RECOMMENDATIONS

- 1. All Roadless Areas should be unavailable for leasing. Current leases in Roadless Areas that have no producing wells should not be renewed. Current leases in Roadless areas that have producing wells at the time the lease expires should be redesignated so that any additional drilling would be directional from points near the existing wells or from an appropriate point on the perimeter of the Roadless Area.
- 2. All municipal watersheds should be unavailable for leasing.
- 3. There should be no leasing in the Kebler Pass corridor.
- 4. There should be no waivers of lease stipulations.
- 5. The DEIS needs to display the impacts associated with a higher level of exploration and development.
- 6. The DEIS should reveal how the unitization process occurs and how unitization affects the Forest.
- 7. There should be no leases with Standard Lease Terms. The Forest Service relinquishes too much authority and control with SLTs.
- 8. Much of the analysis area is already leased. The Forest Service should analyze an alternative that leases no new lands, does not re-lease non-producing leases, rationalizes existing leases, consolidates existing leases into more manageable blocks, etc.

0GRF06
0GRF04
0GRF01
0GRF02
0GRF03

0GRF07

0GRF08

0GRF05

ALT02
RECS02
STP01
0GRF01
0G34
STP20
ALT01

There will be a lot of pressure to grant exemptions if a lease with exemptions is in the vicinity of a lease with SLT. Without a clear policy statement acknowledging these SLT leases and declaring a policy of no exemptions on future leases, it might even be argued in court that more stringent stipulations intermingled with SLT represents unfair practices of some sort.

STP96

7) There is no attempt to rationalize the existing leases. That is, there should be an alternative that attempts to integrate the existing leases and proposed leases into logical units that can be both efficiently managed and efficiently produced. There should be an attempt to foresee an efficient and minimally environmentally disruptive road infrastructure and efficient pipeline design to service the likely full field development that will far exceed the RFD used here. An effort should also be made to consolidate existing leases into Blocks held by single producers through trading outlying leases for leases nearer existing leases.

ALT01

Factors that deserve more consideration

1) The area identified here for leasing is on the southern edge of the Piceance Basin, the largest known natural gas deposit in the country.

2) Full field development sometimes runs as high as 3 wells per square mile. Extrapolated to the area identified for leasing in the draft EIS, this would approach 3,000 wells on the GMUG. Although this is hopefully unreasonably high number, it illustrates the absurdity of 7 wells for the RFD.

3) The trans Colorado pipeline, by its size and location, is obviously not intended to carry gas for domestic consumption.

4) The Piceance Basin contains vast deposits of CBM. There is a high likelihood of significant CBM development in the GMUG. See pg E-2 and E-16 (fig 8). This indicates that a significant portion of the GMUG has high and moderate potential for CBM production. This has been glossed over to an amazing degree. Why are we paying people to do this study if they are so out of step with the realities of the situation, unless they have been ordered to ignore the realities of the geologic situation, and the realities of the by-products of the CBM production process?

OGCBM1

5) However, the document acknowledges the possibility of extremely salt-laden production water being brought to the surface. The document should provide a thorough discussion of all aspects of CBM production, including the environmental consequences of vast quantities of production water that can contain up to 15% salt. This is many times saltier than the ocean.

OGCBM2

6) The consequences of large scale development of CBM and the inherent vast quantities of extremely salty water has been examined elsewhere. Apparently, in an area such as this where rainfall sometimes exceeds evaporation, any surface disposal of salt would eventually be washed into the river drainage system. It is estimated that enough salt could be brought to the surface as a by-product of CBM production to render the waters of the Colorado unusable.

7) The local irrigation water is already borderline from a heavy load of salt and dissolved solids, any degradation would render it poison to crops and soil.

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market position of natural gas.

6) Public Utility Commissions in California and Nevada already have rules charging utilities for the "externalities" of power production. This means they are being penalized for pollution. Natural gas pollutes less, and hence will be ever more in demand in the coming years.

7) The new Energy Bill streamlines leasing procedures for natural gas, a move clearly aimed at increasing its production.

8) At this moment (Oct 12, 1992) the spot price for natural gas is at an all time high.

9) There is a clear trend developing toward the fleet motor-vehicle conversion of natural gas, as evidenced by the imminent conversion of the nation wide fleet of the United Parcel Service.

10) There is a planned forced conversion away from gasoline and diesel in southern California that could well portend a national trend toward the use of natural gas as a motor fuel.

OGCBM3|11) Plans in the Dept. of Energy to push the development of Coal Bed Methane.

OGCBM4|12) Large tax incentives for the development of CBM.

13) Rancho Soco Nuclear Generating Station in California and Ft. St. Vrain Nuclear generating station in Colorado are converting to natural gas.

ALTERNATIVES NOT LOGICAL

The alternatives used in this document are not logical and do not represent as sufficiently wide range of alternatives.

1) There is a gross underestimation or RFD used in all the alternatives (see above).

2) One third of the area proposed for leasing is **already** leased.

3) The majority of these existing leases are Standard Lease Term Leases (SLT), and therefore not subject to any of the mitigation measures proposed in the document.

4) The existence of these existing leases renders Alternative 5 meaningless. Nominally designed to protect unleased areas, these existing leases virtually guarantee that these areas will be leased, opening the areas to any new leases as well.

ALTS04

5) These existing leases make the restrictions imposed in the preferred alternative similarly meaningless.

ALT202

6) Also, there is no mention of the common practice of granting exemptions from stipulation after the lease is granted. Extensive use of exemptions from stipulation would obviously render the stipulating ineffective, and the likelihood should be addressed.

STP95

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UNIVERSITY OF COLORADO WILDERNESS STUDY GROUP

October 13, 1992

To:
Oil and Gas Leasing Analysis
Grand Mesa, Uncompahgre, Gunnison N.F.
2250 Highway 50
Delta, Colorado 81416

On behalf of the Wilderness Study Group, we would like to make the following comments on the proposed leasing of roadless areas for potential oil and gas development on the Grand Mesa, Uncompahgre, Gunnison (GMUG) National Forests. In the draft environmental impact statement (DEIS), there are some areas that we feel have been well addressed, and others that we feel need to be re-examined in a further study.

The DEIS does not propose to lease nearly two million acres of the three million acre Forest because of a low mineral potential. This is bona fide. The recognition of sensitive resource lands such as wetlands and alpine areas, that have been given a "no surface occupancy" stipulation, is also important. These sensitive areas should continue to be protected, and the no surface occupancy stipulations on leases should not be waived under any circumstance by the Forest Service. This would allow for ground disturbing activities in the sensitive areas, and an overall net loss of value on the Forest.

We, at the Wilderness Study Group, believe that the preferred alternative in the DEIS (which calls for the opening of 350,000 acres of roadless land on the GMUG) should be changed. The Forest Service's own analysis shows that closing these roadless areas to oil and gas leasing will have no impact on the level of oil and gas activity on the Forest in the future, it will only shift the burden to less pristine areas. This is countered with admissions by the F.S. that the proposed (preferred) alternative would result in "some loss of biological diversity" and "reduced opportunities for dispersed back country recreation". To us, there is a fundamental jump in logic that is incongruous. If the DEIS says that by not entering these areas, that no net loss of oil and gas production (activity) will ensue, and then counter that with the statement that a loss in biological diversity and recreation will follow, then it seems reasonable to us that the preferred option that the F.S. selected should not be chosen for the final alternative.

The Wilderness Study Group, which sponsored two summer interns to study roadless areas on the GMUG this past summer, would ask that Alternative Five from the DEIS be selected. This designates all roadless areas as "no lease" areas, and still allows for oil and gas mineral development in an environmentally safe manner. We would also like to point to several roadless areas that we feel are in

UNIVERSITY MEMORIAL CENTER 183 BOULDER, COLORADO 80309 (303) 492-6870

8) The water that the lower basin states draw from the Colorado is heavily laden with salt and dissolved solids, and any increase would extract a heavy toll from agriculture in those states.

9) The water that reaches Mexico is already of very poor quality. Witness the construction of costly de-salination plants as a pathetic attempt to uphold the US obligations to provide Mexico with water suitable for agriculture from the Colorado River. Any increase in the salt load going into Mexico will render the water totally unusable.

10) It has been estimated that pumping the salt from extensive CBM production to the ocean would significantly pollute the ocean.

11) The document indicates that permits would be required to dispose of production water by injection, but ignore the fact that the technology to re-inject this brine does not exist. The recent attempts at re-injecting brine in the four corners area are largely failures. The deep injection simply did not work, and re-injecting the brine into shallower aquifers resulted in pollution of domestic wells and the seeping of methane into basements, with various consequences.

12) The document should deal with the fact that like nuclear waste, no path exists to dispose of the salt that will accumulate as a by-product of CBM.

13) The document should address much more in terms of water quality than impacts from erosion and road construction.

14) The document should examine the fate of previous cultures that relied on irrigation for their survival, and the role increasing salinity in their soils played in their demise.

15) The impacts to water quality from road construction and erosion from production facilities should be calculated on the basis of a RFD of closer to a thousand wells.

16) The document should examine the effects on wildlife and bio-diversity from a more realistic RFD.

17) The document predicts that there will be serious degradation of critical wildlife habitat even with the unrealistically low RFD. This must be examined in the light fact the future will place massive demands for all phases of natural gas production and development on the GMUG forest.

18) If the true scale of likely future development is taken into account, the Forest Service will likely conclude that without a tremendous effort on the part of the Forest Service, this development will overwhelm the GMUG National Forest.

If the final EIS bears any resemblance to the draft, it will likely be found in court to have violated the public's right under NEPA to be informed of the likely consequences of the management decisions of the US Forest Service.

Sincerely, Bill Brunner
P.O. Box 172
Poncha, CO 81428
Co-chair, Western Slope Energy Research Center



UNIVERSITY OF COLORADO WILDERNESS STUDY GROUP



Colorado Chapter of The Wildlife Society

Donald Whittaker, Chairman
 Conservation Review Committee
 Colorado Chapter of The Wildlife Society

October 9, 1992

Oil and Gas Leasing Analysis
 Forest Supervisor's Office
 Grand Mesa, Uncompahgre and Gunnison National Forests
 2250 Highway 50
 Delta, Colorado 81416

Dear Mr. Storch,

The Colorado Chapter of The Wildlife Society (CWS) is an organization representing over 400 professional wildlife managers in Colorado employed by various state and federal agencies and private corporations. We have reviewed the DRAFT OIL AND GAS LEASING ENVIRONMENTAL IMPACT STATEMENT (Draft EIS) for the Grand Mesa, Uncompahgre, and Gunnison National Forests. Overall, it appears that the Draft EIS provides managers with the tools to protect wildlife resources associated with affected areas and still utilize the mineral resources of the area. We do, however, have some specific concerns regarding the Draft EIS.

References are continuously made throughout the document with respect to suitability of timber for harvest. At times it was difficult to determine if the Draft EIS is an oil and gas EIS or a timber management EIS. If timber harvest is a secondary objective of this document, it should be stated. Our recommendation would be to not allow timber harvest in those areas already impacted by oil and gas activities.

It is not clear in the Draft EIS whether oil and gas activity will be allowed to occur in wetlands, floodplains, and riparian areas. We are concerned that the document does not specifically state who is responsible for reclamation/replacement of these areas if they are disturbed.

We are concerned that the Draft EIS relies on timing limitations too much for mitigation of impacts to wildlife. We feel that timing limitations may not be adequate for some areas. These limitations are only for oil and gas activities and may do nothing to control the potential increase in other human activities stemming from easier access created by oil and gas roads. Also, if a well becomes permanent, so does the disturbance. We would like to see more stipulations on allowable acreage of disturbed areas, time limits for reclamation/restoration of disturbed sites, and exclusion of highly sensitive areas such as bighorn sheep lambing habitats and sage grouse leks and breeding areas from development.

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jeopardy. On the Grand Mesa, we have noted Springhouse Park (Flowing Lake), Priest Mtn., Electric Mtn., Nick Mtn., Salt Creek, and Clear Creek as critical areas that should be protected from roading and development. Battlement Mesa was also outlined, as well as Drift Creek and Raggeds in the McClure Pass region. Also worthy of consideration are the north West Elks, including Coal Mesa, Snowshoe Mesa, Kebler Pass and Wheistone Mtn. Finally, on the Uncompahgre Plateau, we have noted Kelso Mesa and Johnson Creek as sensitive roadless areas.

We would like to thank you for exercising your authority under the 1987 Oil and Gas Leasing Reform Act in protecting the Kannah Creek, Roubideau, and Tabeguache roadless areas with no lease designations. We would request that all other roadless areas (especially the ones listed above), receive that same no lease protection. These areas are of special concern to us, as well as to all citizens, for the fostering of biological diversity, intact ecosystems, and productive wild lands with intact wildlife corridors. The value of these still pristine roadless areas vastly outweighs the short-term gain that would be accrued through the preferred alternative. We do not want to see roads cut a swath through our shared wild lands. The multiple use agenda should be broad enough to respect that, and roads into unproductive oil and gas lands should not lead to an inferred 'hidden agenda' that would make increased timber volume and sales more economical.

William W. Martin

William W. Martin
 Wilderness Study Group
 Campus Box 207 UMC 183
 Boulder, CO 80309

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AEF03

OG06

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STP02

STP04

AEW06

AEW07

UNIVERSITY MEMORIAL CENTER 183 BOULDER, COLORADO 80309 (303) 497-6870

Although the Draft EIS states that new roads as a result of oil and gas development will eventually be removed, we could not find where the document specifies time limits for reclamation of new roads. Roads associated with any development activity can increase other human activity in sensitive areas. We recommend that more specific details be provided concerning development and reclamation of all roads associated with oil and gas activity.

We are concerned that the preferred alternative (#2) only protects roadless areas with political implications (those being considered for wilderness designation). Perhaps the better alternative would be alternative #5, No Lease in Roadless and SPNM. This alternative would protect roadless areas in the impacted areas without decreasing potential development (47 wells for both alternatives). At the same time, alternative #5 would decrease the projected acreage affected by about 32,000 acres.

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We appreciate the opportunity to express our views concerning the management of resources in our national forests.

NP02

Sincerely,



Donald Whittaker, Chairman
Colorado Wildlife Society
Conservation Review Committee

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Mailing List

Federal

Director's Office
APHIS (PPQ)
ASCS Office - Sagauche Co.
Office of Architecture & Environment
Advisory Council on Historic Preserv.
BLM Grand Junction Resource Area
Barry Tollefson
BLM Gunnison Resource Area
Chip Marlowe
BLM Uncompahgre Resource Area
Area Manager
BLM Uncompahgre Resource Area
B. Curtis Smith Area Manager
BLM White River Resource Area
Attn: Kathy Hall
United States Senator
Honorable Hank Brown
United States Senator
Hon. Ben Nighthorse Campbell
Attn. Dee Jacobsen
Hon. Ben Nighthorse Campbell
David Merritt
Colorado River Water Conser. Dist.
NOAA Ecology and Conservation
Division
EIS Review Coordinator
EPA Regional Office - Region VIII
Resource Liaison Development Staff
EPA, Office of Environmental Review
Chief
Section of Energy and Environment
Administrator Colorado Division
Federal Highway Administration
Environmental Staff
Office of Plan. PLPP GSA
Equal Employ Opp Comm
Office of the Deputy General Counsel
Attn: Ms. Pat Teck
Representative Scott McInnis
John E. Welch Superintendent
NPS Black Canyon of the Gunnison NM
Jimmy Taylor Superintendent
NPS Colorado National Monument
John Chapman Superintendent
NPS Curecanti National Recreation
Area
Jeff Handy
NRD, OGC, USDA
Richard Strait Chief, Dv of Planning
National Park Service
Navajo Nation Historic Preservation
Dept
OASD (P&L) E

Charles B. Lennahan
Office of General Counsel
Advisor Environ. Qual
Federal Energy Regulatory
Commission (FERC)
Rocky Mtn. Forest & Range Exp.
Station
Library - FSINFO
Rocky Mtn. Forest & Range Exp.
Station
Kenneth Kumor
Rural Electric Admin. (REA)
Asst. Admin for Mgmt.
Rural Electric Admin. (REA)
Soil Conservation Service
Douglas H. Cryer
Soil Conservation Service
John M. Scott Dist. Conservationist
Gunnison Soil Conservation Service
Environ. Coord. Ecol.
USDA Soil Conservation Service (SCS)
Vice Chairman
Southern Ute Tribal Council
Southern Ute Tribe
Gary Davis
US Army Corp of Engineers
ATTN: DAEN-ZCE
Headquarters, US Army Corps of
Engineers
Attn. Regulatory Sec.
Sacramento District, US Army Corps of
Engineers
Chairman Explosive Safety Board
US Department of Defense
Director Office of Environmental
Compliance
US Department of Energy
Policy Evaluation & Research Asst Sec
US Department of Labor
Special Programs Grous (F29) Cntr. for
Environ. Health & Injury Cntrl
US Dept. Health & Human Services
Dept Environ Office
US Dept. Health & Human Services
Environmental Officer Region VIII
US Dept. Housing & Urban Dev.
Asst Sec Pol & Intl A
US Dept. of Trans, Envir Div
Environmental Protection Div
Chief Navy Operations US Navy (USN)
Director of Environmental
Coordination
USDA Forest Service
USDI Office of Environmental Affairs
Regional Environmental Officer
USDI Office of Environmental Affairs

Forest Supervisor
USFS Arapaho-Roosevelt National
Forest
Forest Supervisor
USFS Black Hills National Forest
David Hatfield
USFS Custer National Forest
Forest Supervisor
USFS Manti-Lasal National Forest
District Ranger
Moab District, USFS Manti-Lasal
National Forest
Forest Supervisor
USFS Rio Grande National Forest
Rich Hall
USFS Routt National Forest
USFS San Juan National Forest
Barry Burkhardt
USFS Wasatch - Cache National Forest
Forest Supervisor
USFS White River National Forest
LeRoy W. Carlson F&W Enhancement
USFWS - Colo. State Office
Lucy Jordan Ecological Services
USFWS - Western Colorado Office
F&W Enhancement
USFWS-W. Colo Sub-Office
ATTN: Melody Holm
USGS - Denver Federal Center
United States Air Force (USAF)
Ute Mountain Ute Tribe
Uintah & Ouray Indian Reservation
Ute Museum & Archives

State

CSU Documents Department
Ken Salazar Executive Director
Colorado Dept. Natural Resources
Laurence Abbott
Colorado Dept. of Highways
Robin Geddy, Intergovernmental
Review Coordinator
Colorado Dept. of Transportation
Colorado Natural Areas Program
Colorado Div of Parks & Outdoor Rec
Director
Colorado Division of Minerals &
Geology
Colorado Division of Wildlife
Bob Clark
Colorado Division of Wildlife
Donald Smith
Colorado Division of Wildlife
Jim Garner
Colorado Division of Wildlife

Robert Caskey
Colorado Division of Wildlife

Ron Arant
Colorado Division of Wildlife

Director
Colorado Division of Wildlife

NW Regional Mgr.
Colorado Division of Wildlife

Lyle Bennett Wildlife Mgt. Officer
Colorado Division of Wildlife

Barbara Sudler SHPO
Colorado Historical Society

Colorado State Clearing House

Colorado State Forest Service

Pete Barth
Colorado State Forest Service

Chief Engineer Div of Water Res-SNBO
Dept of Conservation & Nat Res

John W. Steck Governmental Affairs
Public Service Co. of Colo.

Governor
Roy Romer

Nate Lund
Western State College

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Susan Hansen
Delta County Administrator

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Delta County Commissioners

Ken Nordstrom
Delta County Health Department

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Gunnison Co Planning Dept.

Chair
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Region 10 LEAP

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San Miguel Power Assn.

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Department
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ARCO Oil & Gas Co.

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Ana-lab Corp.

Ken Currey
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John Martin
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Stanley Dempsey
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Steve Duffy
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Petro Energy Exploration, Inc.

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Texaco Inc., AERD

Rocky Watson

Western Engineers

Jay Errabo
Western Slope Environmental
Consultants
Don Wilson, Realtor
Wilson Associates Realty
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Wolf Cattle Co, Inc.
Bill Killam; David Jones
Woodward-Clyde Consultants

Organization

Sandy Shea
Ancient Forest Rescue
Black Canyon Audubon Society
Mesa County Chamber of Commerce
Caroline Hogan, President
Montrose Chamber of Commerce
Paonia Chamber of Commerce
Greg Walcher
Club 20
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Jim Krebs, President
Colorado Assoc of 4WD Clubs Inc.
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Colorado Environmental Coalition
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Telluride Times Journal
News Desk
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Individual

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Chapter VII - Acronyms / Glossary

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Chapter VII - Acronyms / Glossary

Acronyms

| | |
|-------|--|
| ADT | Average Daily Traffic |
| AMP | Allotment Management Plan |
| ANSI | American National Standards Institute |
| AO | Authorized Officer |
| APD | Application for Permit to Drill |
| ASME | American Society of Mechanical Engineers |
| ASQ | Allowable Sale Quantity |
| ATV | All Terrain Vehicle |
| AUM | Animal Unit Month |
| BCFG | Billion Cubic Feet of Gas |
| BLM | Bureau of Land Management |
| BMP | Best Management Practices |
| BO | Barrels of Oil |
| BR | Bureau of Reclamation |
| BTU | British Thermal Unit |
| CCC | Civilian Conservation Corps |
| CDOW | Colorado Division of Wildlife |
| CFR | Code of Federal Regulations |
| CEQ | Council on Environmental Quality |
| CNAP | Colorado Natural Areas Program |
| COA | Condition of Approval |
| COGCC | Colorado Oil and Gas Conservation Commission |
| CSU | Controlled Surface Use |
| DEIS | Draft Environmental Impact Statement |
| EA | Environmental Assessment |
| EIA | Economic Impact Areas |
| EIS | Environmental Impact Statement |
| EO | Executive Order |
| EPA | Environmental Protection Agency |
| ESA | Endangered Species Act |

| | |
|----------------|---|
| FAN | Final Abandonment Notice |
| FLPMA | Federal Land Policy and Management Act |
| FONSI | Finding of No Significant Impact |
| FOOGLRA | Federal Onshore Oil and Gas Leasing Reform Act of 1987 |
| FY | Fiscal Year (October 1 - September 30) |
| FDR | Forest Development Road |
| FEIS | Final Environmental Impact Statement |
| FPA | Further Planning Area |
| FS | U.S. Forest Service |
| FSEIS | Final Supplemental Environmental Impact Statement |
| FSH | Forest Service Handbook |
| FSM | Forest Service Manual |
| GIS | Geographic Information System |
| GZ | Geographic Zone |
| IDT | Interdisciplinary Team |
| Kg/ha | Kilograms per hectare |
| KV | Kilovolts |
| LRMP | Land and Resource Management Plan (Forest Plan) |
| MBF | Thousand Board Feet |
| Mcf | Thousand Cubic Feet |
| MIS | Management Indicator Species |
| MM | Thousand Thousand = Million Maximum Modification |
| MMBF | Million Board Feet |
| MMBO | Million Barrels of Oil |
| NEPA | National Environmental Policy Act |
| NF | National Forest |
| NFMA | National Forest Management Act |
| NFS | National Forest System |
| NL | No Lease |
| NOI | Notice of Intent |
| NPDES | National Pollutant Discharge Elimination System |
| NRHP | National Register of Historic Places |
| NSO | No Surface Occupancy |
| NTL | Notice to Lessee(s) |
| O&G | Oil and Gas |
| OHV | Off-highway Vehicles |

| | |
|---------|---|
| ORV | Off-road Vehicles |
| P | Primitive; Preservation |
| PAOT | People At One Time |
| PL | Public Law |
| R | Rural; Retention |
| R2 | Region 2 - Rocky Mountain Region, USFS |
| RARE II | Roadless Area Review and Evaluation |
| RCRA | Resource Conservation and Recovery Act |
| RFD | Reasonably Foreseeable Development |
| RM | Roaded Modified |
| RMP | Resource Management Plan |
| RN | Roaded Natural |
| RNA | Research Natural Area |
| RO | Regional Office, USFS |
| ROD | Record of Decision |
| ROS | Recreation Opportunity Spectrum |
| ROW | Right-of-Way |
| RVD | Recreation Visitor Day |
| SAOT | Skiers at One Time |
| SCS | Soil Conservation Service |
| SEIS | Supplemental Environmental Impact Statement |
| SLT | Standard Lease Terms |
| SMA | Surface Management Agency |
| SO | Supervisor's Office, USFS |
| SPCC | Spill Prevention Control and Countermeasures (Plan) |
| SPM | Semi-primitive Motorized |
| SPNM | Semi-primitive Non-motorized |
| spp. | Species |
| SUPO | Surface Use Plan of Operations |
| T&E | Threatened and Endangered |
| TDS | Total Dissolved Solids |
| TE&S | Threatened, Endangered and Sensitive (Species) |
| TL | Timing Limitation |
| TSP | Total Suspended Particulates |
| USC | United States Code |
| USDA | United States Department of Agriculture |
| USDI | United States Department of Interior |

| | |
|-------|--------------------------------|
| USFS | U.S. Forest Service |
| USFWS | U.S. Fish and Wildlife Service |
| USGS | U.S. Geological Survey |
| VAC | Visual Absorption Capability |
| VPD | Vehicles Per Day |
| VQO | Visual Quality Objective |
| WSA | Wilderness Study Area |

Glossary

A complete and definitive glossary of terminology used in this EIS is found in the Wildland Planning Glossary, C.F. Schwarz, E.C. Thor, and G.H. Elsner, a publication of the USDA Forest Service, Gen. Tech. Report PSW, 13/1979. Forest Plan FSEIS Appendix D contains a glossary of terms that is also useful for further definition of information in this EIS.

- A -

Abandonment. Termination of operations for production from a well. Permanent abandonment involves plugging the well and removal of installations. Conclusively abandoned unpatented oil placer mining claims are subject to conversion into a noncompetitive oil and gas lease pursuant to the Federal Oil and Gas Royalty Management Act of 1982 (30 U.S.C. 188(f)).

Affected Environment. Surface or subsurface resources (including social and economic elements) within or adjacent to a geographic area which could potentially be affected by oil and gas activities. The environment of the area to be affected or created by the alternatives under consideration. (40 CFR 1502.15)

Air Quality Classes. Classifications established under the Prevention of Significant Deterioration portion of the Clean Air Act which limit the amount of air pollution considered significant within an area. Class I applies to areas where almost any change in air quality would be significant; Class II applies to areas where the deterioration normally accompanying moderate well-controlled growth would be permitted; and Class III applies to areas where industrial deterioration would generally be allowed.

Allotment Management Plan (AMP). The plan for long-term use and development of a range allotment.

Allowable Sale Quantity. The quantity of timber that may be sold from the area of suited land covered by the Forest Plan for a time period specified by the plan. (36 CFR 219.3)

Alluvial Soil. A soil developing from recently deposited alluvium and exhibiting essentially no horizon development or modification of the recently deposited materials.

Alluvium. Clay, silt, sand, gravel, or other rock materials transported by flowing water. Deposited in comparatively recent geologic time as sorted or semi-sorted sediment in riverbeds, estuaries, floodplains, lakes and shores, and in fans at the base of mountain slopes.

Analysis Area. A delineated area of land subject to analysis of (1) responses to proposed management practices in the production, enhancement, or maintenance of forest and rangeland outputs and environmental quality objectives, and (2) economic and social impacts.

Animal Unit Month (AUM). The amount of forage necessary to sustain one cow and one calf or its equivalent for one month.

Application for Permit to Drill (APD). An application to drill a well submitted by a lessee or operator to the BLM. The APD consists of a Drilling Plan that discusses downhole specifications and procedures (reviewed by the BLM) and a Surface Use Plan of Operations (SUPO) that examines surface uses, including access roads, wellsite layout, cut/fill diagrams, reclamation procedures, production facility locations, etc. (reviewed by the FS). The approved APD is a contract between the operator and the Federal government and cannot be changed or modified unless authorized by the BLM and FS.

Aquatic Ecosystem. All organisms in a water based community plus the associated environmental factors.

Authorized Officer (AO). The Forest Service employee delegated the authority to perform a duty described in these rules. Generally, a Regional Forester, Forest Supervisor, District Ranger, or Minerals Staff Officer, depending on the scope and level of the duty to be performed.

Available Lands. Any lands subject to oil and gas leasing under the Mineral Leasing Act.

Availability for Oil and Gas Leasing. Availability of NFS lands for oil and gas leasing refers to lands which have not been formally withdrawn from oil and gas leasing activities. The existing Forest Land and Resource Management Plan provided the primary basis for the identification of NFS lands available for consideration for oil and gas leasing. All NFS lands will be subject to determination of compatibility of oil and gas leasing activities with the affected resources as well as the human environment before the Forest Service consents to leasing.

- B -

Background. One of the distance zones of a landscape being viewed. Extends from middleground (3 to 5 miles) to infinity.

Big Game. Larger species of wildlife that are hunted, such as mule deer, mountain lion, bighorn sheep, elk, mountain goat, black bear, turkey, pronghorn antelope and moose.

Big Game Winter Range. The area available to and used by big game (large mammals normally managed for sport hunting) through the winter season.

Biological Diversity. (1) The relative abundance of wildlife species, plant species, communities, habitats, or habitat features per unit of area. (2) The distribution and abundance of different plant and animal communities and species within the area covered by a Land and Resource Management Plan (36 CFR Part 219.3(g)).

Browse. That part of the current leaf and twig growth of shrubs, woody vines and trees available for animal consumption.

- C -

Candidate Species. Any species not yet officially listed as threatened, endangered or sensitive, but which are undergoing a status review or are proposed for listing according to Federal Register notices published by the Secretary of the Interior or the Secretary of Commerce.

Carrying Capacity.

In Range Management - The maximum stocking rate possible without inducing damage to vegetation or related resources.

In Wildlife Management - The maximum number of individual animals that can survive the greatest period of stress each year on a given land area.

In Recreation - The maximum human use an area can sustain on a long-term basis without unacceptable physical (ecological) deterioration or psychological crowding.

Clearcutting. The harvest of all trees in a localized area, generally to encourage regeneration of a new, even-aged stand or to meet other specified non-timber resource objectives.

Condition of Approval (COA). Conditions or provisions (requirements) under which an Application for a Permit to Drill or a Sundry Notice is approved.

Consent for Oil and Gas Leasing. A consent by the Forest Service for oil and gas leasing on a specified parcel of NFS land. Grants the right to explore, develop, extract, and dispose of a specific mineral or minerals in lands covered by the lease, subject to various terms and conditions.

Controlled Surface Use (CSU). Allowed use and occupancy (unless restricted by another stipulation) with identified resource values requiring special operational constraints that may modify the lease rights. CSU is used as an operating guideline, not as a substitute for NSO or Timing stipulations.

Cover.

Hiding Cover. Vegetation capable of hiding 90 percent of a standing adult deer or elk from the view of a human at a distance of 200 feet or less.

Thermal Cover. Cover used by animals for protection against adverse effects of weather.

Critical Habitat. Specific areas essential to the conservation of a given species. A biological feature, that if lost, would adversely affect the 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 that were of importance in human events.

Cultural Resources 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 the development of the Forest's site record system.

CLASS II. A sampling field inventory designated 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.

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

- D -

Developed Recreation. Recreation which occurs at man-made developments, such as campgrounds, picnic grounds, resorts, ski areas, trailheads, etc.

Development and Full-Field Development.

Development well. Well drilled in proven territory in a field to complete a pattern of production.

Full field development. The drilling of the necessary development wells and associated field facilities, including roads, production facilities, pipelines, injection wells, power lines, etc.

Directional Drilling. Drilling borehole with course of hole planned before drilling. Such holes are usually drilled with rotary equipment at an angle to the vertical and are useful in avoiding obstacles, or in reaching side areas or mineral estate beneath restricted surface.

Discovery Well. A well that yields commercial quantities of oil or gas.

Dispersed Recreation. That type of outdoor recreation which tends to be spread out over the land such as hunting, fishing, snowmobiling, hiking, driving for pleasure, cross-country skiing, motorbiking, and mountain climbing.

- E -

Economic Impact Areas (EIA). Subdivision of the analysis area used to calculate economic effects of alternatives.

Ecosystem. All organisms in a community plus the associated environmental factors.

Effects.

Direct Effects. Caused by the action and occur at the same time and place.

Indirect Effects. Caused by the action later in time or farther removed in distance, but still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

Note: Effects and impacts as used in these regulations are synonymous. Effects includes ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial.

Endangered Species. Any species which is 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. It includes a brief discussion of the need for the proposal, alternatives considered, environmental impact of the proposed action and alternatives, and a list of agencies and individuals consulted.

Environmental Impact Statement (EIS). A formal public document prepared to analyze the impacts on the environment of a proposed project or action and released for comment and review. An EIS must meet the requirements of NEPA, CEQ guidelines, and directives of the agency responsible for the proposed project or action.

Erosion. 1. The wearing away of the land surface by running water, wind, ice, or other geological agents, including such processes as gravitational creep. 2. Detachment and movement of soil or rock fragments by water, wind, ice, or gravity. The following terms are used to describe different types of erosion:

Accelerated Erosion. Erosion much more rapid than normal, natural, or geologic erosion, primarily as a result of the activities of man or animals or natural catastrophes such as fire that expose base surfaces.

Gully Erosion. The erosion process whereby water accumulates in narrow channels and, over short periods, removes the soil from this narrow area to considerable depths, ranging from 1 to 2 feet to as much as 75 to 100 feet.

Rill Erosion. An erosion process in which numerous small channels only several inches deep are formed: occurs mainly on recently cultivated soils.

Sheet Erosion. The removal of a fairly uniform layer of soil from the land surface by runoff water.

Erosion Hazard. The probability of soil loss resulting from complete removal of vegetation and litter. It is an interpretation based on potential soil loss in relation to tolerance values. Soil loss tolerance rate: An estimate of the amount of erosion which could occur over a short period of time (one year) without causing irreparable damage to the long-term productivity of the soil.

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 criteria applies.

Exploration or Wildcat Wells . Wells drilled to test for the presence of oil or gas in a previously undeveloped area. Nine out of ten wildcats are dry holes.

- F -

Federal Land Policy and Management Act of 1976 (FLPMA). Public Law 94-579 signed by the President on October 21, 1976. Established public land policy for management of lands administered by the Bureau of Land Management. FLPMA specifies several key directions for the Bureau, notably (1) management on the basis of multiple-use and sustained yield, (2) land use plans prepared to guide management actions, (3) public lands for the protection, development, and enhancement of resources, (4) public lands retained in federal ownership, and (5) public participation utilized in reaching management decisions.

Forage. All browse and herbaceous foods that are available to grazing animals.

Foreground. One of the distance zones of a landscape being viewed. Distance at which details can be perceived, normally within 1/4 to 1/2 mile from viewer. Must be determined on a case by case basis.

Formally Withdrawn From Oil and Gas Leasing. A Formal Withdrawal of lands is segregation of public lands from specific management activities by Acts of Congress or other types of administrative regulations subject to valid existing rights. A number of National Forest System lands have been removed from oil and gas leasing as well as other mineral development as a result of Congressional Acts or other forms of withdrawal such as by the Department of Interior. Such lands include designated Wilderness areas, Wilderness Study Area lands which were found to be suitable by the surface management agency for Wilderness designation as identified by the Federal Onshore Oil and Gas Leasing Reform Act, as well as other specially classified lands.

Formation. A body of rock identified by lithic characteristics and stratigraphic position; it is prevailingly but not necessarily tabular, and is mappable at the earth's surface or traceable in the subsurface.

- G -

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 one inch above soil level.

- H -

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.

Habitat Capability. The estimated ability of an area, given existing or predicted habitat conditions to support a wildlife, fish or plant population. It is measured in terms of potential population numbers.

Habitat Effectiveness. The degree to which a physical wildlife habitat (food, water, shelter) is free from disturbances, and therefore attractive for wildlife occupancy.

Hydrocarbon. Any organic compound, gaseous, liquid, or solid, consisting solely of carbon and hydrogen.

- I -

Igneous. Type of rock or mineral that solidified from molten or partly molten material.

Impact. The effect, influence, alteration, or imprint caused by an action.

- K -

Known Geologic Structures (KGS). A trap in which an accumulation of oil and gas has been discovered by drilling and which is determined to be productive. Its limits include all acreage that is presumptively productive (43 CFR 3100.0-5(a)).

Krummholz. The belt of discontinuous scrub or groveland at alpine timberlines, composed of species which have the genetic potential of the tree life form, but in this ecotonal belt are both strongly dwarfed and misshapen (Daubenmire 1978). Wind, low effective soil temperatures (also affected by wind), very short growing season, and very small soil pedons are some of the factors involved in formation of the krummholz belt.

- L -

Leasable Mineral(s). Those minerals or materials designated as leasable under the Mineral Leasing Act of 1920. They include coal, phosphate, asphalt, sulphur, potassium, sodium minerals, and oil and gas. Geothermal resources are also leasable under the Geothermal Steam Act of 1970.

Lease. A legal contract that provides for the right to develop and produce oil and gas resources for a specific period of time under certain agreed-upon terms and conditions.

Lease Modification. Fundamental change to the provisions of a lease stipulation, either temporarily or for the term of the lease. A modification may 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 criteria applied.

Lease Notice. Provides more detailed information concerning limitations that already exist in law, lease terms, regulations, or operational orders. A Lease Notice also addresses special items the lessee would need to consider when planning operations, but does not impose new or additional restrictions. Lease Notices that are attached to leases should not be confused with formal Information Notices (43 CFR Part 3101.1-3) or Notices to Lessees (43 CFR Part 3160.0-5).

Lease Options. One of five possible sets of Lease Stipulations which may be chosen for a given area through this *Leasing Analysis*. Lease options include 1) No Lease, 2) No Surface Occupancy, 3) Controlled Surface Use, 4) Timing Limitations and 5) Standard Lease Terms.

Lease Stipulations. Additional specific terms and conditions that change the manner in which operation may be conducted on a lease, or modify the lease rights granted.

Leasehold. The area described in a Federal oil and gas lease, communitized, or unitized area.

Lessee. A person or entity holding record title in a lease issued by the United States.

- M -

Macroinvertebrate. Aquatic insects visible with the naked eye.

Management Area. An area with similar management objectives and a common management prescription.

Management Direction. A statement of multiple use, other goals, and objectives; and associated management prescriptions, standards, and guidelines for attaining them (36 CFR Part 219.3).

Management Indicator Species. Those wildlife species selected in the planning process to monitor the effects of planned management activities on viable populations of all wildlife and fish species including those species that are socially or economically important.

Mass Wasting (geologic hazard). A general term for a variety of processes by which large masses of earth material are moved by gravity either slowly or quickly from one place to another. (American Geological Institute, 1974, p.308) Slow displacements include slumping and soil creep. Rapid movements include slope failures, landslides, debris flows, and rock slides.

Maximum Modification (MM). A visual resource management objective (VQO) in which management activities may dominate the landscape characteristic. When viewed as background they should appear natural. In middleground or foreground they may not completely blend in. Introduced structures should remain subordinate. Contrast reduction should be completed within five years.

Middleground. One of the distance zones of a landscape being viewed. This zone extends from the foreground to 3 to 5 miles from the observer. Texture is characterized by masses of trees.

Mineral Entry. Claiming public lands (administered by the Forest Service) under the Mining Law of 1872 for the purpose of exploiting minerals. May also refer to mineral exploration and development under the mineral leasing laws and the Material Sale Act of 1947.

Mineral Potential. The classification of lands according to the probability of undiscovered mineral resources, delineated as to the type of mineral, the extent of the expected deposit, and the likelihood of its occurrence. The likelihood of occurrence for oil and gas is classified as follows:

High Potential. Describes geologic environment that is highly favorable for discovering oil and gas resources. The area is on or near a producing field and evidence exists that the geologic conditions of reservoir, source, and trap necessary for the accumulation of oil and gas are present.

Moderate Potential. Refers to environment that is favorable for the occurrence of undiscovered oil and gas resources, however one of the geologic conditions necessary for the accumulation of oil or gas may be absent.

Low Potential. Refers to an environment that is not favorable for the accumulation of oil and gas as indicated by geologic, geochemical, and geophysical characteristics. Evidence exists that one of the geologic conditions necessary for the accumulation of oil or gas is absent.

No Known Potential. Refers to a region for which geologic information is insufficient to otherwise categorize potential. This category should be limited to specific areas for which there is a true lack of data and should not be used as a substitute for performing the interpretation.

Mitigation. Includes:

- (a) Avoiding the impact altogether by not taking a certain action or parts of an action.
- (b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation.

- (c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
- (d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- (e) Compensating for the impact by replacing or providing substitute resources or environments.

Modification (M). A visual resource management objective (VQO) in which the characteristic landscape may be dominated by management activities. Vegetative and landform disturbances must borrow from existing line, form, color and texture patterns. Introduction of structures should also borrow from existing patterns to be compatible with surroundings. Reduction in contrast should be completed within one year.

Multiple-use. Management of surface and subsurface resources so that they are jointly utilized 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.

- N -

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 Forest System (NFS). All National Forest lands reserved or withdrawn from the public domain of the United States; all National Forest lands acquired through purchase, exchange, donation, or other means, the National Grasslands and land utilization projects administered under Title III of the Bankhead-Jones Farm Tenant Act (7 U.S.C. 1010 et seq.); and other lands, waters, or interests therein which are administered by the Forest Service or are designated for administration through the Forest Service as a part of the system (16 U.S.C. 1609).

National Register of Historic Places (National Register, NRHP). A listing of architectural, historical, archaeological, and cultural sites of local, state, or national significance, established by the Historic Preservation Act of 1966 and maintained by the National Park Service.

No Lease (NL). Forest Service discretionary authority to remove sensitive resource lands from oil and gas leasing. Authority must be based on sound management justification. The Federal Onshore Oil and Gas Leasing Reform Act of 1987 expanded the Forest Service authority to include a "discretion" to consent or deny consent on all NFS lands with leasable minerals.

No Surface Occupancy (NSO). A fluid mineral leasing stipulation that prohibits occupancy or disturbance on all or part of the land surface to protect special values or uses. The NSO stipulation includes stipulations which may have been worded as "No Surface Use/Occupancy," "No Surface Disturbance," "Conditional NSO," and "Surface Disturbance or Surface Occupancy Restriction by location". Lessees may exploit the oil and gas or geothermal resources under leases restricted by this stipulation through use of directional drilling from sites outside the No Surface Occupancy area.

Notice to Lessees, Transferees, and Operators. Written notice issued by an authorized Forest officer. Notices To Lessees, Transferees, and Operators implement regulations and serve as instructions on specific item(s) of importance within a Forest Service Region, National Forest, or Ranger District.

- O -

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 (ORV). Any motorized vehicle designed for or capable of cross-country travel on or immediately over land, water, snow, ice, marsh, swampland or other natural terrain. It includes, but is not limited to, four-wheel drive or low-pressure-tire vehicles, motorcycles and related two-wheel vehicles, amphibious machines, ground-effect or air-cushion vehicles.

Oil and Gas Lease. An oil and gas lease grants the right to explore, develop, extract, and dispose of a specific mineral or minerals in lands covered by the lease, subject to various terms and conditions. Oil and gas leases are issued by the Bureau of Land Management, Department of the Interior.

Old Growth. Ecosystems distinguished by old trees and related structural attributes. Attributes vary by forest type and location but may include several of the following: 1) large trees for species and size, 2) wide variation in tree sizes and spacing, 3) accumulation of large-size dead standing and fallen trees, 4) decadence in the form of broken or deformed tops, or bole and root decay, 5) multiple canopy layers and 6) canopy gaps and understory patchiness.

Onshore Oil and Gas Order. A formal numbered order issued by or signed by the Chief of the Forest Service that implements and supplements the oil and gas regulations. (36 CFR 228 Subpart e)

Operations. Surface disturbing activities that are conducted on a leasehold on National Forest System lands pursuant to a current approved Surface Use Plan of Operations, including but not limited to, exploration, development, and production of oil and gas resources and reclamation of surface resources.

Operator. Any person or entity, including, but not limited to, the lessee or operating rights owner, who has stated in writing to the authorized Forest officer the intent to be responsible under the terms of the lease for the operations conducted on the leased lands or a portion thereof.

Overstory. That portion of a plant community consisting of the taller plants on the site; the forest or woodland canopy.

- P -

Paleontological Resource. A site containing evidence of non-human life of past geological periods, usually in the form of fossil remains.

Partial Retention (PR). A visual resource management objective (VQO) in which management activities remaining visually subordinate to the surrounding landscape. Repetition of line, form, color, and texture is allowed, but changes in qualities, size, amount, intensity, direction, pattern should remain subordinate. New contrast may be introduced but should remain subordinate as well. Reduction in contrast should be accomplished within one year of project completion.

People At One Time (PAOT). Used to define recreation capacity which is equal to five persons per family unit for camp and picnic grounds. Other sites vary.

Plant Association. A kind of plant community represented by stands occurring in places where environments are so closely similar that there is a high degree of floristic uniformity in all layers. (Daubenmire 1952)

Preservation (P). A visual resource management objective (VQO) in which only ecological changes are allowed. Management activities, except low impact recreation facilities are prohibited. This objective applies mainly to Wilderness, primitive areas and areas with special classifications.

Primitive (P). A recreation opportunity (ROS) classification term for describing a land area that is almost completely free of management controls. Essentially unmodified natural environment where evidence of other users is low, usually three miles or more from roads. Visitors enjoy hiking, horseback riding, nature study and other non-motorized uses. Visitors experience isolation, independence, closeness to nature, and self-reliance in an environment offering a high degree of challenge and risk.

- R -

Range Allotment. A designated area of land available for livestock grazing upon which a specified number and kind of livestock may be grazed under an allotment management plan. It is the basic land unit used to facilitate management of the range resource on National Forest System lands administered by the Forest Service.

Raptors. Birds of prey with sharp talons and strongly curved beaks, e.g., hawks, owls, vultures, eagles.

Reasonably Foreseeable Development (RFD). A projection of likely exploration, development, and production within a study area based on existing and credible geologic data, technology, economics, and activity trends.

Reclamation. Returning disturbed lands to a form and productivity that will be ecologically balanced and in conformity with a predetermined land management plan.

Recreation Opportunity Spectrum (ROS). Land delineations which identify a variety of recreation experience opportunities in six classes along a continuum from primitive to urban. Each class is defined in terms of natural resource settings, activities and experience opportunities. The six classes are: Urban, Rural, Roaded Natural, Semi-primitive Motorized, Semi-primitive Non-motorized and Primitive.

Recreation Visitor Day (RVD). An RVD is 12 hours of recreation for one person or one hour of recreation for 12 persons or any combination thereof.

Rehabilitation. A short-term visual resource management objective used to restore landscapes containing undesirable visual or other resource impacts to the desired visual or other acceptable quality level.

Research Natural Area (RNA). Designated areas of land established by the Chief of the Forest Service under 36 CFR Part 251.23 for research and educational purposes and to typify important forest and range types of the Forest as well as other plant communities that have special or unique characteristics of scientific interest and importance.

Retention (R). A visual resource management objective (VQO) allowing for management activities which are not visually evident. Activities may only repeat line, form color and textures found in the characteristic landscape. Reductions in form, line, color, and texture contrasts should be completed either during or after project completion

Riparian. Riparian areas consist of terrestrial and aquatic ecosystems. These areas may be associated with lakes, reservoirs, estuaries, potholes, marshes, streams, bogs, wet meadows, and intermittent or permanent streams where free and unbound water is available.

Roaded Natural (RN). A recreation opportunity (ROS) classification term for describing a land area that has predominately a natural appearing environment with moderate evidence of sights and sounds of humans. Concentration of users is moderate to low. Roads of better than primitive class are usually within 1/2 mile. A broad range of motorized and non-motorized activity opportunities are available. Management activities including timber harvest are present and harmonize with the natural environment.

Roadless Area. Area reviewed and evaluated for possible Wilderness designation in the Roadless Area Review And Evaluation (RARE I and RARE II) inventories, completed in 1979.

Roads. Vehicle routes which have been 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.)

Arterial Roads. Primary travel routes that provide service to a large land area and which usually connect with public highways or other Forest Service arterial roads.

Collector Roads. Roads that serve smaller land areas and are usually connected to Forest arterial roads or public highways. They collect traffic from local roads and terminal facilities. Collector roads are operated for constant use.

Local Roads. Roads that connect terminal facilities with collector roads, arterial roads, or public highways. May be developed for either long-term or short-term service.

Rural (R). A recreation opportunity (ROS) classification term for describing land areas that are substantially modified. Sights and sounds of others are readily evident. Interactions between users is moderate to high. Numerous facilities are usually present. Challenge and risks are unimportant. Motorized use and facilities are common. Resource management activities may be common and obvious.

- S -

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 is used as an equivalent.

Scoping Process. An early and open public participation process for determining particular issues to be addressed and for identifying the significant issues related to a proposed action.

Semi-primitive. A recreation opportunity (ROS) classification term for describing land areas that have very few management controls lying between half a mile and three miles from the nearest point of motor vehicle access, excepting four-wheel drive roads and trails, with mostly natural landscapes and some evidence of other people.

Semi-primitive Motorized (SPM). A land area classified as semi-primitive that may have primitive roads present and where motorized use is permitted. Settings, activities and opportunities are affected accordingly though there is still a moderate probability of experiencing isolation from sights and sounds of humans. (ROS)

Semi-primitive Non-motorized (SPNM). A land area classified as semi-primitive that has a natural environment and motorized use is not permitted. Non-motorized status increases the probability of experiencing isolation, independence, and closeness to nature. Challenge and risk is generally high. Resource management activities may be present; however, natural appearance is still maintained. (ROS)

Sensitivity Levels. A measure of people's concern for the scenic quality of the Forest. Sensitivity levels are developed for visitors viewing the Forest as a result of traveling by car, hiking, camping, fishing or boating. Some degree of sensitivity is established for all National Forest System lands.

Shut-In. An oil or gas well that is capable of production but is temporarily not producing.

Significant. An effect that is analyzed in the context of the proposed action to determine the importance of the effect, either beneficial or adverse. The degree of significance is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment and when the effects on the quality of the human environment are likely to be highly controversial.

Slope. The amount or degree of deviation from the horizontal or vertical. Landscape is categorized into three slope classes: 0-15%, 16-40% and greater than 40%. Concerning visual resources, as slope increases, views into a site and the size of the disturbance increase. Generally, the steeper slopes are more visible due to their location in the landscape.

Soil Fertility. The quality of a soil that enables it to provide nutrients in adequate amounts and in proper balance for the growth of specified plants when other growth factors are favorable.

Soil Texture. The relative proportions of sand, silt, and clay particles in a mass of soil. Basic textural classes, in order of increasing proportion of fine particles, are: sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, and clay.

Stipulation. A provision that modifies standard lease rights and is attached to and made a part of the lease.

Stream Bank (and Channel) Erosion. The removal, transport, deposition, recutting, and bed load movement of material in streams by concentrated water flows.

Sundry Notice. Standard form to notify of or approve well operations subsequent to Application for Permit to Drill in accordance with Forest Service regulations.

Surface Management Agency (SMA). Any agency outside the Department of the Interior with jurisdiction over the surface overlying Federally owned minerals.

Surface Use Plan of Operations (SUPO). A plan for surface use, disturbance, and reclamation.

- T -

Terrestrial. Living or growing in or on the land.

Terrestrial Ecosystem. All organisms in a land-based community plus the associated environmental factors.

Threatened Species. Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range and which has been designated in the Federal Register by the Secretary of Interior as a threatened species.

Timber Production. The purposeful growing, tending, harvesting, and regeneration of regulated crops of trees to be cut into logs, bolts, or other round sections for industrial or consumer use. For planning purposes, the term "timber production" does not include production of fuelwood (36 CFR Part 219.3).

Timing Limitation (Seasonal Restriction). Prohibits surface use during specified time periods to protect identified resource values. The stipulation does not apply to the operation and maintenance of production facilities unless the findings of analysis demonstrate the continued need for such mitigation and that less stringent, project-specific mitigation measures 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 cations that form salts.

Trailhead. Developed recreation sites with parking, signing, and other facilities designated to provide a take-off point for trail users at a major access point and terminus of a trail.

- U -

Understory. That portion of a plant community growing underneath the taller plants on the site.

Unitization. The agreement to jointly operate an entire producing reservoir as a single entity (**Unit**) without regard to lease boundaries, and allows for the maximum recovery of production from the reservoir and may involve several layers of various contractual and other legal relations.

Urban (U). A recreation opportunity (ROS) classification term for describing a land area that is usually highly modified and contains numerous improvements and large concentrations of humans. Experiencing the natural environment is unimportant.

Utilization. The proportion of current year's forage production that was consumed or destroyed by grazing animals; usually expressed as a percentage.

- V -

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, wildlife cover, species composition, etc.

Vegetation Type. A plant community with immediately distinguishable characteristics based upon and named after the current dominant plant species.

Visual Absorption Capability (VAC). The relative ability of a landscape to accept management practices without affecting its visual characteristic. The capability to absorb visual change. A prediction of how difficult it will be for a landscape to meet recommended VQO's.

Visual Quality Objectives (VQO). Based upon variety class, sensitivity level and distance zone determinations. Each objective describes a different level of acceptable alteration based on aesthetic importance. The degree of alteration is based on contrast with the surrounding landscape.

Visual Resource. The composite of basic terrain, geologic features, water features, vegetative patterns, and land use effects that typify a land unit and influence the visual appeal of the unit.

- W -

Waiver. Permanent exemption from a lease stipulation. The stipulation no longer applies anywhere within the leasehold.

Wetlands. Lands where saturation with water is the primary factor determining the nature of soil development and the kinds of animal and plant communities living under or on its surface.

Wild and Scenic River System. A system of selected rivers as provided in the Wild and Scenic Rivers Act of October 2, 1968, as amended, that are authorized by Act of Congress or Act of the State Legislature and designated as Wild, Scenic or Recreational Rivers. They are free flowing streams free of impoundments with varying degrees of accessibility and shoreline development with outstandingly remarkable scenic, recreation, geologic, fish and wildlife, historic, cultural or other similar values, to be preserved for the benefit of present and future generations.

Wildcat Well. A well drilled in unproved territory.

Wilderness. An area of undeveloped Federal land designated Wilderness by Congress, retaining its primeval character and influence, without permanent improvements or human habitation, protected and managed to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or primitive and unconfined recreation; (3) has at least 5,000 acres or is of sufficient size to make practical its preservation and use in an unimpaired condition; and (4) may also contain features that are of ecological, geological, scientific, educational, scenic, or historical value. These characteristics were identified by Congress in the Wilderness Act of 1964.

Wilderness Study Area (WSA). An area included in Section 105(a) of Public Law 96-560 (Colorado Wilderness Bill) which the Secretary of Agriculture shall review. Following review he will report his recommendations on suitability or unsuitability of the lands for inclusion in the National Wilderness Preservation System.

Withdrawal. An action which restricts the use of public land and segregates the land 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.

Chapter VIII - Bibliography

Chapter VIII - Bibliography

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**Appendix A -
Forest Service Manual
Interim Directive
2820-91-1**

Appendix A

!!ID 2820-91-1 Page 1 of 3

Expiration Date: 7/2/93

FOREST SERVICE MANUAL

Washington, D.C.

INTERIM DIRECTIVE: 2820-91-1

EFFECTIVE DATE: January 2, 1992

EXPIRATION DATE: July 2, 1993

CHAPTER: 2820 - MINERAL LEASES, PERMITS AND LICENSES

POSTING NOTICE: Last ID was 90-1 to FSM 2820, which is being removed

REMOVE: 2820 ID 90-1

This interim directive provides policy and direction by which the Regional Forester or Forest Supervisor may authorize the Bureau of Land Management (BLM) to offer national Forest System (NFS) lands for oil and gas leasing, and replaces Interim Directive 90-1, effective September 14, 1990. The new direction is set forth in section FSM 2822.9, Oil and Gas Leasing Analyses and Policy. In carrying out direction in this ID, ensure that related requirements in FSM 1950 Environmental Policy and Procedures and FSH 1909.15 are also met.

/s/ Larry Henson
LARRY HENSON
ASSOCIATE DEPUTY CHIEF

2820 - MINERAL LEASES, PERMITS, AND LICENSES.

2822.9 - Oil and Gas Leasing Analyses and Policy.

2822.91 - Authority. Title 36, Code of Federal Regulations, 228 Subpart E, Section 228.102.

2822.92 - Policy. The authorized officer shall make both decisions described in 36 CFR, Subpart E, 228.102(d) and 228.102(e) in one decision document upon completion of the leasing analysis described in 228.102(c). The authorized officer shall authorize leasing upon: 1) verifying the decision has been adequately addressed in a NEPA document and is consistent with the Forest Plan, 2) ensuring conditions of surface occupancy are identified, and 3) determining that operations could be allowed somewhere on the leased lands except where stipulations prohibit all surface occupancy.

2822.93 - Responsibility.

2822.93a - Regional Foresters. Regional Foresters are responsible for:

1. Ensuring oil and gas leasing analysis schedules are met.
2. Ensuring proper stipulations are attached to leases issued by the BLM and establishing a system of monitoring their implementation.
3. Approving the separation of a Forest into more than one leasing analysis area.

2822.93b - Forest Supervisors. Forest Supervisors are responsible for developing a schedule for analyzing all legally available lands under their jurisdiction that have not been already analyzed for leasing.

2822.94a - Scheduling Leasing Analyses. Regulations at 36 CFR, Subpart E, 228.102(b) require a schedule to be maintained for analyzing lands for leasing that have not been previously analyzed, or when existing analyses are deemed inadequate by the authorized officer. In complying with 228.102(b) the authorized officer shall; 1) Give priority to areas of the Forest in which there is interest in leasing, and, 2) Analyze all contiguous legally available lands of the Forest in one analysis unless the Regional Forester approves otherwise.

The authorized officer shall consider there to be interest in leasing if: an interest in leasing has been expressed by the oil and gas industry; there has been oil and gas production nearby; the geologic environment is favorable for oil or gas to have accumulated; there are State, private, or Federal leases in the vicinity; geophysical exploration has been done recently; or the Bureau of Land Management (BLM) indicates that lands have been nominated for lease.

2822.94b - Conducting Leasing Analyses. Conduct the leasing analysis required at 36 CFR, Subpart E, 228.102(c) for those lands identified (FSM 2822.94a). Conduct a site-specific analysis appropriate for making leasing decisions and defer the analysis appropriate for ground disturbing activity to the next decision stage, the Surface Use Plan of Operations (36 CFR Subpart E, 228.107 and 228.108). For example,

inventory surface resources that could be affected by lease operations only if they extend over 40 acres or more. Identify stipulations that will apply to areas of 40 acres or more, unless a larger area is acceptable based on the established legal well spacing. For example, if the well spacing rule(s) for a particular area allow only one well for every 160 acres, do not stipulate land areas smaller than a 160 acre well spacing.

2822.94c - Leasing Decisions. The regulation at 36 CFR, Subpart E, 228.102 describes two decisions for leasing. The first decision identifies which lands are administratively available for leasing and under what stipulations (228.102(d)). The second decision authorizes the BLM to offer leases for specific lands (228.102(e)).

The authorized officer shall make both leasing decisions in the same decision document upon completion of a leasing analysis described in FSM 2822.94b. The leasing decisions shall include all lands in the analysis area, whether leased or not leased at the time of the decision, and lands in which oil and gas ownership is expected to revert to the Federal government.

When the leasing decision for specific lands is determined not to have been made in a prior decision document, this decision will need to be made. A verification that leasing has been adequately addressed in an environmental document and is consistent with the Forest Plan must occur. If there is significant new information, if leasing has not been adequately addressed in an environmental document, or if leasing is inconsistent with the Forest plan, take only those actions necessary to eliminate the inadequacy or inconsistency to expedite the leasing decision for specific lands.

2822.94d - Documentation of the Leasing Decision. Include the following statements in the scoping documents, notices of intent, environmental analyses and decision documents:

- Both the administratively available decision, and the leasing decision for specific lands are being made.
- BLM may offer the specific lands for lease subject to the Forest Service ensuring that correct stipulations will be attached to leases issued by BLM.
- Except where stipulations prohibit all surface use, operations and development may be allowed on the leased lands. Such activity is subject to the operator obtaining an approved Surface Use Plan of Operations from the Forest Service in accordance with 36 CFR, Subpart E, 228.106 and 228.107.

2822.95 - Life of the Leasing Decision for Specific Lands. The leasing decision for specific lands shall remain in effect until significant new information or circumstances cause the existing environmental analysis to be out of date, at which time the BLM will be notified and the lands will be scheduled for a new leasing analysis (FSM 2822.94a).

**Appendix B -
BLM Form 3100-11
(June 1988)**

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Serial No. _____

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, as amended and supplemented (30 U.S.C. 181 et seq.), the Mineral Leasing Act for Acquired Lands of 1947, as amended (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 application/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: *Parcel No.: _____ *Sale Date (m/d/y): _____ / _____ / _____
***SEE ITEM 2 IN INSTRUCTIONS BELOW PRIOR TO COMPLETING PARCEL NUMBER AND SALE DATE.**

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 \$ _____

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.

NOTE: This lease is issued to the high bidder pursuant to his/her duly executed bid or nomination form submitted under 43 CFR 3120 and is subject to the provisions of that bid or nomination and those specified on this form.

Type and primary term of lease:

- Noncompetitive lease (ten years)
- Competitive lease (five years)
- Other _____

THE UNITED STATES OF AMERICA

by _____
(Signing Officer)

(Title) (Date)

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 246,080 acres in Federal oil and gas leases in the same State, of which not more than 200,000 acres are held under option, or 300,000 acres in leases and 200,000 acres in options in either leasing District in Alaska; (4) offeror is not considered a minor under the laws of the State in which the lands covered by this offer are located; (5) offeror is in compliance with qualifications concerning Federal coal lease holdings provided in sec. 2(a)(2)(A) of the Mineral Leasing Act; (6) offeror is in compliance with reclamation requirements for all Federal oil and gas lease holdings as required by sec. 17(g) of the Mineral Leasing Act; and (7) offeror is not in violation of sec. 41 of the Act.

(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 in part, unless the withdrawal is received by the proper 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) Noncompetitive lease, \$1.50 for the first 5 years; thereafter \$2.00;
- (b) Competitive lease, \$1.50; for primary term; thereafter \$2.00;
- (c) Other, see attachment, or as specified in regulations at the time this lease is issued.

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), or (c) 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) Noncompetitive lease, 12½ %;
- (b) Competitive lease, 12½ %;
- (c) Other, see attachment; or as specified in regulations at the time this lease is issued.

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 in lieu of rental of not less than the rental which otherwise would be required for that lease year shall be payable at the end of each lease year beginning on or after a discovery in paying quantities. 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) (30 U.S.C. 1701). 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—A bond shall be filed and maintained for lease operations as 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-way. 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 of 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 unless or until the leasehold contains a well capable of production of oil or gas in paying quantities, or the lease is committed to an approved cooperative or unit plan or communitization agreement which contains a well capable of production of unitized substances in paying quantities. 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. Lessee shall be subject to applicable provisions and penalties of FOGRMA (30 U.S.C. 1701).

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 C - Stipulations

EXAMPLE

Serial No. _____

**CONTROLLED SURFACE USE STIPULATION
MODERATE GEOLOGIC HAZARDS**

Surface occupancy or use is subject to the following special operating constraints.

Special interdisciplinary team analysis and mitigation plans detailing construction and mitigation techniques will be required on areas having moderate geologic hazards. (Interdisciplinary team disciplines could include: geotechnical engineer, soils engineer, roads engineer, oil and gas specialist and reclamation specialist.) Attributes constituting moderate geologic hazard include stabilized earthflows, stabilized mudflows, stabilized landslides; slopes adjacent to failed slopes or active earthflows, mudflows or landslides and avalanche chutes; areas of rockfall; flash flood zones; and areas with potential mining related problems (i.e. subsidence, acid drainage).

On lands described below:

All or portions of Sec. __, T. __, R. __, PM __ as shown on the attached map which becomes a part hereof. Any area within the leasehold which is identified as having moderate geologic hazard falls under jurisdiction of this stipulation.

For the purpose of:

To insure the stability of facilities required (roads, pipelines, drill pads, etc.) during the oil and gas operations and to insure the stability of lands adjacent to these facilities.

Waivers, exceptions, or modifications (WEM's) to this stipulation will be considered only at the time operations are proposed, and will be subject to the Forest Land and Resource Management Plan in effect at the time of consideration, and will be subject to applicable regulatory and environmental compliance requirements. Granting of a WEM is a discretionary action which the operator should not routinely expect. The Forest Service reserves the right to impose other stipulations in the same area of this leasehold if a WEM is granted.

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 1650 and 2820.)

Form #/Date

EXAMPLE

Serial No. _____

**CONTROLLED SURFACE USE STIPULATION
RETENTION VQO**

Surface occupancy or use is subject to the following special operating constraints.

When necessary to meet the Retention Visual Quality Objective (VQO), proposed site clearings, roads, collection facilities, structures, utilities and pipelines will be relocated. At the time of an APD, a visual resource assessment will be made considering vegetation, topography, proposed facilities and on-site controls necessary to mitigate expected impacts sufficiently to insure meeting the Retention VQO. A computer generated perspective may be required as part of the visual impact assessment.

On lands described below:

All or portions of Sec. __, T. __, R. __, PM __ as shown on the attached map which becomes a part hereof. All areas within the leasehold which are identified as having a Retention VQO fall under jurisdiction of this stipulation. Planning scale visual quality maps are on file at the District offices and at the Forest Supervisors Office in Delta, Colorado.

For the purpose of:

1. Protecting the visual quality of areas with high visual values.
2. Preventing location of oil and gas related facilities in areas with high visual values when a VQO of retention cannot be met.

Waivers, exceptions, or modifications (WEM's) to this stipulation will be considered only at the time operations are proposed, and will be subject to the Forest Land and Resource Management Plan in effect at the time of consideration, and will be subject to applicable regulatory and environmental compliance requirements. Granting of a WEM is a discretionary action which the operator should not routinely expect. The Forest Service reserves the right to impose other stipulations in the same area of this leasehold if a WEM is granted.

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 1650 and 2820.)

Form #/Date

EXAMPLE

Serial No. _____

**CONTROLLED SURFACE USE STIPULATION
SCENIC BYWAY CORRIDORS**

Surface occupancy or use is subject to the following special operating constraints.

When necessary to meet the scenic, social, cultural and historical values associated with the (specific Scenic Byway) proposed site clearing, roads, collection facilities, structures, utilities and pipelines will be relocated. Exclude drill pad development and operation in the foreground seen along (specific byway). Require all structures (drill rigs, tanks, buildings) in middle ground to be colored to blend with the natural landscape. At the time of an APD, visual and interpretive resource assessments will be made considering vegetation, topography, proposed facilities and on-site controls necessary to mitigate impacts to the (specific byway). A computer generated perspective may be required as part of the visual impact assessment.

On lands described below:

All or portions of Sec.____,T.____,R.____,PM____ as shown on the attached map which becomes a part hereof. Any area within the leasehold which is within the (specific Scenic Byway) falls under the jurisdiction of this stipulation.

For the purpose of:

To protect the scenic, social, historic and cultural resource values associated with the (specific Scenic Byway).

Waivers, exceptions, or modifications (WEM's) to this stipulation will be considered only at the time operations are proposed, and will be subject to the Forest Land and Resource Management Plan in effect at the time of consideration, and will be subject to applicable regulatory and environmental compliance requirements. Granting of a WEM is a discretionary action which the operator should not routinely expect. The Forest Service reserves the right to impose other stipulations in the same area of this leasehold if a WEM is granted.

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 1650 and 2820.)

Form #/Date

EXAMPLE

Serial No. _____

**CONTROLLED SURFACE USE STIPULATION
WATERSHEDS OF SPECIAL INTEREST TO MUNICIPALITIES**

Surface occupancy or use is subject to the following special operating constraints.

A 1/4 mile buffer will be established around each developed surface water inlet and spring development in the watershed. Waterlines will also be protected. At the APD stage special consideration will be given to insure against contamination of groundwater aquifers. All reserve mud pits will be closed systems. All road drainage work will be kept current; surfacing will be required for all roads planned for all weather use. All waste, refuse and trash will be kept in closed containers and regularly removed from the watershed. Fuel storage and spill plans will be required. No disposal of waste water will be allowed by subsurface injection. Water needed to support oil and gas activities, i.e. dust abatement, fire control, drilling mud, etc., will be imported from outside the watershed.

On lands described below:

All or portions of Sec.____,T.____,R.____,PM____ as shown on the attached map which becomes a part hereof. Any developed domestic facilities within the (Specific watershed) falls under jurisdiction of this stipulation.

For the purpose of:

Protecting the water resource in the (Specific watershed) from contamination which would degrade water quality below State and Federal standards for domestic water or reduce water supply to communities.

Waivers, exceptions, or modifications (WEM's) to this stipulation will be considered only at the time operations are proposed, and will be subject to the Forest Land and Resource Management Plan in effect at the time of consideration, and will be subject to applicable regulatory and environmental compliance requirements. Granting of a WEM is a discretionary action which the operator should not routinely expect. The Forest Service reserves the right to impose other stipulations in the same area of this leasehold if a WEM is granted.

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 1650 and 2820.)

Form #/Date

EXAMPLE

Serial No. _____

**CONTROLLED SURFACE USE STIPULATION
SLOPES 40-60%**

Surface occupancy or use is subject to the following special operating constraints.

Special interdisciplinary team analysis and mitigation plans detailing construction and mitigation techniques will be required on areas with slopes ranging from 40-60%. (Interdisciplinary team disciplines could include engineering, soil scientist, hydrologist, landscape architect, reclamation specialist and oil and gas specialist.)

Mitigation may include use of erosion control cloths, mats, geoweb soil support materials, lifting and saving local native vegetation in chunks of sod to be later placed over disturbed areas, reseeding disturbed banks with stabilizing seed mix, use of chemical stabilizers, tackifiers and blankets and careful design of surface water flow.

On lands described below:

All or portions of Sec.____,T.____,R.____,PM____ as shown on the attached map which becomes a part hereof. Any area within the leasehold which has slopes ranging from 40-60% falls under jurisdiction of this stipulation.

For the purpose of:

Minimizing potential for soil loss, mass land movement, revegetation failure and unacceptable visual impairment.

Waivers, exceptions, or modifications (WEM's) to this stipulation will be considered only at the time operations are proposed, and will be subject to the Forest Land and Resource Management Plan in effect at the time of consideration, and will be subject to applicable regulatory and environmental compliance requirements. Granting of a WEM is a discretionary action which the operator should not routinely expect. The Forest Service reserves the right to impose other stipulations in the same area of this leasehold if a WEM is granted.

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 1650 and 2820.)

Form #/Date

EXAMPLE

Serial No. _____

**CONTROLLED SURFACE USE STIPULATION
BIG GAME WINTER RANGE**

Surface occupancy or use is subject to the following special operating constraints.

Limit road use to periods when animals are not present on the winter range. Restrict road use to operators. Recontour and revegetate to prior existing conditions (to extent possible) new roads when work is complete.

Operation and maintenance of production facilities will be scheduled to minimize adverse effects on big game (Elk, Mule Deer, Big Horn Sheep and Turkey) from December 1 to April 30.

On lands described below:

All or portions of Sec. ____, T. ____, R. ____, PM ____, as shown on the attached map which becomes a part hereof. Any area within the leasehold which is classified as big game winter range for one of the four species listed above falls under jurisdiction of this stipulation.

For the purpose of:

Protecting big game winter range for Elk, Mule Deer, Bighorn Sheep and Turkey. These ranges are extremely important for animal survival during winter. Disturbances and habitat losses may place unnecessary stress on the wintering wildlife herds and cause an increase in herd mortality.

Waivers, exceptions, or modifications (WEM's) to this stipulation will be considered only at the time operations are proposed, and will be subject to the Forest Land and Resource Management Plan in effect at the time of consideration, and will be subject to applicable regulatory and environmental compliance requirements. Granting of a WEM is a discretionary action which the operator should not routinely expect. The Forest Service reserves the right to impose other stipulations in the same area of this leasehold if a WEM is granted.

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 1650 and 2820.)

Form #/Date

EXAMPLE

Serial No. _____

**CONTROLLED SURFACE USE STIPULATION
SPECIAL WILDLIFE HABITATS**

Surface occupancy or use is subject to the following special operating constraints.

Limit road use to periods when animals are not present. Restrict road use to operators. Recontour and revegetate to prior existing conditions (to the extent possible) new roads when work is complete.

Operation and maintenance of producing wells will be accomplished during the following time frames to minimize disruption to the species being considered:

| | |
|---|--|
| Elk calving and Mule Deer fawning: | April 15 to July 1 |
| Elk and Mule Deer migration routes: | March 1 to May 30 November 1 to December 31 |
| Elk and Mule Deer staging areas: | October 15 to December 31 |
| Sage Grouse Leks and nesting areas: (within a 2 1/2 m radius of the Lek) | March 1 to June 1 |

On lands described below:

- a. Elk calving and Mule Deer fawning areas.
- b. Elk and Mule Deer migration routes and staging areas.
- c. Sage Grouse and nesting areas within a 2 1/2 m radius of the Lek.

All or portions of Sec. __, T. __, R. __, PM __ as shown on the attached map which becomes a part hereof. All lands categorized as listed in a, b and c above, fall within jurisdiction of this stipulation.

For the purpose of:

Preventing human disturbance which would produce increased stress, leading to poor physical condition, winter mortality and/or reduced reproduction. These areas have been identified through a coordinated effort with the Colorado Division of Wildlife (CDOW). Disturbance during the reproductive season may reduce herd productivity. For nesting species, surface disturbance and associated human activity could disrupt breeding and/or cause nest abandonment. Disruption of migration routes or staging areas could result in direct mortality to big game species by disturbing annual normal staging and migration patterns to winter ranges. Animals could be dispersed or delayed in traveling to their winter ranges, causing direct mortality during normal fall/early winter snows.

Waivers, exceptions, or modifications (WEM's) to this stipulation will be considered only at the time operations are proposed, and will be subject to the Forest Land and Resource Management Plan in effect at the time of consideration, and will be subject to applicable regulatory and environmental compliance requirements. Granting of a WEM is a discretionary action which the operator should not routinely expect. The Forest Service

reserves the right to impose other stipulations in the same area of this leasehold if a WEM is granted.

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 1650 and 2820.)

Form #/Date

EXAMPLE

Serial No. _____

**NO SURFACE OCCUPANCY STIPULATION
WETLANDS / FLOODPLAINS / RIPARIAN AREAS**

No surface occupancy or use is allowed on the lands described below (legal subdivision or other description).

All or portions of Sec.____, T.____, R.____, PM____, as shown on the attached map which becomes a part hereof.

Wetlands, Floodplains and Riparian Areas of any defined drainage or location containing these specific ecosystem types come under jurisdiction of this stipulation. Drill pads, staging areas and storage sites will not be allowed in these areas. When road locations must occur in these areas, streams will be crossed at right angles and access across other areas will be held to a minimum. Streams will not be paralleled by roads through these areas.

Location of these areas which is more specific than can be identified on USGS topographic maps will come at the APD stage based on on-the-ground observations.

For the purpose of:

The management of wetlands and floodplains are subject to Executive Orders 11990 and 11988, respectively. The purpose of the EO's are to avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands and floodplains and to avoid direct or indirect support of new construction in wetlands wherever there is a practical alternative.

Also, it is recognized that there is a direct relationship between impacts on such areas and effects on water quality and aquatic ecosystems. There is a high risk of irreversible and irretrievable impacts on the latter with operation and developments in wetlands, floodplains and riparian areas.

Waivers, exceptions, or modifications (WEM's) to this stipulation will be considered if it can be shown through environmental analysis and the application of mitigation measures that the impacts to wetland, floodplain and riparian resources will be minimized and that no other alternative route for a road or pipeline is feasible because of environmental effects.

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.)

Form #/Date

EXAMPLE

Serial No. _____

**NO SURFACE OCCUPANCY STIPULATION
ALPINE / TUNDRA AREAS**

No surface occupancy or use is allowed on the lands described below (legal subdivision or other description).

Land areas above timberline as shown on the attached map which becomes a part hereof. All or portions of Sec. ____, T. ____, R. ____, PM ____, are included within the jurisdiction of this stipulation.

For the purpose of:

- a. Preventing significant or permanent impairment of soil productivity.
- b. Maintaining or improving water quality to meet Federal or State standards.
- c. Minimizing the potential for significant or cumulatively significant impacts in alpine ecosystems, per 40 CFR 1508.27(b)(7).
- d. Minimizing visual quality impacts.
- e. Maintaining the integrity of associated ecosystems.

Waivers, exceptions, or modifications (WEM's) to this stipulation will be considered only at the time operations are proposed, and will be subject to the Forest Land and Resource Management Plan in effect at the time of consideration, and will be subject to applicable regulatory and environmental compliance requirements. Granting of a WEM is a discretionary action which the operator should not routinely expect. The Forest Service reserves the right to impose other stipulations in the same area of this leasehold if a WEM is granted.

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.)

Form #/Date

EXAMPLE

Serial No. _____

**NO SURFACE OCCUPANCY STIPULATION
HIGH GEOLOGIC HAZARD**

No surface occupancy or use is allowed on the lands described below (legal subdivision or other description).

All or portions of Sec._____, T._____, R._____, P.M._____, as shown on the attached map which becomes a part hereof. Areas of high geologic hazard have been mapped from aerial photographs and are characterized by active mudflows, active earthflows, active landslides and areas prone to avalanche. All areas within the lease with high geologic hazard are under jurisdiction of this stipulation.

For the purpose of:

Avoidance of areas with high geologic hazard to prevent mass slope failure.

Waivers, exceptions, or modifications (WEM's) to this stipulation will be considered only at the time operations are proposed, and will be subject to the Forest Land and Resource Management Plan in effect at the time of consideration, and will be subject to applicable regulatory and environmental compliance requirements. Granting of a WEM is a discretionary action which the operator should not routinely expect. The Forest Service reserves the right to impose other stipulations in the same area of this leasehold if a WEM is granted.

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.)

Form #/Date

EXAMPLE

Serial No. _____

**NO SURFACE OCCUPANCY STIPULATION
BATTLEMENT MESA ROADLESS AREAS**

No surface occupancy or use is allowed on the lands described below (legal subdivision or other description).

All or portions of Sec. ____, T. ____, R. ____, PM. ____ as shown on the attached map which becomes a part hereof. All of the leasehold which falls within the Battlement Mesa Roadless Area is under jurisdiction of this stipulation.

For the purpose of:

Protecting the roadless character of the area which includes its apparent naturalness, degree of remoteness, solitude, and special features, and to protect other resources of special concern (steep slopes, high geologic hazards, high erosion hazards, revegetation problems, important wildlife habitat, visual resources).

Waivers, exceptions, or modifications (WEM's) to this stipulation will be considered only at the time operations are proposed, and will be subject to the Forest Land and Resource Management Plan in effect at the time of consideration, and will be subject to applicable regulatory and environmental compliance requirements. Granting of a WEM is a discretionary action which the operator should not routinely expect. The Forest Service reserves the right to impose other stipulations in the same area of this leasehold if a WEM is granted.

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.)

Form #/Date

EXAMPLE

Serial No. _____

**NO SURFACE OCCUPANCY STIPULATION
SENSITIVE AREAS**

No surface occupancy or use is allowed on the lands described below (legal subdivision or other description).

All or portions of Sec.____,T.____,R.____,PM.____ as shown on the attached map which becomes a part hereof.

For the purpose of:

Protection of aesthetic values perceived as highly sensitive by the public.

Waivers, exceptions, or modifications (WEM's) to this stipulation will be considered only at the time operations are proposed, and will be subject to the Forest Land and Resource Management Plan in effect at the time of consideration, and will be subject to applicable regulatory and environmental compliance requirements. Granting of a WEM is a discretionary action which the operator should not routinely expect. The Forest Service reserves the right to impose other stipulations in the same area of this leasehold if a WEM is granted.

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.)

Form #/Date

EXAMPLE

Serial No. _____

**NO SURFACE OCCUPANCY STIPULATION
RETENTION VQO AND LOW VAC**

No surface occupancy or use is allowed on the lands described below (legal subdivision or other description).

All or portions of Sec. ____, T. ____, R. ____, PM. ____, as shown on the attached map which becomes a part hereof. Any area within the leasehold which has a Visual Quality Objective (VQO) of Retention and Low Visual Absorption Capability (VAC) falls within jurisdiction of this stipulation.

For the purpose of:

Protecting the visual quality of areas with significant visual resources.

Waivers, exceptions, or modifications (WEM's) to this stipulation will be considered only at the time operations are proposed, and will be subject to the Forest Land and Resource Management Plan in effect at the time of consideration, and will be subject to applicable regulatory and environmental compliance requirements. Granting of a WEM is a discretionary action which the operator should not routinely expect. The Forest Service reserves the right to impose other stipulations in the same area of this leasehold if a WEM is granted.

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.)

Form #/Date

EXAMPLE

Serial No. _____

**NO SURFACE OCCUPANCY STIPULATION
SEMI-PRIMITIVE NON-MOTORIZED (3A MANAGEMENT AREAS)**

No surface occupancy or use is allowed on the lands described below (legal subdivision or other description).

All or portions of Sec. ____, T. ____, R. ____, PM. ____, as shown on the attached map which becomes a part hereof. Any portion of the leasehold which falls within the (specific 3A management) area is within jurisdiction of this stipulation.

For the purpose of:

Protecting the Semi-primitive Non-motorized Recreation Opportunities Spectrum (ROS) class character of the area.

Waivers, exceptions, or modifications (WEM's) to this stipulation will be considered only at the time operations are proposed, and will be subject to the Forest Land and Resource Management Plan in effect at the time of consideration, and will be subject to applicable regulatory and environmental compliance requirements. Granting of a WEM is a discretionary action which the operator should not routinely expect. The Forest Service reserves the right to impose other stipulations in the same area of this leasehold if a WEM is granted.

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.)

Form #/Date

EXAMPLE

Serial No. _____

**NO SURFACE OCCUPANCY STIPULATION
ADMINISTRATIVE SITES**

No surface occupancy or use is allowed on the lands described below (legal subdivision or other description).

All or portions of Sec.____,T.____,R.____,PM____ as shown on the attached map which becomes a part hereof.

For the purpose of:

Protecting the investment and use of facilities at [administrative site].

Waivers, exceptions, or modifications (WEM's) to this stipulation will be considered only at the time operations are proposed, and will be subject to the Forest Land and Resource Management Plan in effect at the time of consideration, and will be subject to applicable regulatory and environmental compliance requirements. Granting of a WEM is a discretionary action which the operator should not routinely expect. The Forest Service reserves the right to impose other stipulations in the same area of this leasehold if a WEM is granted.

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.)

Form #/Date

EXAMPLE

Serial No. _____

**NO SURFACE OCCUPANCY STIPULATION
RECREATION COMPLEXES**

No surface occupancy or use is allowed on the lands described below (legal subdivision or other description).

All or portions of Sec. _____, T. _____, R. _____, P.M. _____, as shown on the attached map which becomes a part hereof. This stipulation applies to all recreation complexes identified in Chapter III of the Oil and Gas Leasing EIS, pages III- 94 through III-96, and includes a 1/4 mile buffer around each complex.

For the purpose of:

To protect the investment of facilities within the complex, to protect the recreation experience and safety of the visitors, and to protect the natural environment or setting which initially made the complex desirable for development.

Waivers, exceptions, or modifications (WEM's) to this stipulation will be considered only at the time operations are proposed, and will be subject to the Forest Land and Resource Management Plan in effect at the time of consideration, and will be subject to applicable regulatory and environmental compliance requirements. Granting of a WEM is a discretionary action which the operator should not routinely expect. The Forest Service reserves the right to impose other stipulations in the same area of this leasehold if a WEM is granted.

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.)

Form #/Date

EXAMPLE

Serial No. _____

**NO SURFACE OCCUPANCY STIPULATION
SLOPES > 60%**

No surface occupancy or use is allowed on the lands described below (legal subdivision or other description).

All or portions of Sec. ____, T. ____, R. ____, PM ____, as shown on the attached map which becomes a part hereof. All areas within the leasehold with 60% slopes or greater fall under jurisdiction of this stipulation.

For the purpose of:

Protection of areas with slopes greater than 60% to prevent impacts to soil resources through erosion, mass failure, loss of productivity, etc.

Waivers, exceptions, or modifications (WEM's) to this stipulation will be considered only at the time operations are proposed, and will be subject to the Forest Land and Resource Management Plan in effect at the time of consideration, and will be subject to applicable regulatory and environmental compliance requirements. Granting of a WEM is a discretionary action which the operator should not routinely expect. The Forest Service reserves the right to impose other stipulations in the same area of this leasehold if a WEM is granted.

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.)

Form #/Date

EXAMPLE

Serial No. _____

**NO SURFACE OCCUPANCY STIPULATION
ROCKY MOUNTAIN BIGHORN SHEEP LAMBING AND BREEDING AREAS**

No surface occupancy or use is allowed on the lands described below (legal subdivision or other description).

All or portions of Sec.____,T.____,R.____,PM____ as shown on the attached map which becomes a part hereof.

For the purpose of:

Protection of Rocky Mountain Bighorn Sheep lambing and breeding grounds.

Waivers, exceptions, or modifications (WEM's) to this stipulation will be considered only at the time operations are proposed, and will be subject to the Forest Land and Resource Management Plan in effect at the time of consideration, and will be subject to applicable regulatory and environmental compliance requirements. Granting of a WEM is a discretionary action which the operator should not routinely expect. The Forest Service reserves the right to impose other stipulations in the same area of this leasehold if a WEM is granted.

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.)

Form #/Date

EXAMPLE

Serial No. _____

**NO SURFACE OCCUPANCY STIPULATION
SUMMER RANGE (CONCENTRATED USE)**

No surface occupancy or use is allowed on the lands described below (legal subdivision or other description).

All or portions of Sec. ____, T. ____, R. ____, PM ____, as shown on the attached map which becomes a part hereof.

For the purpose of:

Protection of concentrated use summer range for elk. To protect hiding cover and security from disturbance and to keep elk on their summer range and off winter range as long as possible. Disturbance in these areas is causing summering elk to be pushed off Grand Mesa a little earlier each year.

Conditions under which a waiver of this stipulation would be considered:

- 1) The magnitude of the proposed operations is such that summering elk would not be disturbed.
- 2) A site specific study indicates activity in these areas would not cause summering elk to prematurely leave summer range. Mitigation is proposed that would accomplish the purpose of this stipulation.

Waivers, exceptions, or modifications (WEM's) to this stipulation will be considered only at the time operations are proposed, and will be subject to the Forest Land and Resource Management Plan in effect at the time of consideration, and will be subject to applicable regulatory and environmental compliance requirements. Granting of a WEM is a discretionary action which the operator should not routinely expect. The Forest Service reserves the right to impose other stipulations in the same area of this leasehold if a WEM is granted.

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.)

Form #/Date

EXAMPLE

Serial No. _____

**NO SURFACE OCCUPANCY STIPULATION
SAGE GROUSE LEKS**

No surface occupancy or use is allowed on the lands described below (legal subdivision or other description).

All or portions of Sec. __, T. __ R. __, PM __ as shown on the attached map which becomes a part hereof.

For the purpose of:

Protecting sage grouse leks.

Waivers, exceptions, or modifications (WEM's) to this stipulation will be considered only at the time operations are proposed, and will be subject to the Forest Land and Resource Management Plan in effect at the time of consideration, and will be subject to applicable regulatory and environmental compliance requirements. Granting of a WEM is a discretionary action which the operator should not routinely expect. The Forest Service reserves the right to impose other stipulations in the same area of this leasehold if a WEM is granted.

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.)

Form #/Date

EXAMPLE

Serial No. _____

**TIMING LIMITATION STIPULATION
BIG GAME WINTER RANGE**

No surface use is allowed during the following time period(s). This stipulation does not apply to operation and maintenance of production facilities.

1. Exploration, drilling and development activity will not be allowed during the period from December 1 to April 30.
2. New oil and gas roads on public lands will be closed yearlong to the public.

On the lands described below:

Winter ranges for big game. (Mule Deer, Elk, Bighorn Sheep and Turkey) All or portions of Sec. ____, T. ____, R. ____, PM __ as shown on the attached map which becomes a part hereof. All lands which are classified as big game winter range fall within jurisdiction of this stipulation.

For the purpose of (reasons):

Preventing unnecessary stress on the wintering wildlife herds and causing an increase in mortality resulting from disturbances and habitat losses. These areas are critical for mule deer, bighorn sheep, elk and turkey during winter. They serve as key concentration areas which support and sustain these species and are extremely important for animal survival.

Waivers, exceptions, or modifications (WEM's) to this stipulation will be considered only at the time operations are proposed, and will be subject to the Forest Land and Resource Management Plan in effect at the time of consideration, and will be subject to applicable regulatory and environmental compliance requirements. Granting of a WEM is a discretionary action which the operator should not routinely expect. The Forest Service reserves the right to impose other stipulations in the same area of this leasehold if a WEM is granted.

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.)

Form #/Date

EXAMPLE

Serial No. _____

**TIMING LIMITATION STIPULATION
SPECIAL WILDLIFE HABITATS**

No surface use is allowed during the following time period(s). This stipulation does not apply to operation and maintenance of production facilities.

| | |
|--|---|
| Elk calving and Mule deer fawning areas: | April 15 to July 1. |
| Elk and Mule Deer migration routes: | March 1 to May 30 November 1 to December 3 |
| Elk and Mule Deer staging areas: | October 15 to December 31 |
| Sage Grouse Leks and nesting areas: (within a 2 1/2 m radius of the Leks) | March 1 to June 1 |

On the lands described below:

- a. Elk calving and Mule deer fawning areas.
- b. Elk and Mule deer migration routes and staging areas.
- c. Sage Grouse Leks and nesting areas.

All or portions of Sec. __, T. __, R __, PM __ as shown on the attached map which becomes a part hereof. All lands categorized as listed in a, b and c above fall within jurisdiction of this stipulation.

For the purpose of (reasons):

Preventing human disturbance which would produce increased stress, leading to poor physical condition, winter mortality and/or reduced reproduction. These areas have been identified through a coordinated effort with the Colorado Division of Wildlife (CDOW). Disturbance during the reproductive season may reduce herd productivity. For nesting species, surface disturbance and associated human activity could disrupt breeding and/or cause nest abandonment. Disruption of migration routes or staging areas could result in direct mortality to big game species by disturbing annual normal staging and migration patterns to winter ranges. Animals could be dispersed or delayed in traveling to their winter ranges, causing direct mortality during normal fall/early winter snows.

Waivers, exceptions, or modifications (WEM's) to this stipulation will be considered only at the time operations are proposed, and will be subject to the Forest Land and Resource Management Plan in effect at the time of consideration, and will be subject to applicable regulatory and environmental compliance requirements. Granting of a WEM is a discretionary action which the operator should not routinely expect. The Forest Service reserves the right to impose other stipulations in the same area of this leasehold if a WEM is granted.

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.)

Form #/Date

EXAMPLE

Serial No. _____

TIMING LIMITATION STIPULATION
MAJOR TRAILS

No surface use is allowed during the following time period(s). This stipulation does not apply to operation and maintenance of production facilities.

Exploration, drilling and development activity will not be allowed during the period from December 1 to April 15.

On the lands described below:

Along major cross country ski trails on Grand Mesa. The Crag Crest National Recreation Ski Trail (aka County Line Cross Country Ski Trail), the Skyway Cross Country Ski Trail, and the Ward Lake Cross Country Ski Trail are the trails protected by the use of this stipulation. All or portions of Sec. __, T __, R __, PM __ as shown on the attached map which becomes a part hereof.

For the purpose of (reasons):

Protecting the recreational use, opportunity, and experience along the trail corridors. These are high use cross country ski trails.

Waivers, exceptions, or modifications (WEM's) to this stipulation will be considered only at the time operations are proposed, and will be subject to the Forest Land and Resource Management Plan in effect at the time of consideration, and will be subject to applicable regulatory and environmental compliance requirements. Granting of a WEM is a discretionary action which the operator should not routinely expect. The Forest Service reserves the right to impose other stipulations in the same area of this leasehold if a WEM is granted.

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.)

Form #/Date



**Appendix D -
Stipulation for Lands of
the National Forest
System Under
Jurisdiction of
Department of
Agriculture**

R2-FS-2820-13 (92) a.

Serial No. _____

**STIPULATION FOR LANDS OF THE NATIONAL FOREST SYSTEM
UNDER JURISDICTION OF
DEPARTMENT OF AGRICULTURE (FS-#1)**

The permittee/lessee must comply with all the rules and regulations of the Secretary of Agriculture set forth at Title 36, Chapter II, of the Code of Federal Regulations governing the use and management of the National Forest System (NFS) when not inconsistent with the rights granted by the Secretary of Interior in the permit. The Secretary of Agriculture's rules and regulations must be complied with for (1) all use and occupancy of the NFS prior to approval of an exploration plan by the Secretary of the Interior, (2) uses of all existing improvements, such as forest development roads, within and outside the area permitted by the Secretary of the Interior, and (3) use and occupancy of the NFS not authorized by an exploration plan approved by the Secretary of the Interior.

All matters related to this stipulation are to be addressed

to: District Ranger

at:

Telephone:

who is the authorized representative of the Secretary of Agriculture.

NOTICE

CULTURAL AND PALEONTOLOGICAL RESOURCES - The FS is responsible for assuring that the leased lands are examined to determine of cultural resources are present and to specify mitigation measures. Prior to undertaking any surface-disturbing activities on the lands covered by this lease, the lessee or operator, unless notified to the contrary by the FS, shall:

1. Contact the FS to determine if a site specific cultural resource inventory is required. If a survey is required, then:
2. Engage the services of a cultural resource specialist acceptable to the FS to conduct a cultural resource inventory of the area of proposed surface disturbance. The operator may elect to inventory an area larger than the area of proposed disturbance to cover possible site relocation which may result from environmental or other considerations. An acceptable inventory report is to be submitted to the FS for review and approval at the time a surface disturbing plan of operation is submitted.
3. Implement mitigation measures required by the FS and BLM to preserve or avoid destruction of cultural resource values. Mitigation may include relocation of proposed facilities, testing, salvage, and recordation or

other protective measures. All costs of the inventory and mitigation will be borne by the lessee or operator, and all data and materials salvaged will remain under the jurisdiction of the U.S. Government as appropriate.

The lessee or operator shall immediately bring to the attention of the FS and BLM any cultural or paleontological resources or any other objects of scientific interest discovered as a result of surface operations under this lease, and shall leave such discoveries intact until directed to proceed by FS and BLM.

ENDANGERED OR THREATENED SPECIES - The FS is responsible for assuring that the leased land is examined prior to undertaking any surface-disturbing activities to determine effects upon any plant or animal species listed or proposed for listing as endangered or threatened, or their habitats. The findings of this examination may result in some restrictions to the operator's plans or even disallow use and occupancy that would be in violation of the Endangered Species Act of 1973 by detrimentally affecting endangered or threatened species or their habitats.

The lessee/operator may, unless notified by the FS that the examination is not necessary, conduct the examination on the leased lands at his discretion and cost. This examination must be done by or under the supervision of a qualified resource specialist approved by the FS. An acceptable report must be provided to the FS identifying the anticipated effects of a proposed action on endangered or threatened species or their habitats.

**Appendix E -
Reasonably Foreseeable
Development Activity
within the Grand Mesa,
Uncompahgre and
Gunnison
National Forests**

Appendix E - Reasonably Foreseeable Development Activity Within the Grand Mesa, Uncompahgre and Gunnison National Forests

Introduction

Forest lands administered by the Grand Mesa (GMNF), Uncompahgre (UNNF) and Gunnison National Forests (GUNF), which are collectively referred to as GMUG are situated within portions of four U. S. Geological Survey (USGS) petroleum resource assessment provinces. Figure 1 illustrates those portions of the Uinta-Piceance-Eagle, Paradox, San Juan, and Albuquerque-Santa Fe-San Luis basins that include National Forest System lands addressed in this report.

Conventional oil and gas plays defined by the USGS and present within GMUG are situated within the Uinta-Piceance-Eagle basins and the Paradox basin (Table 1). No plays have been identified within the San Juan and Albuquerque-Santa Fe-San Luis basins.

In addition to the plays designated by the USGS, the lower and middle Paleozoic section, specifically the Leadville Limestone constitutes a highly speculative play within the southern Piceance basin. Mobile Oil Corporation drilled a 19,500 foot test of the Leadville south of the town of Silt. The rig was reported (Dwights EnergyData, 1992) to have been released on January 28, 1992 with details being held confidential. Potential traps include unconformities and stratigraphic pinchouts within the Pennsylvanian age rocks along the margin of the Central Colorado Trough.

Hydrocarbon Occurrence

Gas was first discovered in the GMUG from sandstones in the Mesaverde Group in 1958 which was designated as the Grand Mesa Field. The field produced only 741 thousand cubic feet of gas (MCFG) and was abandoned in 1973 (Table 2). Since that time, three additional fields have been discovered with established production from the Cozzette, Corcoran, and Morapos sandstones, as well as undivided sandstones in the Mesaverde. To date, no coal bed methane (CBM) wells have been completed for production within the Forest.

Oil and gas production is confined to the most northern portions of the GMNF and the GUNF, with no drilling on the GUNF south of Township 12 South. Exploratory drilling has been confined to the high and moderate potential areas within the remainder of the GMUG, specifically along the southeastern margin of the UNNF within the Paradox Basin. Eighteen exploratory wells have been drilled on the UNNF since 1949 with no success, however there have been some oil and gas shows reported (Table 3).

Prospectively Valuable for Oil and Gas

Land classified as prospectively valuable (PV) for oil and gas is based on criteria described in Appendix A. PV lands for oil and gas within the GMUG are shown in Figure 2 and generally include lands that have a minimum of 1,000 feet of sedimentary rock, favorable structural setting, and minimum evidence of potential for the occurrence of oil and gas. Areas not designated as PV are rated as having no potential.

Oil and Gas Potential

Oil and gas potential for the region is shown in Figure 3 and its rating criteria are described in Appendix B and provide the basis for the ratings described below for the GMUG and surrounding area. In general, areas defined by the USGS as a conventional oil and gas play are assigned a high potential, while lands not classified as PV have no potential. It should be noted that the plays described below occur within two petroleum provinces and do not cross into the other province, since the provinces are defined on administrative boundaries, not geologic.

Spencer and Wilson (1988) describe three major and two unconventional plays that occur within the GMUG. The conventional plays are the Permian-Pennsylvanian sandstone, Uinta-Piceance Tertiary gas, and Uinta-Piceance Upper Cretaceous plays, while the unconventional plays are tight gas sands and Cretaceous CBM (Figures 4-9).

The Permian-Pennsylvanian sandstone play is relatively unexplored and involves stratigraphic pinchouts within the Weber and correlative sandstones into relatively impermeable red-bed sequences. The play as evaluated by the USGS, also includes lands within Utah (Figure 4) and is estimated to contain from two to ten fields left to be discovered that have at least one million barrels of oil (MMBO). The play may cover a larger area that is shown on the map and is considered to be speculative for the southern Piceance Basin.

The Tertiary conventional gas play (Figure 5) consists of stratigraphic and structural traps that have been moderately well explored. Most of the Tertiary rocks in the Piceance basin are thermally immature. Tertiary reservoir gas is interpreted as having migrated from upper Cretaceous source beds located in the Mesaverde Group (Spencer and Wilson, 1988). Conventional Tertiary reservoirs will be found at depths of from less than 3,000 to about 7,000 feet, and are expected to be unconventional and tight at depths greater than 7,000 feet. The USGS estimates that from 9 to 35 fields remain to be discovered within the play.

Figure 6 illustrates the location of the Upper Cretaceous gas play. Conventional reservoir production is from fluvial and marginal-marine sandstones in both stratigraphic and combination traps at depths of from 2,000 to 5,000 feet. Reservoirs below 5,000 feet are generally tight, which is attributed to paleoburial of 7,000 feet or more (Spencer and Wilson, 1988). The USGS estimates that 25 to 55 reservoirs of 6 billion cubic feet of gas (BCFG) may remain to be discovered within the play.

The areas designated by the Federal Energy Regulatory Commission as being eligible for tight gas sand production price incentives are shown in Figure 7. This designation is for gas produced from the lower Mesaverde Group marginal-marine sandstones. This area has a high potential, while the remainder of the Piceance basin within the GMUG has a moderate potential.

Coal bed methane (CBM) resources of the southern Piceance basin have been studied extensively (Cholate, Jurich, and Saulnier, 1984; Johnson and Nuccio, 1986; Rightmire and Cholate, 1986; Tremain, 1984). Areas rated as having low through high potentials for CBM production are shown in Figure 8. The remainder of the GMUG is rated as having no potential for the occurrence of CBM.

An evaluation of critical production parameters of CBM in the Piceance basin was conducted by the Texas Bureau of Economic Geology under a Gas Research Institute contract. Their evaluation concluded that low coal-seam permeability limits CBM potential of the basin (Tyler and Others, 1991).

Lands rated as having a high potential within the Paradox structural basin are shown in Figure 9 and includes the four USGS oil and gas plays illustrated in Table 1. The speculative Lower Paleozoic play of the Piceance basin is also present within the Paradox as the buried fault blocks, older Paleozoic, Leadville Limestone and McCracken Sandstone. Oil and gas production from this play is represented by the Lisbon Oil Field. This is the largest field in the play and has an estimated ultimate recoverable reserves of 43 MMBO and 250 BCFG. There are five other smaller fields within the play that do not have significant production. Peterson (1989) notes that it is unlikely that any new fields the size of the Lisbon will be discovered and that present production indicates that new field discoveries will be small and have low gas BTU values.

The second play in the Paradox is the salt anticline flanks, which includes the Permian Cutler Formation and the Pennsylvanian Honaker Trail Formation of the Hermosa Group. Reservoirs are developed in arkosic sandstones of the Cutler and limestones with minor sandstones in the Honaker Trail that accumulated as thick (i.e., 2,500 to more than 14,000 feet) in synclines along the margins of salt cored anticlines. The Andy's Mesa Field is the only field in the play to have significant production. Cumulative production through 1990 was 21 MB condensate and 18.4 BCFG from seven wells (Colorado Oil and Gas Conservation Commission, 1991). Three additional one well fields are present within the play.

The Paradox Formation is the objective of the fractured interbeds play and is situated within the deep trough of the Paradox Basin and also includes the Paradox fold and fault belt. The reservoir rock consists of fine-grained silty dolomite and dolomitic or calcareous black shale, that is also the source rock. Oil and gas shows are usually encountered during drilling through the interbeds to test deeper objectives. Most of the fields developed in this play were discovered during exploratory drilling for deeper objectives and are one well fields with the largest having produced about 1.2 MMBO (Peterson, 1989).

The last play within the Paradox is the Silverton Delta, Northeast Basin, Honaker Trail Formation. Potential reservoirs are delta-front sandstones that were deposited along the east flank of the basin. The play is speculative with only one well that had a significant show of gas from the Honaker Trail. Any potential field discoveries are expected to be less than 1 MMBO or 6 BCFG in size (Peterson, 1989).

Drilling activity within the UNNF and GUNF has been confined to the high oil and gas potential areas, while 22 wells (13 dry and 9 producers) and 6 dry holes were drilled within the high potential and moderate potential areas, respectively within the GMNF. No wells have been drilled within the low and no potential areas.

Oil and Gas Activity

Historical Background

A total of 64 wells has been drilled within lands administered by the GMUG since the first well was drilled in 1949. Of those, 18 wells (28 %) were reported as completed for production and resulted in the development of four formally designated fields (Table 2). There have been 1,948 wells drilled within the six county area (Table 4) surrounding the GMUG that have had oil and gas activity, of which 1,146 wells (60 %) were reported as completed for production. Figures 10, 11, and 12 illustrate the drilling activity on the Grand Mesa, Gunnison, and Uncompahgre National Forests, respectively. At the end of 1990 there were 11 wells from four fields capable of production with cumulative production of 3,721 barrels of oil (BBLs) and 1,593,154 thousand cubic feet of gas (MCFG).

Table 5 is a summary of drilling activity since 1986 within the counties surrounding the GMUG and within each Forest. Cumulative oil and gas activity within the Forests averages about three percent (%) of the region. During this same time period 53 producing wells (approximately 10 wells per year) were plugged and abandoned.

There are six Federal oil and gas units that contain lands within the GMNF and GUNF. Four of the units (i.e., Ragged Mountain, Coal Basin, Leon Lake, and Old Man Mountain) have established production, while the Aransas and Narrows are still exploratory. Two other exploratory units, Collier Creek and Acapulco, both had unsuccessful wells drilled and have terminated. A portion of the Ragged Mountain Unit may expand in the near future.

AMOCO Production Company formed the Megas Unit during 1986 to test the degasification potential and develop CBM from the Bowie coal member of the Mesaverde in the southern Piceance basin. The unit area included over 150,000 acres and was one of the largest units approved in Colorado. The lands included in the unit were considered by AMOCO to be optimum for the production of CBM. The unit was subsequently terminated due to several factors, which included economics, well performance and seasonal access problems.

Interest for CBM within the Piceance basin has been high, however only 49 CBM wells have been completed for production through 1990, including 4 wells on GMUG lands that were within the Megas Unit, now plugged and abandoned. Barrett Resources Corporation operates the Grand Valley and Parachute fields (located in Garfield County, north of the GMUG) and has been the most active in the basin. Most of their wells are dual completions in Mesaverde (tight gas) sandstones and Cameo coals, but according to William J. Barrett, president of Barret Resources Corporation, they would not have been "fooling with the coals" without extension of tax credit for CBM through 1992 (Lyle, 1990).

Reasonably Foreseeable Development Scenario (RFD)

Historical trends, USGS resource estimates, mineral ownership patterns, location of existing pipelines, and current activity were incorporated in formulating the RFD. The projection of drilling activity, both wildcat and development is predicated on a continuation of the activity at approximately the same levels as the past and will be confined to the high and moderate potential areas. This assumes that most of the development drilling will occur within the region on lands outside the GMUG, and the Forest will remain the focus of wildcat drilling with associated development of several fields. No activity is forecast for the no potential areas, while the low potential areas may have very minor, if any activity.

The national active rig count is forecast to have an average annual growth rate of about 4% through 2005 and the demand for gas is forecast at about 1.5% (Oil and Gas Journal, 1991). Schleede (1992) notes that natural gas use by electric utilities has declined from a high of 3.98 Tcf in 1972, to a low of 2.6 Tcf by 1988. Demand rose to 2.8 Tcf in 1991, and is expected to rise to 3.2 Tcf in 2000, and 4.1 Tcf by 2010. This represents an annual rate of growth of approximately 2%.

Figures 13 and 14 illustrate the cumulative wells drilled within the region and the GMUG since 1950, respectively. Both graphs also include a projection of growth through 2005. The projection was determined using a trend-comparison model and indicates that there may be between 14 and 27 wells drilled at the upper 95 % confidence level.

Drilling Activity Forecast

Trend Analysis

GMUG cumulative drilling history:

7 to 14 wells @ 95 % confidence interval

Region cumulative drilling history:

471 to 925 wells @ 95 % confidence interval

14 to 27 wells on GMUG (3 %)

Assumptions

1. Drilling activity within each Forest will continue at the same conservative levels of 1986 to 1990 or about a 2 % increase per year, and constitute about 3 % of the regional activity. No drilling activity has taken place within the UNNF since 1974, with any potential activity limited to high potential areas. A total of 47 wells are forecast for the GMUG, including 27 wells as indicated by the trend forecast and an additional 20 development wells in existing oil and gas units.
2. Twenty-seven (27) wells are forecast for the GMUG:
 - a. 12 on GMNF, 6 wells completed for production.
 - b. 12 on GUNF, 6 wells completed for production.
 - c. 3 on UNNF, 1 well completed for production.
3. Unit activity may consist of up to 10 wells in the Ragged Mountain Unit if it is expanded and 10 wells in the Narrows Unit on GMUG lands.
4. Wildcat drilling is not expected within the moderate to no potential areas, however if drilling should occur it will most likely be in the moderate potential area. Five wells may be drilled in those areas that presently contain oil and gas leases. A one to two well field may be developed if commercial quantities of hydrocarbons are discovered.
5. Ten producing wells per year will be plugged and abandoned (P&A) within the region. Five wells within the GMUG will be P&A'd during the life of the plan.
6. The tax credits for the development of CBM are expected to terminate at the end of 1992. If this occurs it is unlikely that very many if any of the wells drilled within the GMUG will be for CBM. Those that would be drilled are included within the forecast.

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Appendix A

3021 - Lands Prospectively Valuable for Leasable Minerals

.2 Classification Criteria. Each leasable mineral has a unique set of limiting classification criteria, as set forth below, to identify lands prospectively valuable for that specific mineral.

.21 Oil and Gas.

A. Approval Date. Criteria for classifying public lands as prospectively valuable for oil and gas were approved by the Director, USGS, on April 22, 1957. Those criteria have been revised and the new standards are presented herein. The approval date of the new classification criteria is the date of this manual release.

B. Criteria. Lands underlain by sedimentary rock shall be classified as prospectively valuable for oil and gas on the basis of the thickness and depth of sedimentary rocks, a favorable structural setting, and evidence of oil and gas potential. Although oil and gas normally occur within sedimentary rocks, these minerals may have also accumulated in rocks of other than sedimentary origin. Classification of lands which do not contain sedimentary rocks should be based on knowledge of known accumulations. Such a determination requires considerable professional judgement.

1. Mineral Thickness. In a sedimentary basin, the minimum thickness of sedimentary rocks considered to be prospectively valuable for oil and/or gas is 1,000 feet, unless a thinner sedimentary section is known to be productive.

2. Maximum Depth. The lower depth limit of potentially productive sedimentary is considered to be 35,000 feet below the surface. Areas having a cover of igneous or metamorphic rock which has flowed or been thrust over sedimentary rock may be classified as prospectively valuable.

3. Evidence of oil and gas potential. Oil seeps, oil and gas shows in well tests, and past or present production constitute direct evidence of oil and gas potential. Indirect evidence may include seismic information, similarity with known producing rocks, or acceptable levels of thermal maturation. Either direct or indirect evidence may be used in classification.

Appendix B

Oil and Gas Potential Rating Criteria

High, (a) in this area there is the demonstrated existence of: (1) source rock, (2) thermal maturation, and (3) reservoir strata possessing permeability and/or porosity, and (4) traps or (b) be part of an oil and gas play as defined by the USGS (Open File Report 88-373 or related publication).

Moderate, there is as geophysical or geological indication that the following are present: (1) source rock, (2) thermal maturation and (3) reservoir strata possessing permeability and/or porosity, and (4) traps.

Low, there are specific indications that one or more of the following are **not** present: (1) source rock, (2) thermal maturation, or (3) reservoir strata possessing permeability and/or porosity, and (4) traps.

None, requires that the absence of source rock, or thermal maturation or reservoir rock prohibits the occurrence of oil and/or gas.

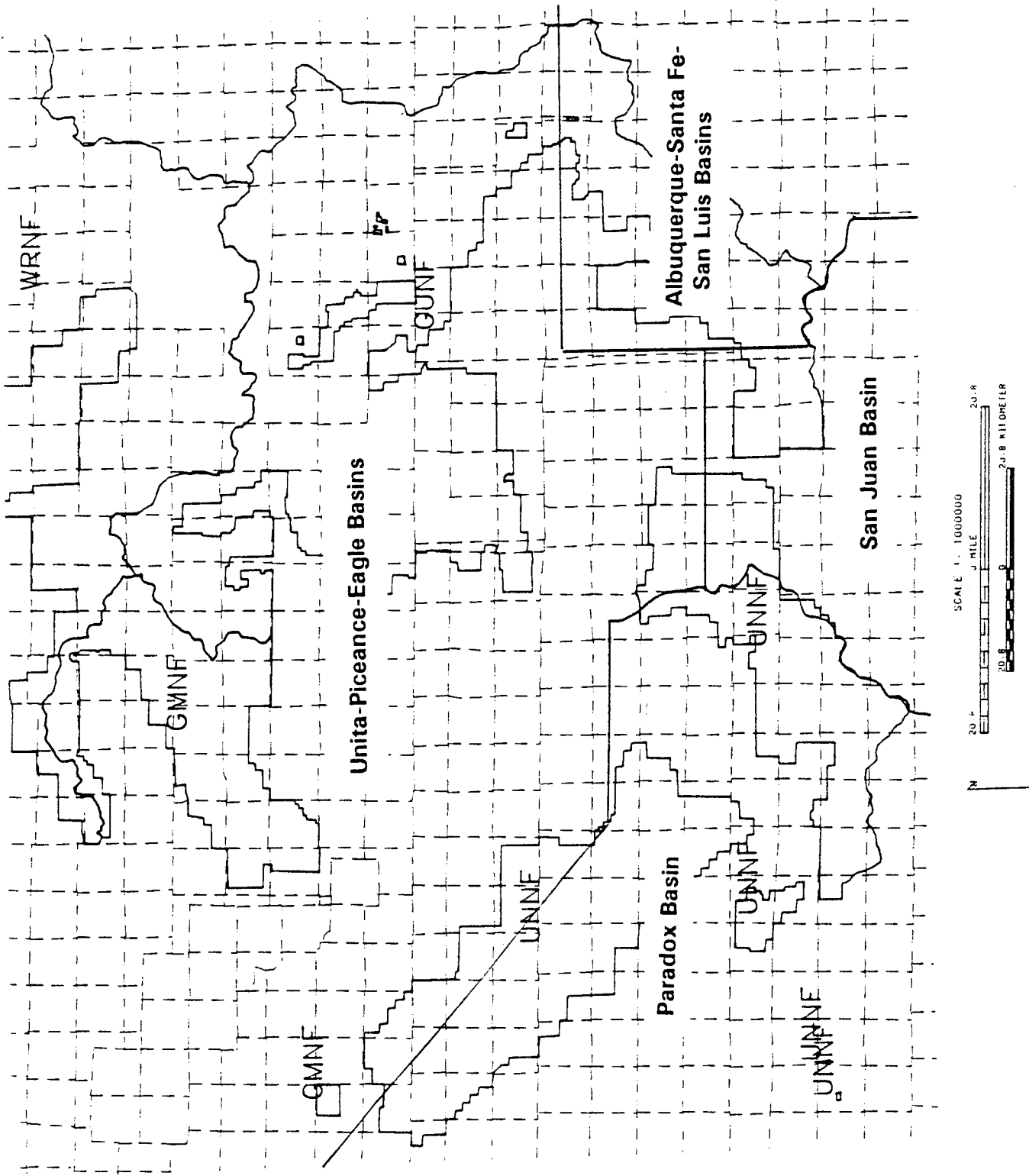
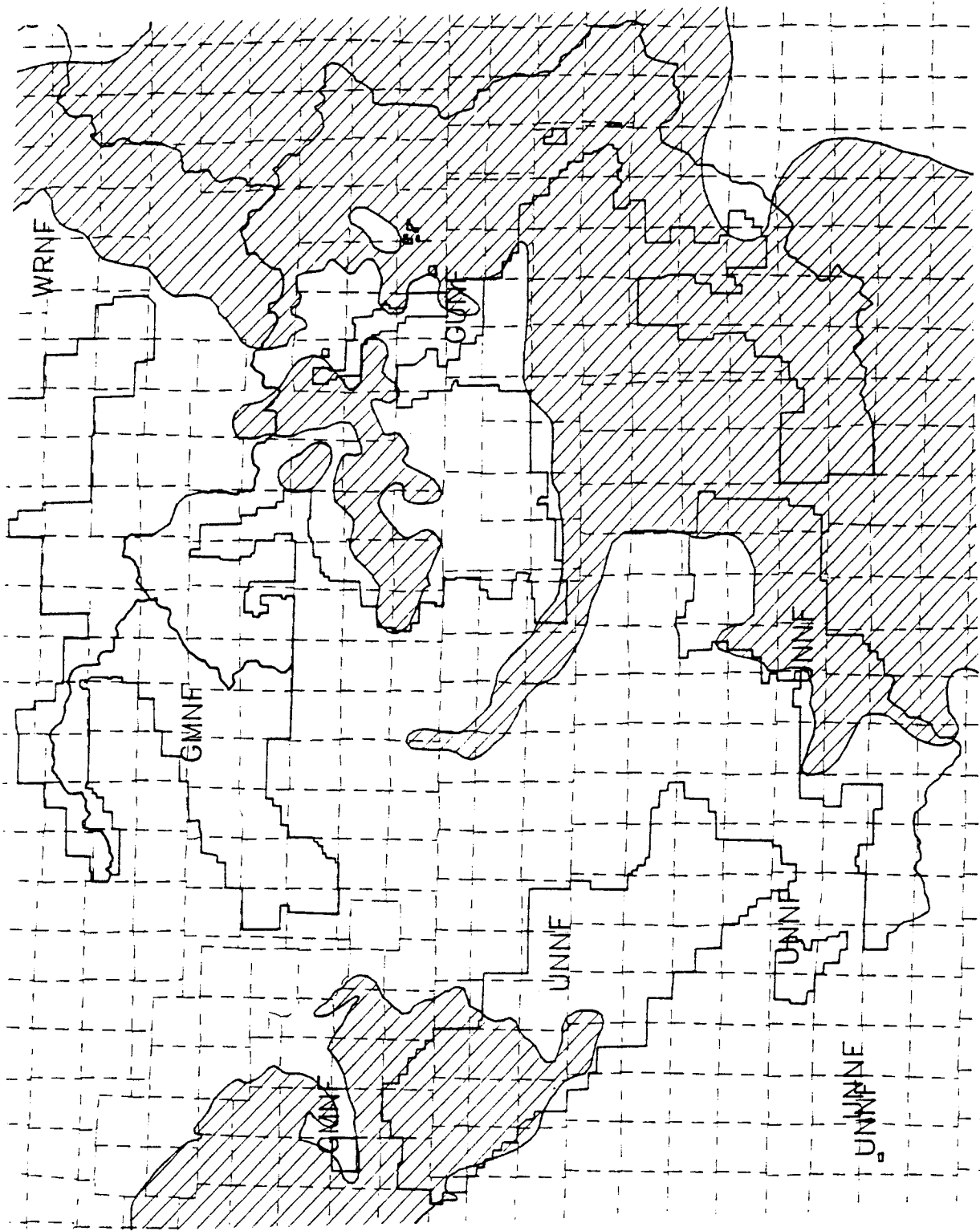


Figure 1. Location map of U. S. Geological Survey petroleum resource assessment provinces.



SCALE 1:100000
 20 M
 20 K
 20 MILE
 20 KILOMETER

Not PV for O & G

Figure 2. Lands prospectively valuable for oil and gas.

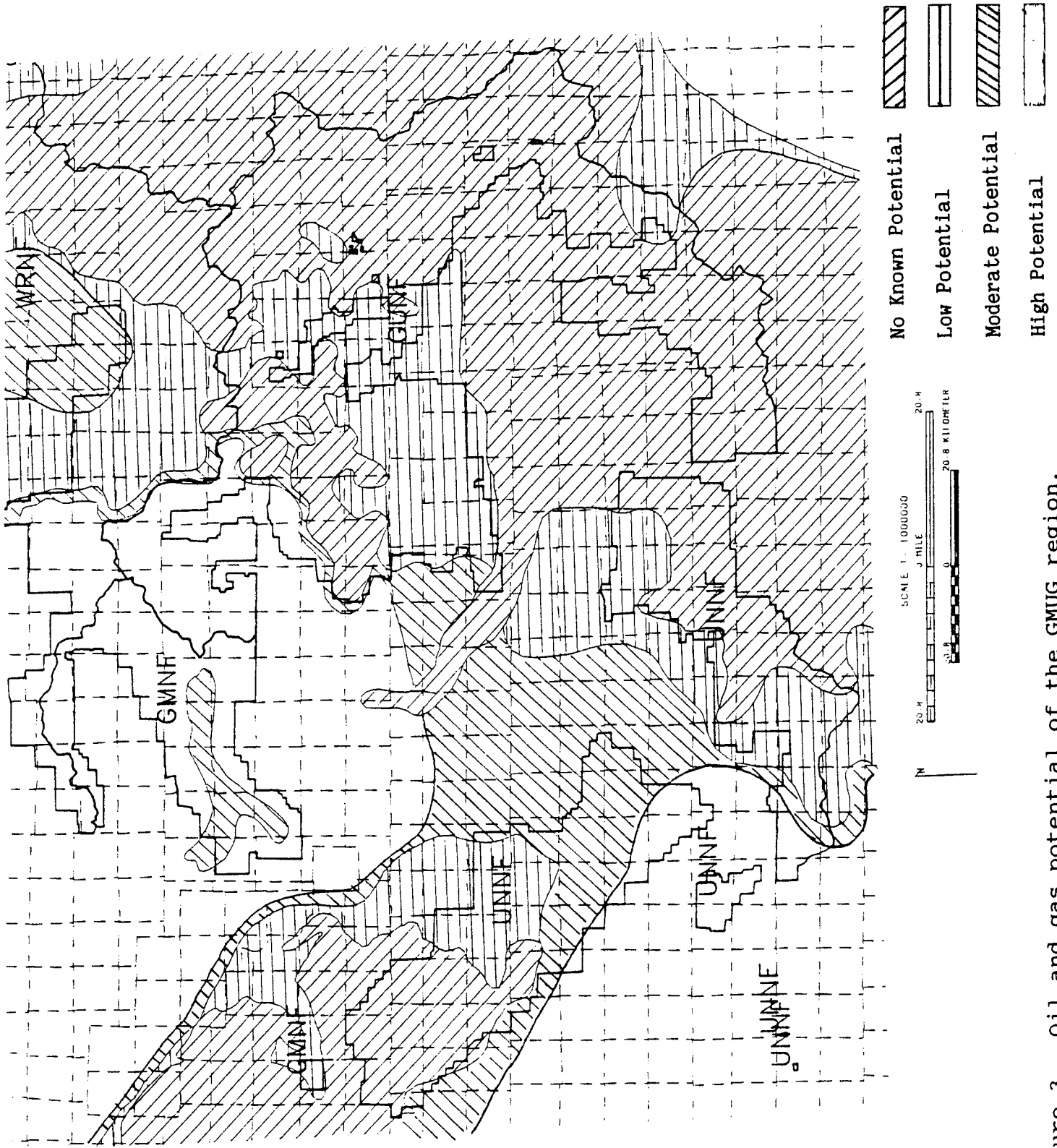


Figure 3. Oil and gas potential of the GMUG region.

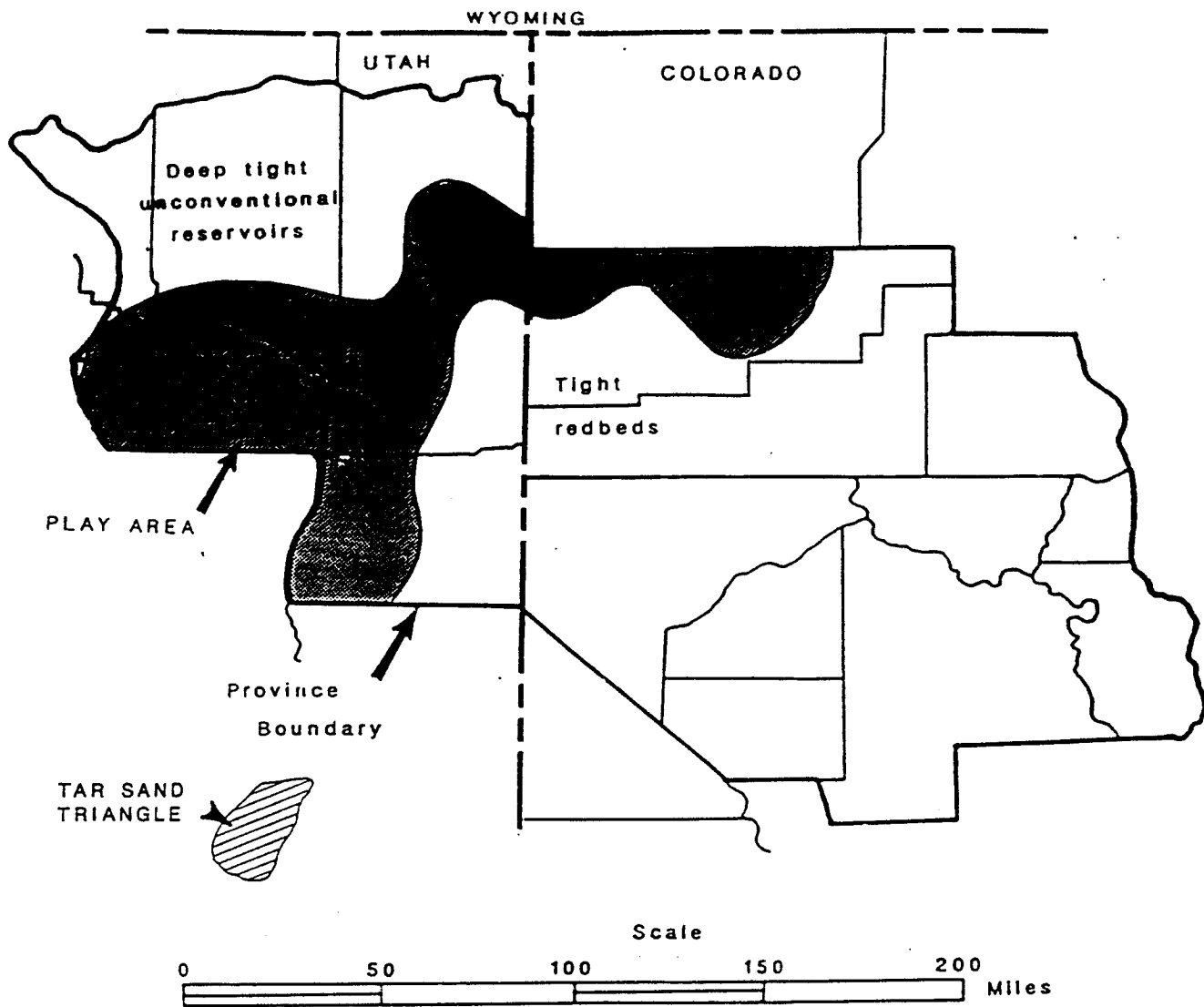


Figure 4. Regional Permian Pennsylvania sandstone play.

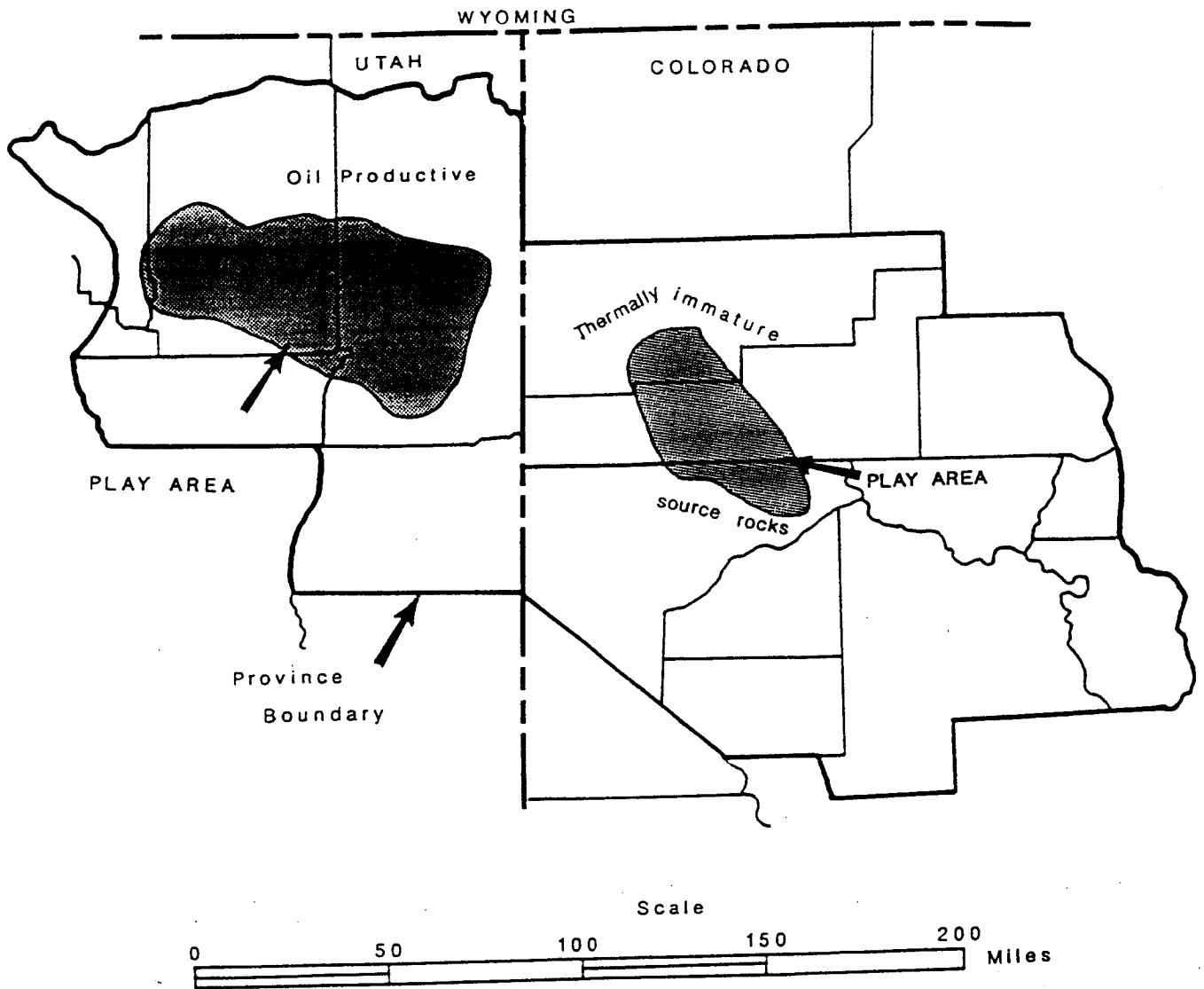


Figure 5. Regional Uinta-Piceance Tertiary conventional gas play.

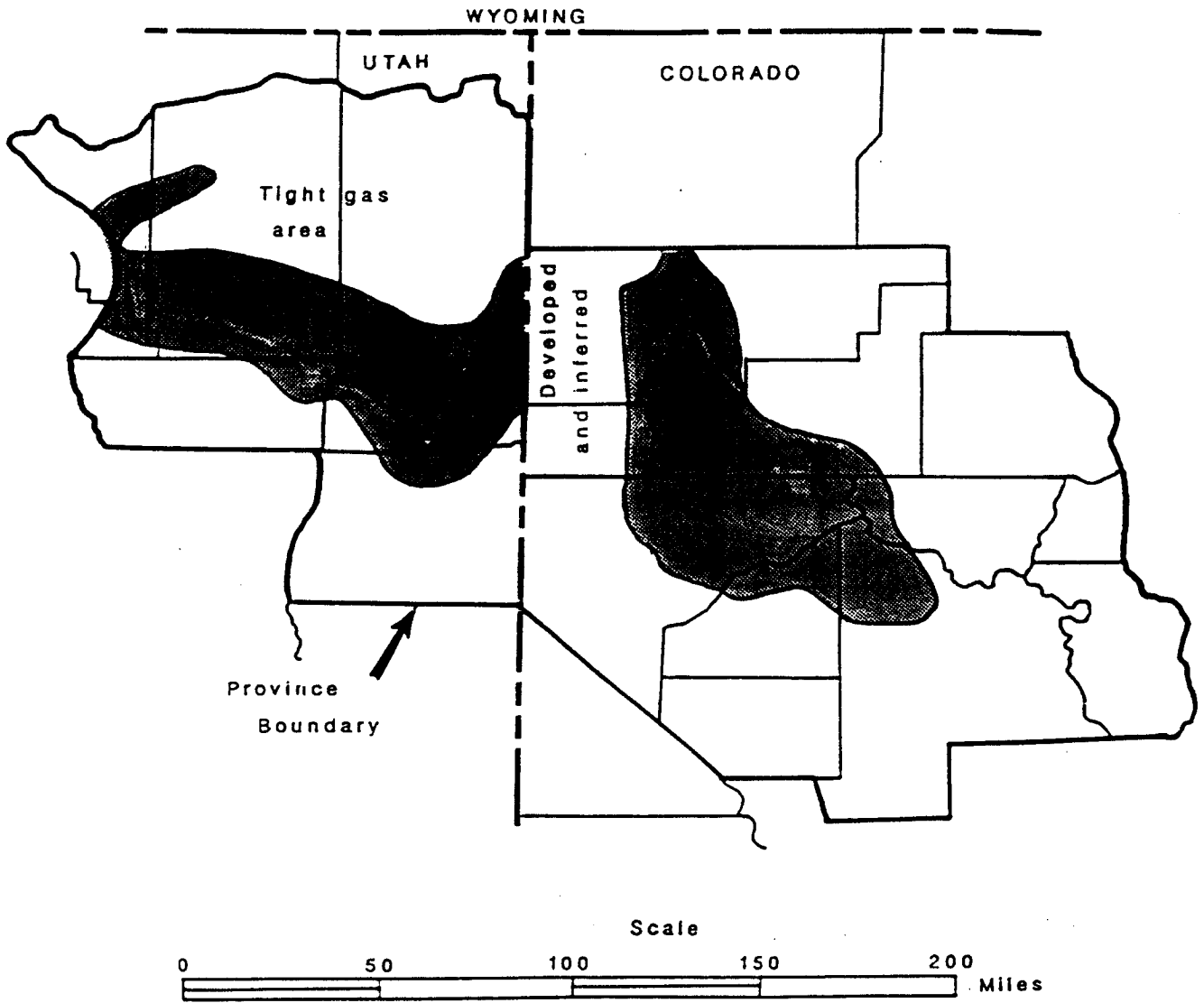


Figure 6. Regional Uinta-Piceance Upper Cretaceous sandstone conventional play.

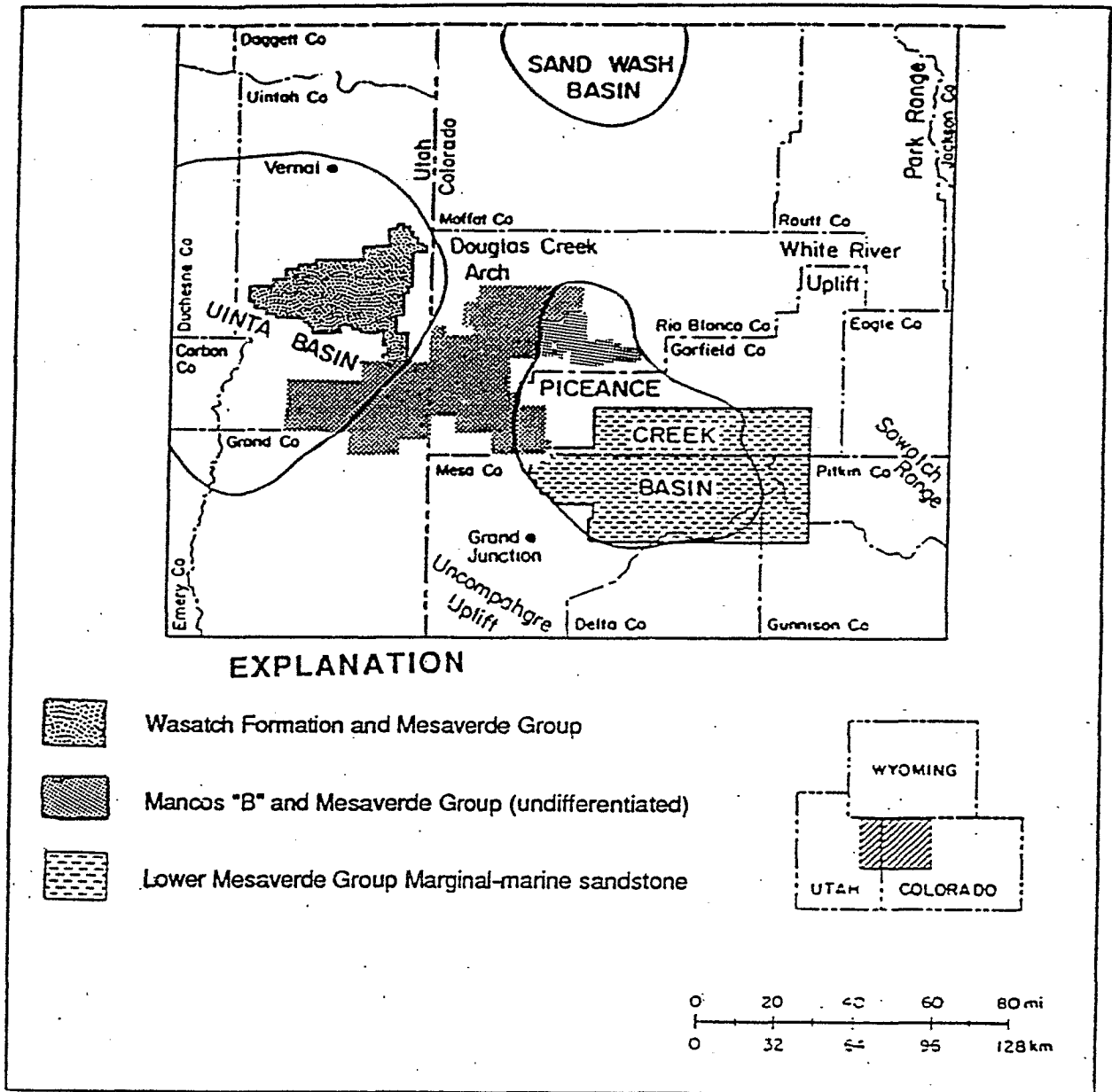


Figure 7. Areas in the Uinta and Piceance basins designated as eligible for receiving tight gas production incentive prices by the Federal Energy Regulatory Commission.

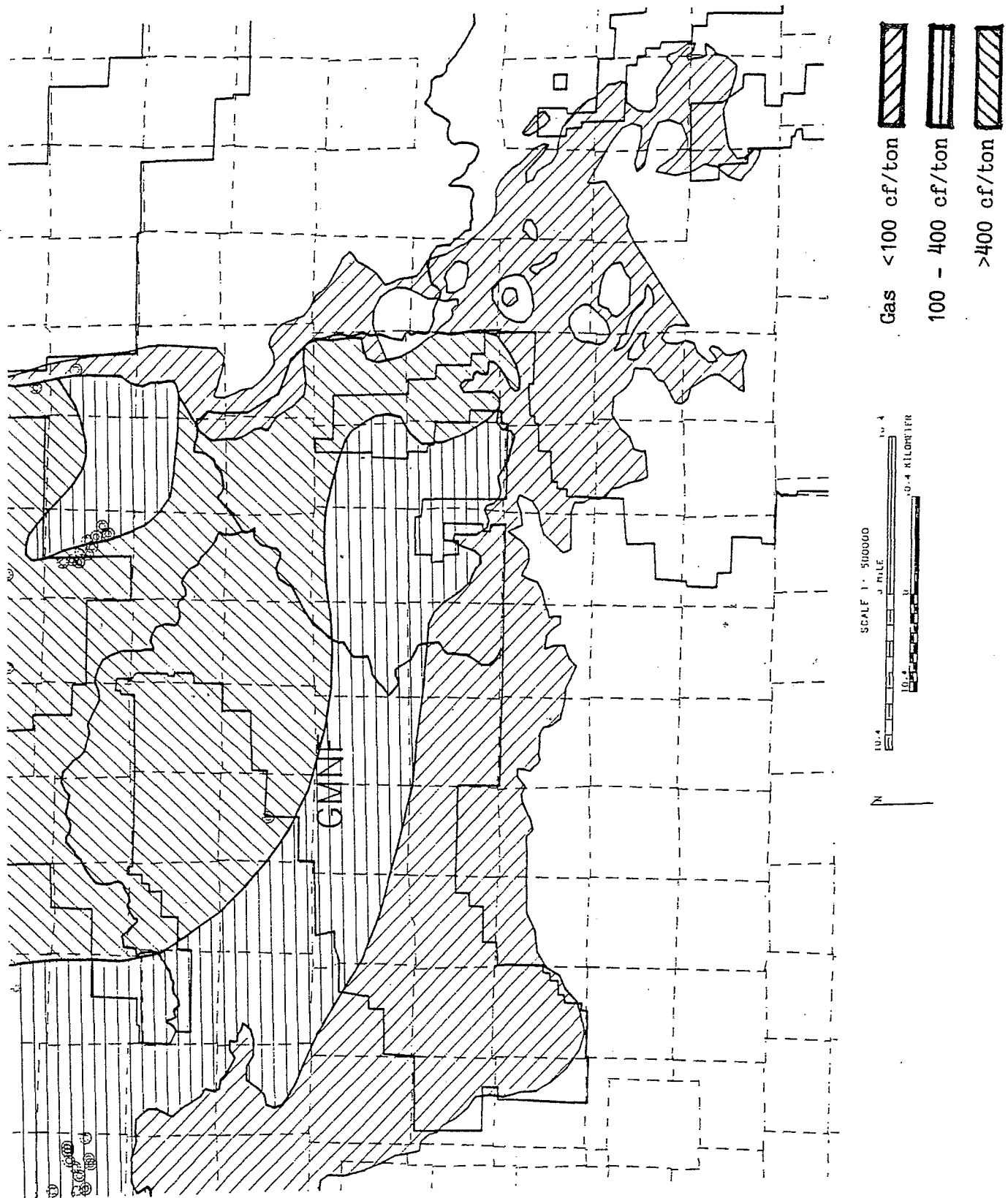


Figure 8. Coal bed methane content of the southern Piceance Basin.

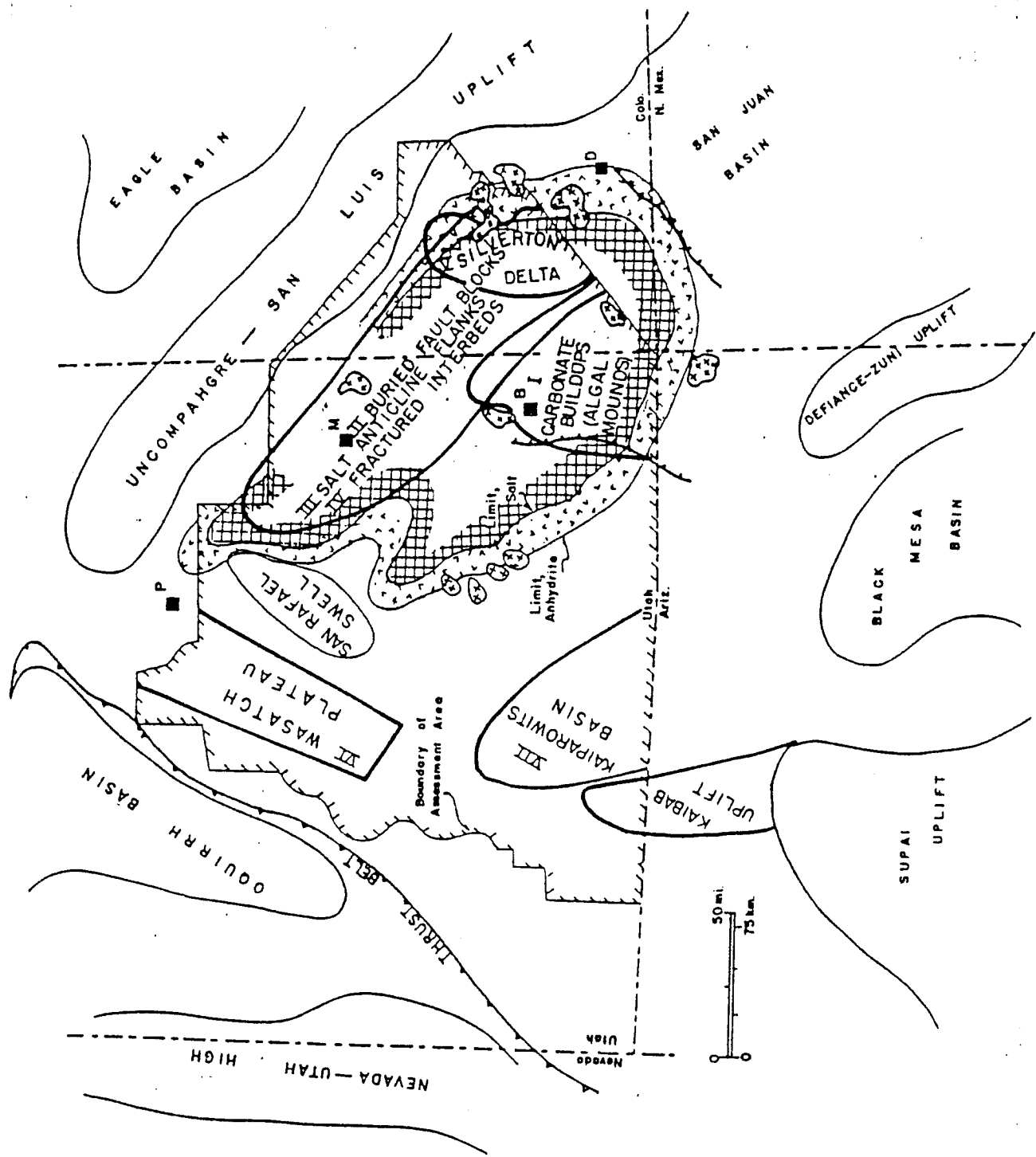


Figure 9. Principal oil and gas plays of the Paradox Basin.

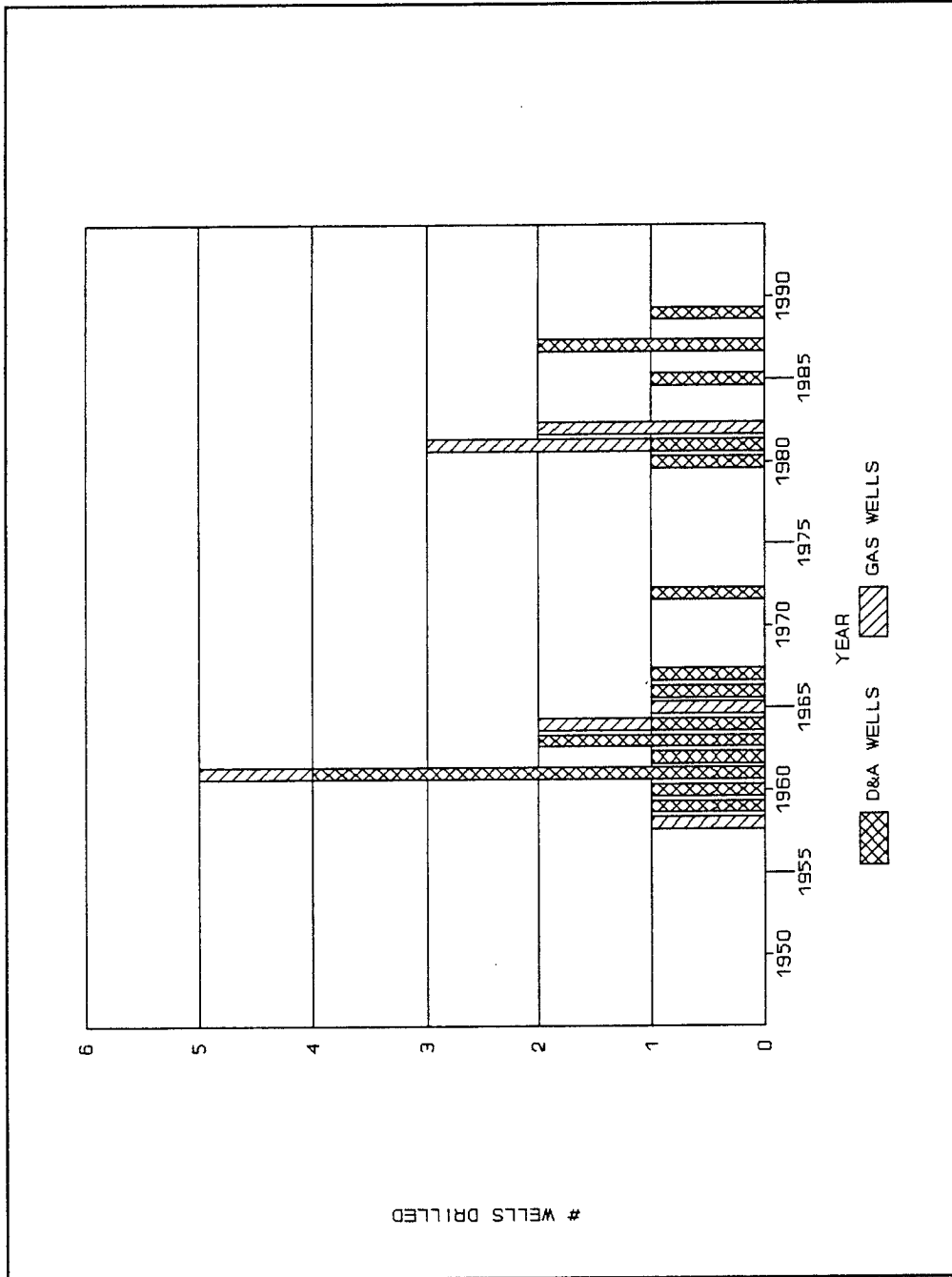


Figure 10. Histogram of drilling activity within the Grand Mesa National Forest.

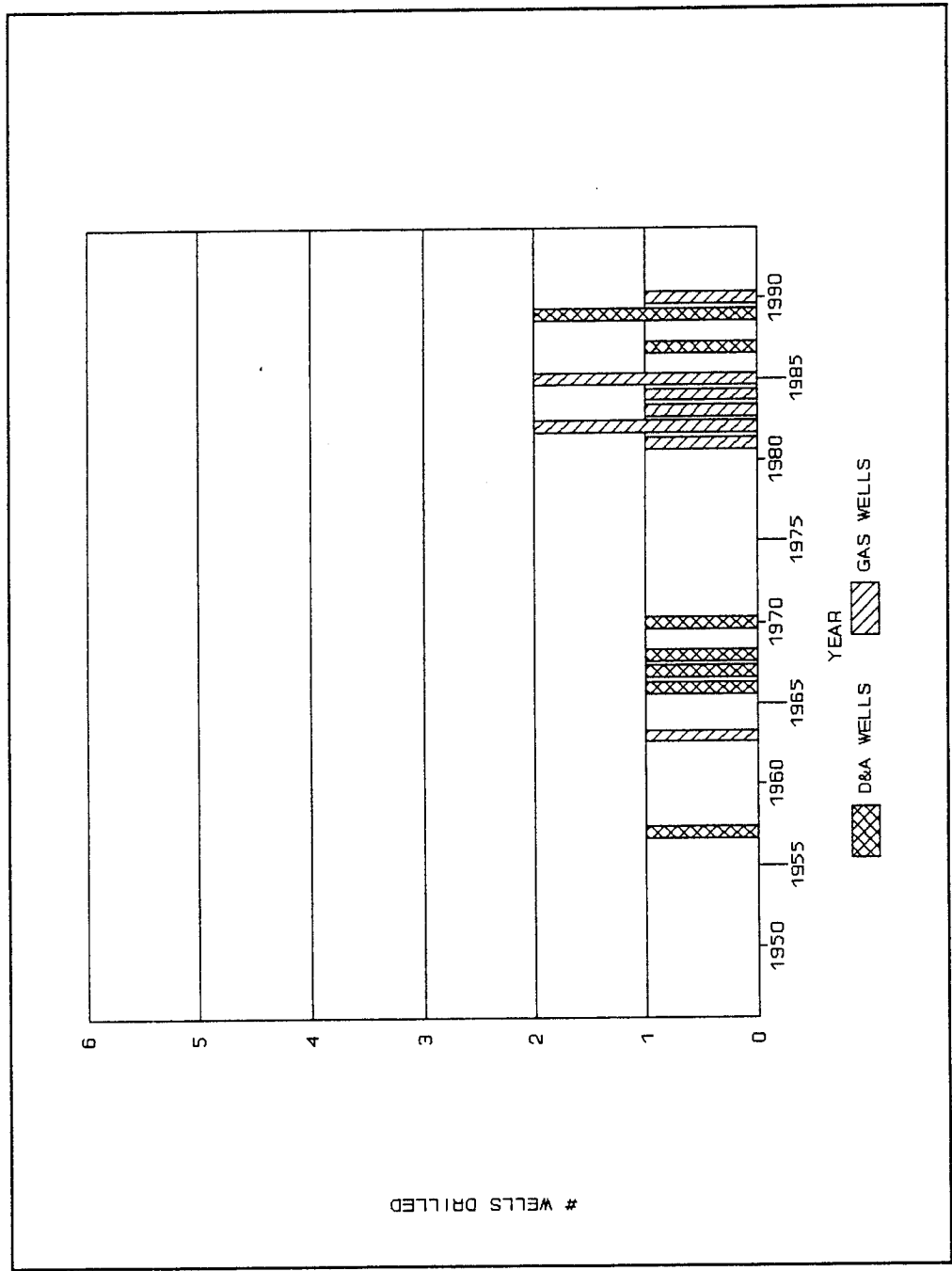


Figure 11. Histogram of drilling activity within the Gunnison National Forest.

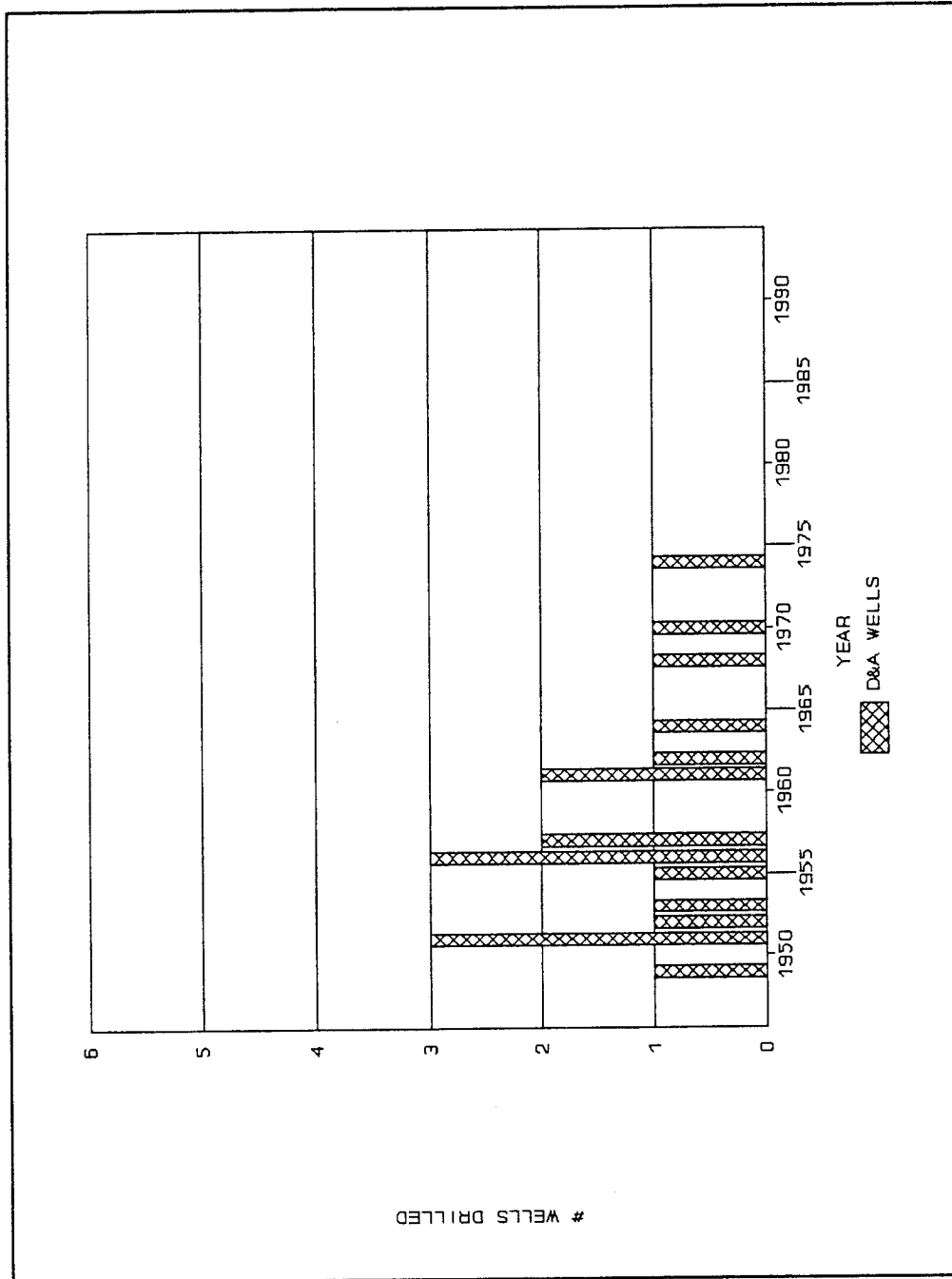


Figure 12. Histogram of drilling activity within the Uncompahgre National Forest.

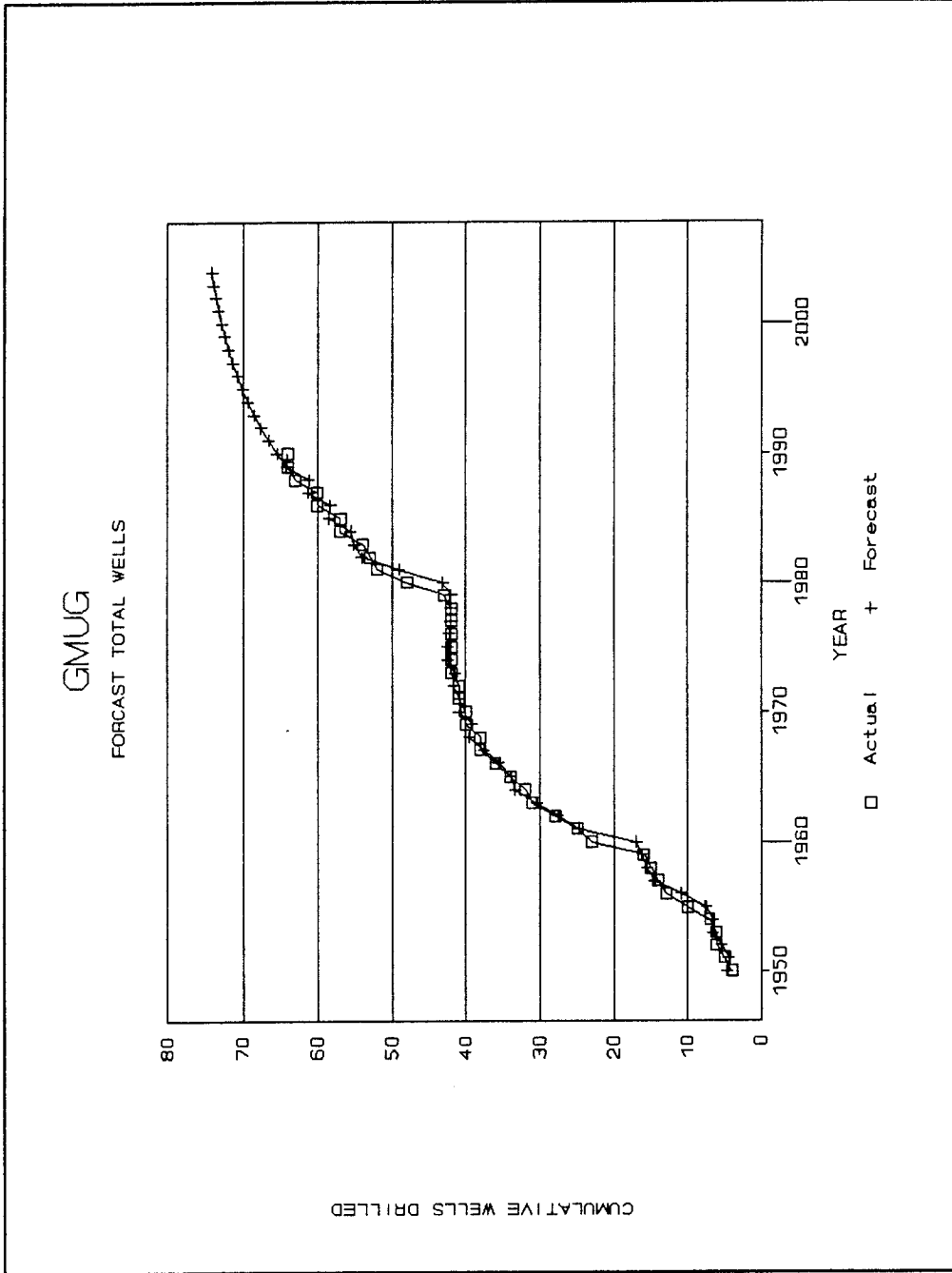


Figure 13. Trend forecast of cumulative drilling activity within GMUG.

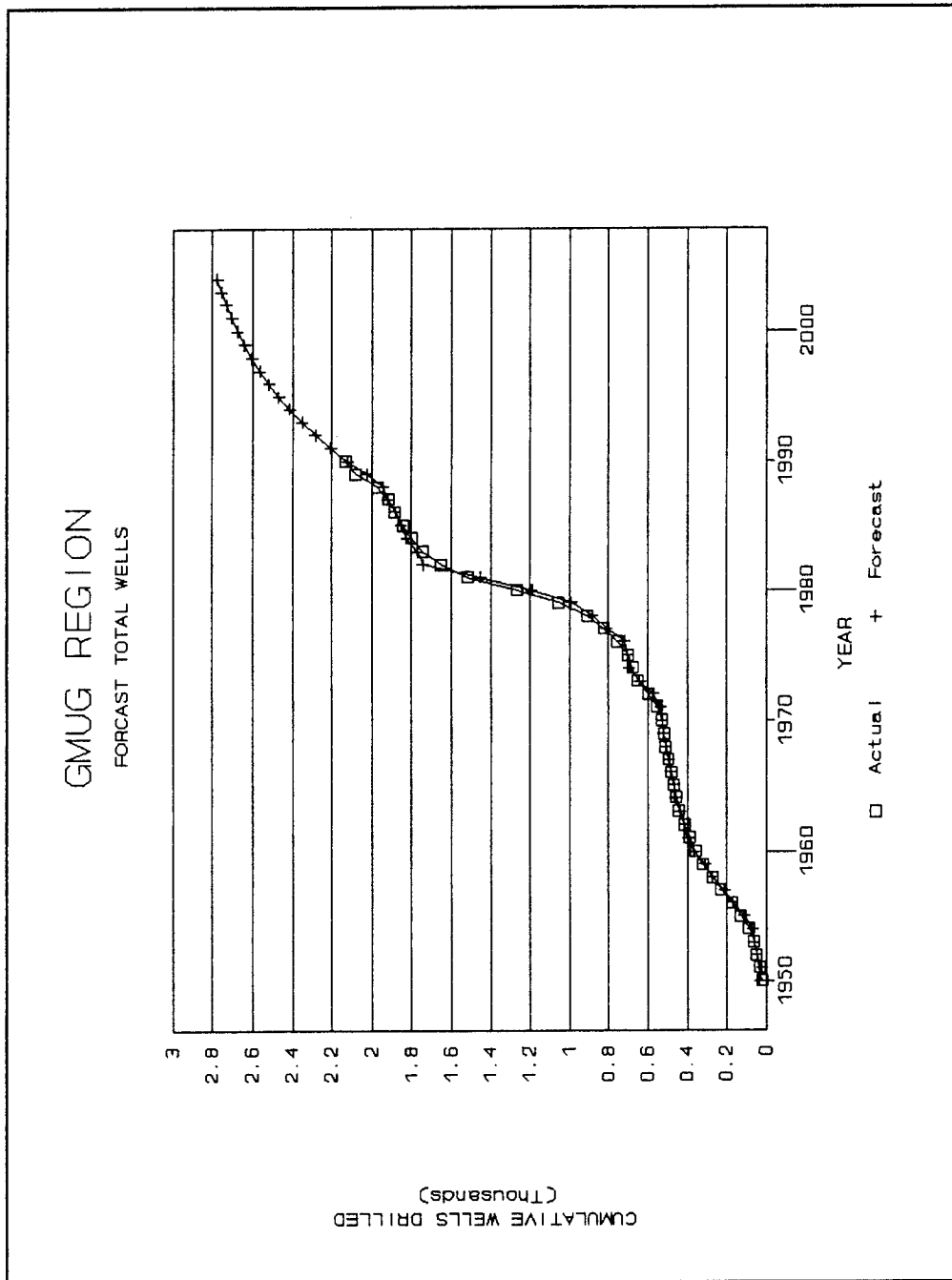


Figure 14. Trend analysis forecast of regional drilling activity.

TABLE 1. USGS OIL AND GAS PLAYS WITHIN THE GMUG.

| BASIN/ PLAY | RESERVOIR TYPE | RESERVOIR ROCK | TRAPS/ SEALS | EXPLORATION STATUS | DEPTH RANGE |
|--|--|---|--|-----------------------------|---------------------------|
| Paradox | | | | | |
| Buried fault block | Dolomitized ls facies most important | Leadville Ls McCracken SS | Paradox evaporates, faults | Moderately explored | 6,000 - 15,000 ft |
| Salt anticline flanks | Carbonates and arkosic ss | Cutler Fm Hermosa Fm | Pinchouts and updip termination against salt diapers | Lightly explored | 5,000 - > 15,000 ft |
| Fractured interbeds | Dolomite and calcareous black shale, fractured | Paradox Ls and evaporite facies | Fractures, salt and shale interbeds | Lightly explored | 5,000 - > 15,000 ft |
| Silverton delta | Arkosic marginal marine facies | Honaker Trail Formation | Combination and stratigraphic | Speculative | 3,000 - 6,000 ft |
| Piceance | | | | | |
| Tertiary gas | Sandstones, fluvial and lacustrine | Wasatch, Fort Union, and Green River Formations | Stratigraphic and structural, updip pinchouts | Moderately well explored | 3,000 - > 7,000 ft |
| Permian- Pennsylvanian sandstone | Sandstones, fluvial and lacustrine | Weber Sandstone | Stratigraphic and structural, updip pinchouts | Speculative | 2,000- 8,000 ft |
| Upper Cretaceous gas | Fluvial, marginal marine, marine sandstones and siltstones | Meserve Group sandstones | Structural and combination | Fairly well explored | 2,000 - 5,000 ft |

TABLE 2. OIL AND GAS FIELDS AND CUMULATIVE PRODUCTION.

| FIELD/ RESERVOIR | | | 1990 | | CUMULATIVE | |
|---------------------|------------------|------------------|-------|---------|------------|-----------|
| | | | OIL | GAS | OIL | GAS |
| | SIW ¹ | PWR ² | (BBL) | (MCFG) | (BBL) | (MCFG) |
| Grand Mesa | | | | | | |
| Mesaverde | 0 | 0 | 0 | 0 | 0 | 741 |
| Field total | 0 | 0 | 0 | 0 | 0 | 741 |
| Sheep Creek | | | | | | |
| Cozzette- | 2 | 0 | 0 | 0 | 0 | 197,433 |
| Morapos | 0 | 0 | 0 | 0 | 0 | 65,190 |
| Mesaverde | 1 | 0 | 0 | 0 | 0 | 13,096 |
| Field total | 3 | 0 | 0 | 0 | 0 | 275,719 |
| Ragged Mtn | | | | | | |
| Corcoran | 0 | 1 | 81 | 29,309 | 1,675 | 292,425 |
| Cozzette- | 4 | 1 | 5 | 79,703 | 971 | 764,244 |
| Field total | 4 | 2 | 86 | 109,012 | 2,646 | 1,056,669 |
| Coal Basin | | | | | | |
| Cozzette- | 1 | 1 | 114 | 36,676 | 1,075 | 260,025 |
| Field total | 1 | 1 | 114 | 36,676 | 1,075 | 260,025 |
| Forest total | 8 | 3 | 200 | 145,688 | 3,721 | 1,593,154 |

¹ - Shut In Well ² - Producing Well

TABLE 3. DRY HOLES DRILLED WITHIN THE UNNF.

| Comp Yr | Sec. | Twp | Dir | Rng | TD | FM @ TD | Comments |
|---------|------|-----|-----|-----|--------|---------------|--|
| 1949 | 14 | 46 | N | 13 | 5035 | Cambrian | O S Devonian dolomite |
| 1951 | 18 | 47 | N | 14 | 7618 | Ignacio | O&G show Paradox Fm GTS Hermosa Fm |
| 1951 | 18 | 47 | N | 14 | 7618 | Elbert | NS reported |
| 1952 | 13 | 45 | N | 12 | 4335 | Mississippian | Drill S G Pennsylvanian |
| 1953 | 10 | 45 | N | 12 | 2017 | Pennsylvanian | NS reported |
| 1955 | 14 | 46 | N | 13 | 2226 | Molas | NS reported |
| 1956 | 26 | 46 | N | 12 | 1441 | NA | NS reported |
| 1956 | 6 | 46 | N | 12 | 1820 | Precambrian | NS reported |
| 1956 | 21 | 46 | N | 12 | 1200 | NA | NS reported |
| 1957 | 10 | 45 | N | 12 | 1200 | NA | NS reported |
| 1961 | 2 | 45 | N | 12 | 3742 | Devonian | NS reported |
| 1961 | 10 | 45 | N | 12 | 4335 | Mississippian | Sli G S Pennsylvanian |
| 1962 | 4 | 45 | N | 12 | 2714 | Pennsylvanian | NS reported |
| 1964 | 13 | 44 | N | 14 | 10,220 | Cambrian | DST Hermosa arkose gauged 363 MCFG/1 hr |
| 1966 | 14 | 44 | N | 14 | 5860 | Hermosa | Drilling Show Hermosa Fm |
| 1968 | 10 | 47 | N | 15 | 7994 | Granite | NS reported |
| 1970 | 3 | 47 | N | 15 | 8430 | Mississippian | NS reported |
| 1974 | 3 | 47 | N | 15 | 6065 | Elbert | NS reported |

note:O=oil,G=gas,N=no,S=show,Fm= formation,TD=total depth

TABLE 4. DRILING STATISTICS OF REGION AND GMUG.

| | GMUG | GUNF | UNNF | FOREST TOTAL | REGION |
|-------|------|------|------|-----------------|--------|
| DRY | 19 | 8 | 19 | 46 | 768 |
| GAS | 8 | 9 | 0 | 17 | 1067 |
| O&G | 0 | 0 | 0 | 0 | 56 |
| OIL | 0 | 0 | 0 | 0 | 23 |
| SI | 1 | 0 | 0 | 1 | 34 |
| TOTAL | 28 | 17 | 19 | 64 | 1948 |

TABLE 5. DRILLING ACTIVITY IN COUNTIES SURROUNDING GMUG AND WITHIN EACH FOREST.

| COUNTY | WELLS DRILLED 1986 - 1990 | | |
|-------------|------------------------------|-----|-------|
| | PWR | DRY | TOTAL |
| Delta | 1 | 1 | 2 |
| Dolores | 4 | 4 | 8 |
| Garfield | 183 | 9 | 192 |
| Gunnison | 2 | 0 | 2 |
| Mesa | 21 | 6 | 27 |
| Montrose | 0 | 1 | 1 |
| San Miguel | 4 | 0 | 4 |
| Total | 215 | 21 | 236 |
| FOREST | | | |
| Grand Mesa | 0 | 3 | 3 |
| Gunnison | 1 | 3 | 4 |
| Uncompahgre | 0 | 0 | 0 |
| Total | 1 | 6 | 7 |

**Appendix F -
Slope Disturbance
Diagrams**

GROUND DISTURBANCE BY SLOPE PERCENT FOR VARIOUS ROAD AND DRILL-PAD CUT AND FILL SLOPES

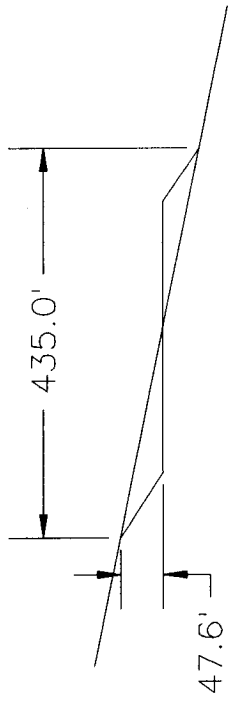
| SIDE-SLOPE (%) | 1:1 CUT-1 1/2:1 FILL | | ROADS | | 1 1/2:1 CUT-1 1/2:1 FILL | | CUT & FILL SLOPES 1 1/2:1 | | DRILL-PADS | | |
|----------------|------------------------|--------------|-----------------|---------------|--------------------------|--------------|---------------------------|-----------------|------------|-----------------|----------|
| | CLEARING LIMITS (FEET) | (ACRES/MILE) | (CU.YD./100FT.) | (CU.YD./MILE) | CLEARING LIMITS (FEET) | (ACRES/MILE) | (CU.YD./100FT.) | CLEARED (ACRES) | (CU.YD.) | CLEARED (ACRES) | (CU.YD.) |
| 10 | 22.9 | 2.8 | 23.7 | 1251 | 23.6 | 2.9 | 24.4 | 2.7 | 13900 | 3.5 | 16000 |
| 20 | 27.2 | 3.3 | 54.8 | 2893 | 29.1 | 3.5 | 59.6 | 3.5 | 30667 | 5.3 | 39167 |
| 30 | 33.4 | 4.0 | 99.5 | 5254 | 37.9 | 4.6 | 113.2 | 4.3 | 50075 | 7.5 | 68250 |
| 40 | 43.4 | 5.3 | 165.8 | 8754 | 53.0 | 6.5 | 207.9 | 5.3 | 72367 | 10.0 | 106667 |
| 50 | 62.2 | 7.5 | 275.3 | 14536 | 89.4 | 10.8 | 408.1 | 6.3 | 97458 | 12.9 | 150833 |
| 60 | 113.4 | 13.7 | 521.0 | 27509 | 233.2 | 28.3 | 1223.6 | 7.5 | 125300 | 16.2 | 202500 |

Road figures are based on data from Engineering Field Tables, EM 7100-10, fourth edition. A width of 20 feet (W=20) was used to account for a 16 foot running surface plus a 3:1 ditch per instructions on page 82. The tables for 1:1 cut slopes are found on pages 116-117 and for 1 1/2:1 cut slopes on pages 94-95.

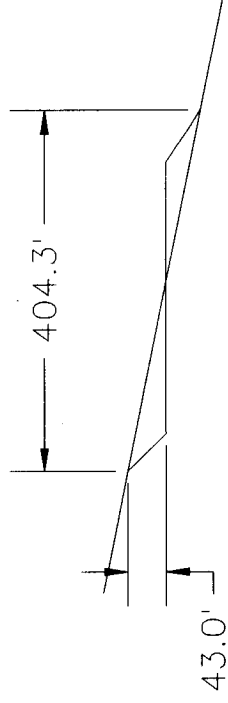
Cubic yardage for drill-pads are approximate. The objective of this table is not to show exact quantities but rather to show various relationships by sideslope %, i.e., the steeper the sideslope, the greater the amount of disturbance.

A level surface of 300' X 300' is assumed for each drill-pad.

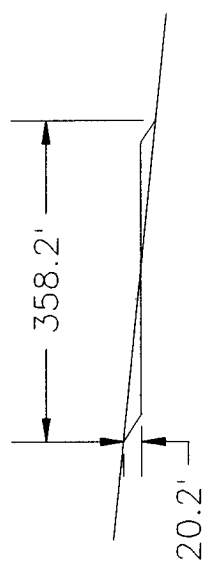
The figures in this appendix simply illustrate the amount of area, in cross-section, disturbed by locating similar size drill pads on various slopes. Locating drill pads on steeper slopes results in significantly greater area disturbed.



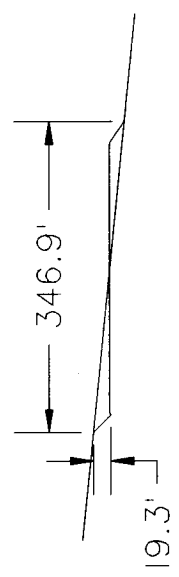
Ground Slope: 20%
 Cut Slope: 1.5:1
 Cut Height: 47.6'
 Disturbed Width: 435.0'



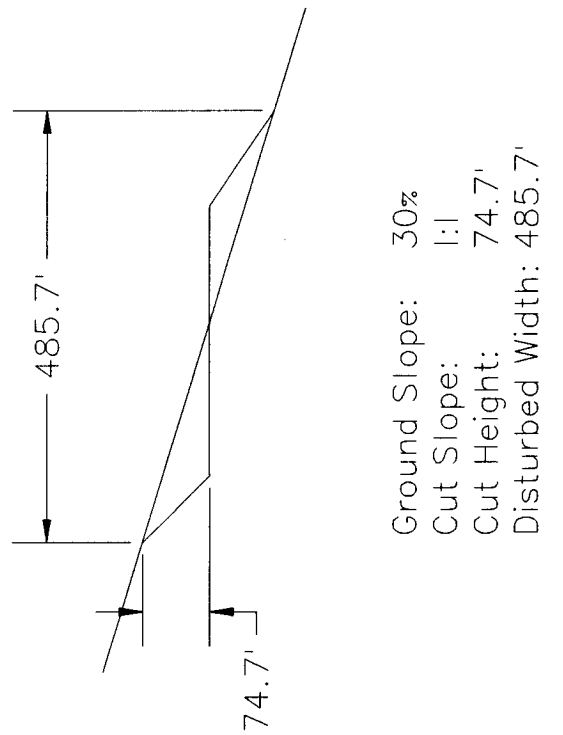
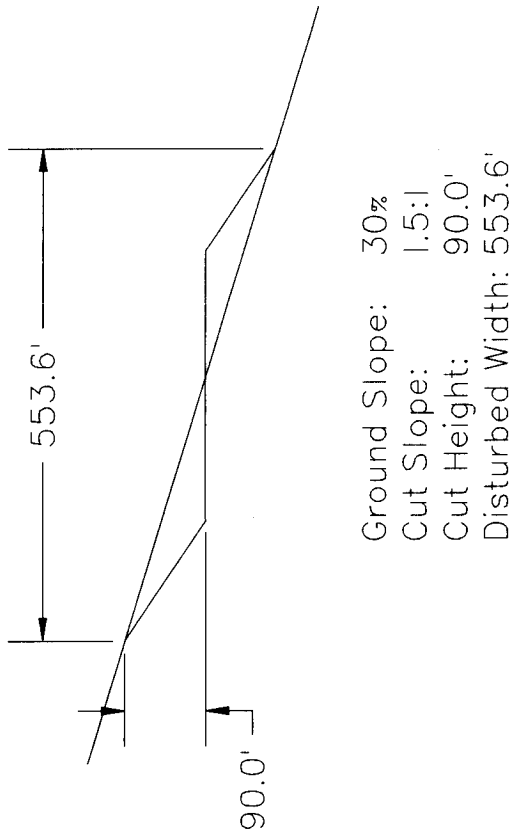
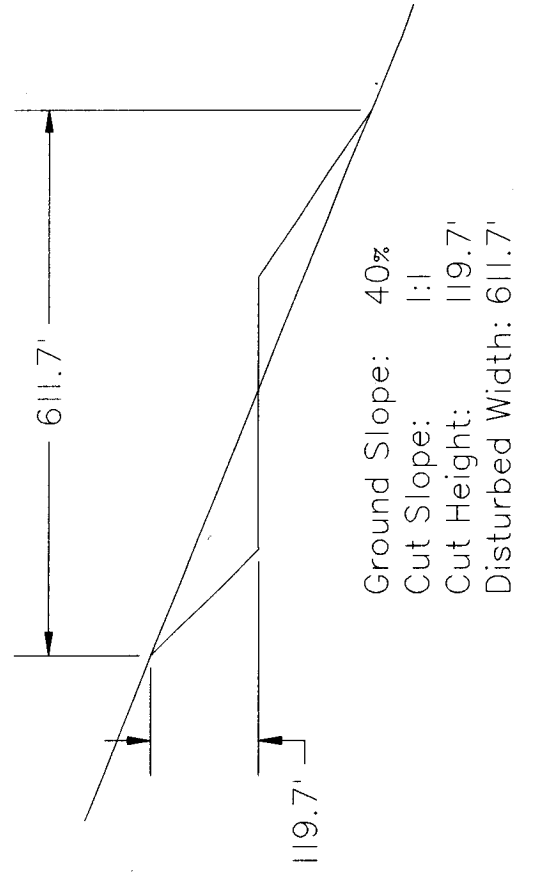
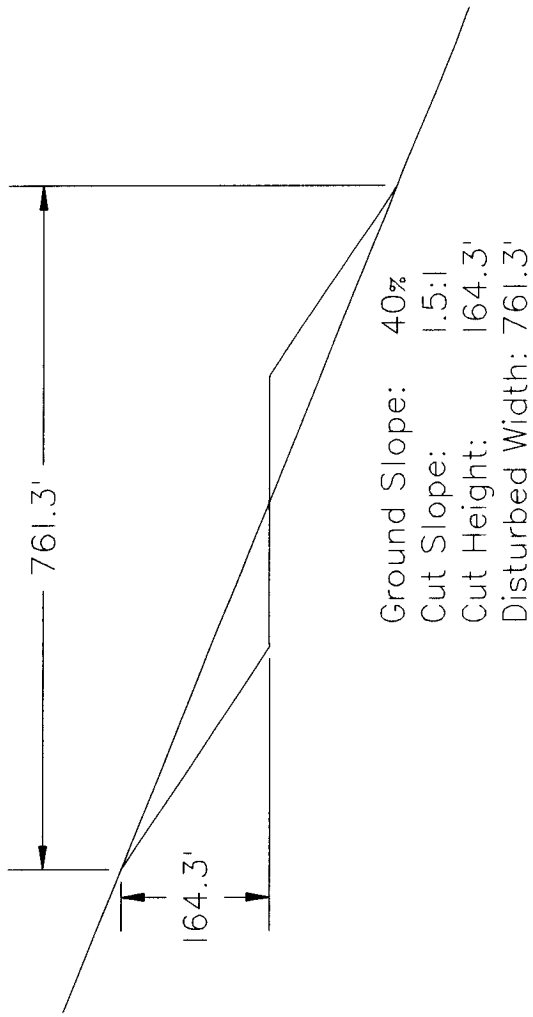
Ground Slope: 20%
 Cut Slope: 1:1
 Cut Height: 43.0'
 Disturbed Width: 404.3'

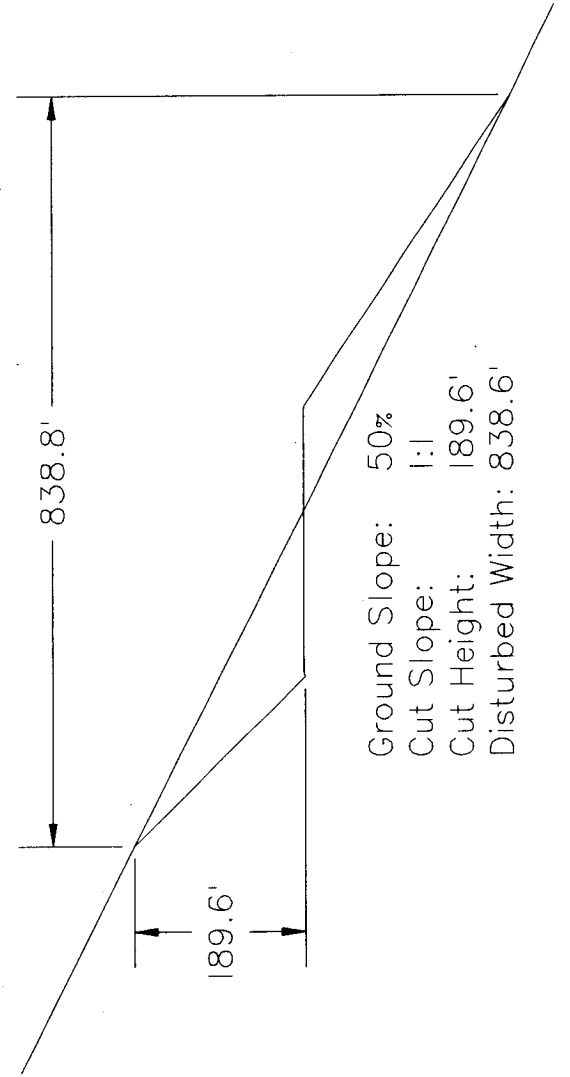
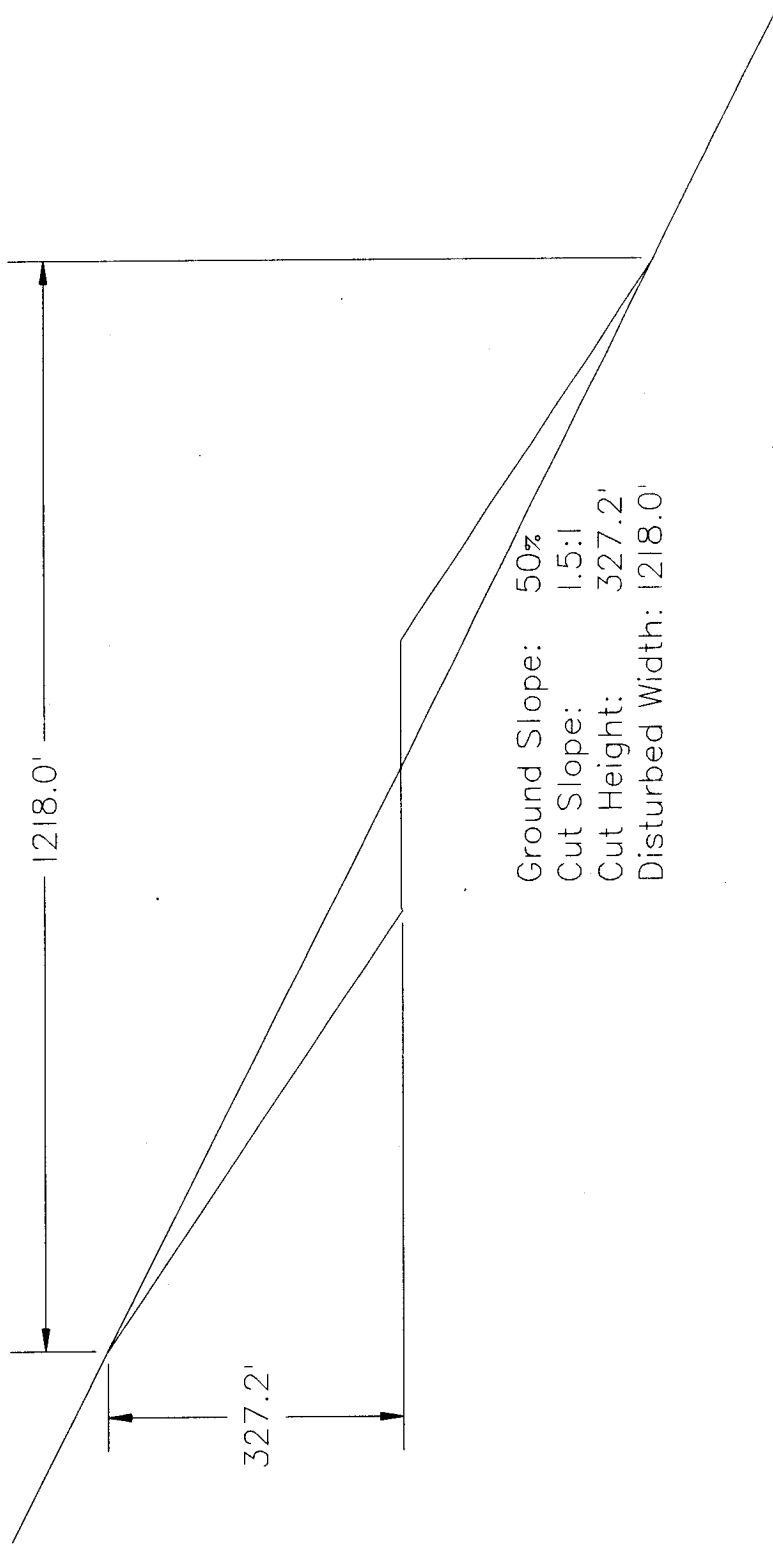


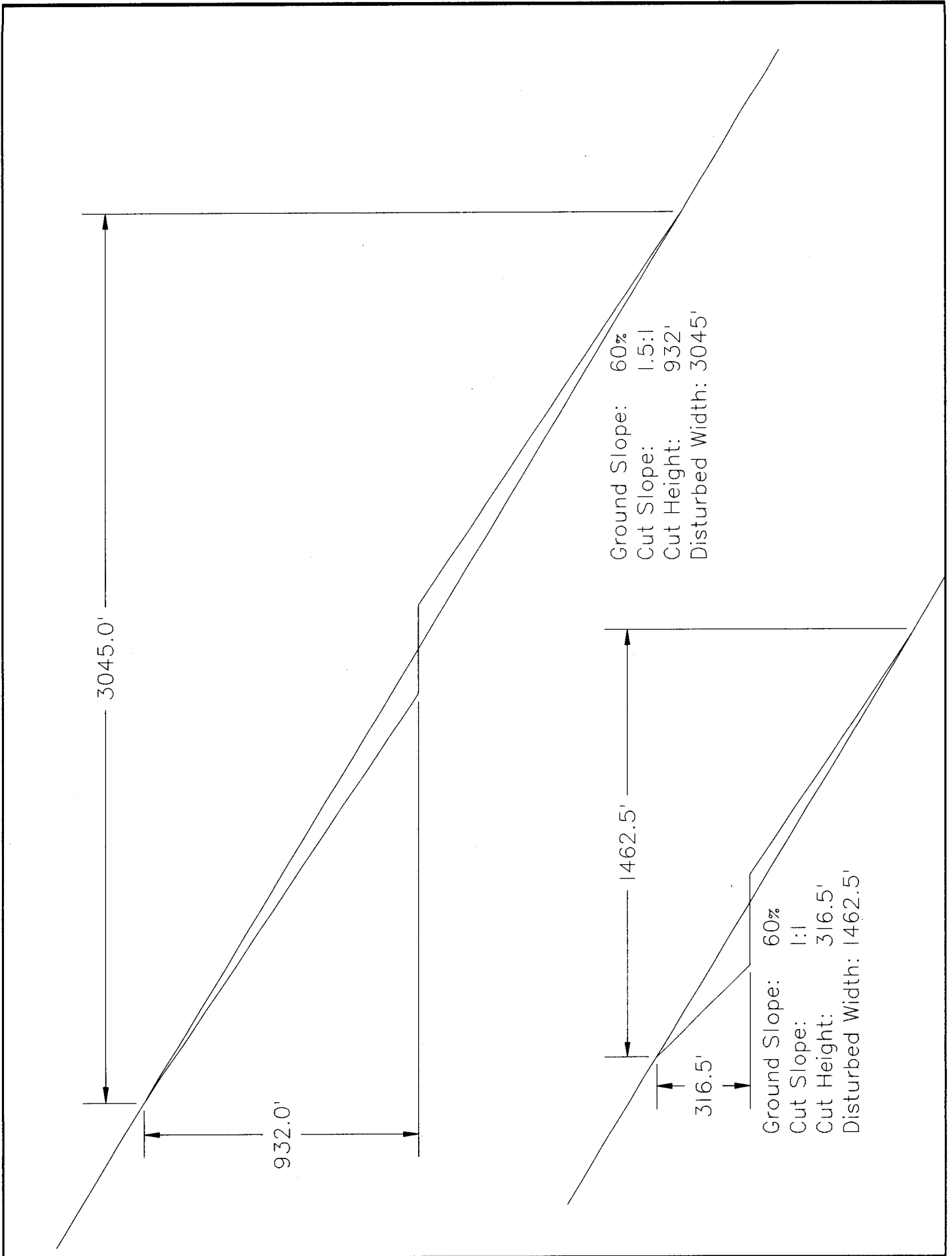
Ground Slope: 10%
 Cut Slope: 1.5:1
 Cut Height: 20.2'
 Disturbed Width: 359.2'



Ground Slope: 10%
 Cut Slope: 1:1
 Cut Height: 19.3'
 Disturbed Width: 346.9'







**Appendix G -
Typical Oil and Gas
Activities**

Appendix G - Typical Oil and Gas Activities

Description of Typical Oil and Gas Activities - A Layman's Experience

You are driving along a one-laned, graveled road, with turnouts, through a mixed aspen-conifer forest, on the Grand Mesa. This is a road you have used in the past, but the last time you were on it, it was not graveled. You round a corner and see the top of a drill rig extending about 70 feet above the 80 foot high forest. As you continue around the corner, you see that approximately 3 1/2 acres of the forest have been cleared and a large level pad has been created. The drill rig you first noticed peaking over the trees, stands before you. It is approximately 150 feet tall, and stands near the center of the cleared area.

Behind the tower, you see several large racks holding many pieces of pipe and casing of varying diameters. These racks are about 3 or 4 feet high, 10-12 feet wide, and 30-50 feet long.

A small metal building is also located near the tower. You see a man come out of the shed carrying some large tool and assume the building is a tool shed. You also see several fluid storage tanks (for reserve pit mud and fuel).

Your window is down and you hear a diesel engine. You had not noticed the noise as you were driving. It only became apparent when you first saw the drill rig above the trees. (The sound is dominant up to a mile away during quiet times of the day, i.e. early morning, late afternoon and at night.)

You notice four or five men are on a platform at the base of the tower, and they are working around a shaft extending above and below them, at the center of the tower. They appear to be working around what looks like a small table surrounding the pipe or shaft. (They are connecting two sections of pipe.)

Lots of power cords and hoses are coiled and piled around the base of the tower. Some of the hoses run to a large (60' X 150') pit next to the tower. The pit is filled with what looks like very muddy water. You see there are hose lines leading into and out of this pit.

A large water truck, a front-end loader, and several pickup trucks are parked on the leveled area, away from the tower and pit. You see six people in the area. While you are stopped another pickup arrives, and two more people get out.

You continue your drive. You are back into the mixed forest as soon as you leave the clearing. The sound of the diesel engines muffles and has disappeared by the time you are 3/4 of a mile away from the area. You round a corner and must stop to let two does cross the road in front of you.

You were looking at a typical well site. This is the type of drilling that may be done in an area after it has been leased for oil and gas development. Drilling activity may last anywhere from 2-3 weeks, up to several months, depending on how deep the well will be drilled. The deeper the well, the longer it takes, the larger the drill rig, the larger the area cleared and leveled, and the more people and traffic required to get the job done.

The route you are taking travels through a productive natural gas field. Side roads intersect the main road every 2-3000 feet. The road right-of-way clearing is approximately 35 feet. The main collector

pipeline is buried within this right-of-way. Valves and gauges poke above the ground at intervals along this pipeline.

At one point, you notice a 35-foot wide cleared corridor angle away from the road. This path was created when the transmission pipeline took off across country, to travel a more direct route to its destination.

If you look down some of the side roads, you can see pretzels of pipe, gauges and valves in several clearings. These are the well sites. The pipe structures are often called "Christmas trees".

Occasionally there may also be several small tanks on the well sites. Water and oil may also be produced with the gas. These by-products must be separated from the gas, and stored in tanks, before the gas is put into the pipeline.

You begin to notice a sound like a jet airplane, getting louder and louder. You approach a well sight and notice flames coming out of a large pit. A well is being "flared". Flaring is done during initial stages of production, when tests are being run to determine the production capability of a well. The gas produced by the well is piped along the surface, to a pit, where it is ignited. If desired production is achieved, the product is put into a pipeline for transport to market. You also notice a slight oil smell while you are next to this site.

As you travel through the gas field, you also see a drill rig on a site in the distance. A new well is being drilled, with hopes of increasing the gas production.

You pass four pickups heading for the drill site. Shortly after the trucks have passed, you encounter a large water tanker going in the same direction. Dust stirred up by the traffic on the road has caused you to close your window.

You continue your drive. After three miles of mixed forest interspersed with small parks and several stream crossings, the forest opens up into a large park. Ahead you see a large tanker truck pulling onto the main road, from a side road. It is somewhat rare to see tankers here. They are associated more with oil and coal bed methane than with the more common natural gas drilling. You are traveling faster than the tanker and soon catch up to it. When you drive past the side road you see a small sign with "#3 Well" on it. You pass the tanker and continue on your drive.

You come to another intersection with a side road, within 1/2 mile of the first intersection. This junction is also marked with a small sign - "#4 Well". This is also the road to one of your favorite fishing haunts, and you decide to see what effects the well site has had on the area.

You cannot see any facilities from the main road. The side road soon enters the forest, again. It is an open stand of aspen, with a few small conifers in the understory. You come to a 2-3 acre clearing, next to the road. One of those pumpjacks that look like an oversized grasshopper is rocking up and down, pumping up methane mixed with water from a coal bed deep below the forest floor. You hear the drone of a butane-powered engine, which provides the energy to operate the pump. You did not notice the sound until you were at the well site. You see a pipeline, about four inches in diameter, running along the ground's surface, to a large tank. The entire clearing, except for a driveway to the tanks and a small distance immediately around the facilities, is covered with a mix of grasses and forbs. Yellow sweet clover is blooming in small patches scattered throughout the clearing.

You continue on to the little reservoir. You cannot see, hear or smell any evidence of the well site when you get out of your vehicle. You decide to wet your line and test the fishing. Fishing is still good, but the area has been impacted by the increase in use, due to the improved access.

On your way back out to the main road, you see the tanker parked next to the tank at the #4 well site. A large hose runs from the tank to the tanker, emptying its store of water condensate into the truck

to be transported off the Forest. (Condensate is hauled off the Forest four or five times a year, depending on the productivity of the well.)

During the course of the six mile drive to the edge of the Forest you pass several clearings which you realize were once well drilling sites. The only evidence of this is the opening in the forest. The ground has been recontoured to the natural lay of the land, and the vegetation is similar to the understory in the surrounding forest. Only the absence of trees indicates that a disturbance has occurred at this spot.

Oil and Gas Exploration and Development - A Technical Description

Note: This appendix is from the USDI Bureau of Land Management Colorado Oil and Gas Leasing and Development Final Environmental Impact Statement, January 1991. It was included as Appendix A in that document. Only those portions of the document that pertain directly to the Forest Service are reproduced here. Portions have been edited.

Oil and gas exploration and development activities progress through five phases that are, in part, sequential and may overlap in time: preliminary exploration, exploratory drilling, development, production, and abandonment. Leases are obtained before the second phase (exploratory drilling).

Preliminary Exploration

Petroleum exploration occurs in unexplored portions of areas where petroleum is known or thought to occur in commercial quantities. An area where petroleum is thought to occur in commercial quantities is known as a frontier or rank wildcat area. With declining known oil and gas supplies, it has become profitable to explore for oil and gas in less promising geological provinces and in areas where the climate, terrain, depth of deposits, and other obstacles have discouraged previous efforts. Increasingly sophisticated exploration techniques, improved oil and gas drilling, and transportation technologies have also enhanced prospects for locating, extracting, and marketing petroleum resources.

Geological Exploration

Where the bedrock geology of an area is well exposed, it is often possible to predict where oil might gather. The potential traps (anticlines, faults, or formations with varying porosity) can sometimes be located with the aid of published geologic maps, aerial photos, and landsat imagery. Occasionally, additional data will be gathered by aircraft. Low altitude reconnaissance flights, frequently at elevations of 100 to 500 feet, help identify rock outcrops that can be studied later on the ground. Next, one or more geologists may examine and sample the rock outcrops in the area and map the surface geology. Geological exploration can be performed with little surface damage; four-wheel drive pickups, motorcycles, all terrain vehicles, foot or horse travel can be used to cover the area.

Geophysical Exploration

Subsurface geology is not always accurately indicated by surface outcroppings. In such cases, geophysical prospecting methods are used to define subsurface structure. Three geophysical survey techniques can be used to define subsurface characteristics through measurements of the gravitational field, the magnetic field, and seismic reflections.

Gravity and magnetic surveys indirectly measure course subsurface structure. The field work involves small portable units which are easily transported via light off-road vehicles, such as four-wheel drive pickups and jeeps, or aircraft. Off-road vehicle traffic is common in these two types of surveys. Sometimes, small holes (approximately one inch by two inches by two inches) are hand dug for instrument placement at the survey measure points. These two surveys can make measurements along defined lines but it is more common to have a grid of discrete measurement stations.

Seismic reflection surveys are the most common of the geophysical methods and produce the most detailed subsurface information. The seismic method detects subsurface geologic structural information by producing a source wave at or near the surface that bounces off subsurface layers. The "echoes" or seismic reflections are recorded as a function of time. The deeper the subsurface reflecting layer, the later in time it is detected. The weak seismic reflections are detected at the surface by arrays (groups) of seismometers or geophones that are very similar to microphones. The geophone electrical signals are sent by a connecting cable to the recorder unit where the signals are amplified and then recorded on a multi-track magnetic tape.

The tape is later sent to a computing center where it is rearranged and computer enhanced to present the subsurface reflections in a graphic picture called a seismic section. The seismic reflections are very weak requiring very sensitive geophones. While the geophones can "hear" the desired reflections, they also detect:

- cars and trucks,
- people and animals moving about,
- water wells pumping,
- airplanes (at tens of thousands of feet in the air),
- trains (many miles away),
- the wind blowing, and
- trees and shrubs moving in the wind.

Any of these other activities can produce a "noise" at the geophone which often is stronger than the desired seismic reflections.

The seismic reflection method needs the seismic source and geophone arrays along a straight line. Sometimes it is possible to work along existing roads if the roads are straight. Where practical, existing roads are used to facilitate access to the seismic operations. The geophone arrays are normally straight along the line length. However, in difficult seismic data areas, they may have considerable width. To understand the subsurface structures in three dimensions, it is necessary to have seismic lines recorded in a "cross" or line gridded pattern. The grid spacing between lines can be from a fraction of a mile apart to many miles apart depending on the exploration purpose. The exploration purpose will also determine what latitude, if any, there is in moving these lines.

The work of a seismic crew begins with the Permit Agent obtaining permits from private landowners and government agencies. The survey crew next places pin flags and other markers at uniform intervals along the seismic line and carefully measures the markers in relation to precisely known geographic locations. For a shot hole explosive seismic source, drilling rigs will be working on the seismic line. When the complete seismic line is ready, the geophone crew arrives and places the geophones in arrays in precise locations to the flagging and lay connecting cables between the geophone arrays and the recorder unit. After the seismic reflection data is recorded, the geophone crew picks up all the geophones and connecting cables and cleans up the seismic line. Most of these individual steps involve one or more equipment trucks to travel the seismic line if the terrain is drivable.

The seismic reflection method is usually referred to by the type of seismic source. The most common seismic sources are vibrator, shot hole explosive, and surface explosive.

The geophysicist, in determining the seismic exploration program parameters, will pick the most appropriate seismic source based on the depth of exploration interest and the degree of detail needed to define the subsurface structure.

Vibrator Source

The vibrator method uses a 4x4 or 4x6 wheel drive truck or buggy mounted hydraulic vibrator source. Their primary physical feature is a pad (about four feet square) that is slowly lowered from the center of the truck or buggy to make contact with the ground. Connected to the pad is the Reaction Mass. The Reaction Mass is moved a few inches up and down hydraulically in a carefully controlled manner to send a seismic source wave into the ground.

The vibrator is a weak seismic source and requires two to eight vibrators working together to create detectable reflections. Since it is a weak source, it has been used successfully to gather seismic reflection information in difficult high population areas such as Los Angeles and Paris.

To be able to use the vibrator source method, it is required that the seismic line goes along a straight road, or if cross country, over gentle, rolling drivable terrain.

Conventional Drilled Shot Hole Source

The shot hole explosive source requires the drilling of a hole to a predetermined depth, placing explosives at the bottom of the hole and back filling the hole with cuttings if the hole is air filled, or bentonite chips if the hole is naturally water filled.

Shot hole drilling depths will range normally from 25 to 200 feet. The explosive charge size can range from five to fifty pounds. The hole diameter is typically two to six inches. The drill rigs are most often truck or buggy mounted. Cuttings from drilling the hole are normally scattered by hand near the shot hole or put back in the shot hole after explosive charge placement. Proper preplugging of the shot hole with tamped cuttings or bentonite chips prevent the view commonly shown in the movies of holes "blowing out." There are some special source testing situations which need the detonation of charges in open holes. A shot hole that "blows out" causes a very poor seismic source wave which is very detrimental to the seismic reflection method. Detonation of a properly preplugged shot hole will create the best seismic source wave and cause no surface disturbance.

Portable Drilled Shot Hole Source

Special limited depth drill rigs can be moved in pieces by a helicopter. Helicopter portable drills are used where access limitations or topography restraints prevent use of conventional truck or buggy mounted drill rigs. This is a very expensive option which also places significant limits on the depth of drilling, and consequently, the size of the explosive charge. These limits can severely restrict the reflection methods ability to define subsurface structures.

Surface Explosive Source

The surface explosive source method involves placing puds (pouches) of explosives on a number of stakes driven into the ground. This is also called the Poulter method, named after its developer.

The explosive puds range in size from a pound to five pounds. The stakes are typically four to eight feet in height. The number of stakes used in the source array can range from a few to the more common ten. Occasionally the explosives are placed on the ground or snow, but this is a less effective source wave technique. Use of tall (six foot) stakes or placing the explosives on the surface of deep snow results in little visible surface disturbance, in contrast to the noise level of the detonations. The surface explosive method is very mobile. Generally 4x4 vehicles are used for transportation, although it can be supported with animal pack teams or helicopters.

Mini-hole Explosive Source

The mini-hole explosive source can be used in favorable conditions. A very small portable unit is used to drill a number (a source array) of small diameter shallow holes. The holes are usually two-to-three inches in diameter, drilled to depths of five-to-fifteen feet and each hole loaded with a small, one pound or less, explosive charge.

These holes are detonated simultaneously to produce a seismic source wave. However, this method is usually limited to defining shallow subsurface structures, and therefore, can not often be substituted for the significantly more effective deep shot holes.

A given area may be explored several times by the same or different companies over a period of time. Multiple exploration is undertaken for a variety of reasons--first attempts may have been unsuccessful, the depth of exploration interest may have changed, other competitive companies want their own information, or improved techniques and/or equipment are used.

All the work required to obtain exploration seismic data does not guarantee that the data will indicate any necessary subsurface structures--let alone a subsurface structure containing hydrocarbons. For the explorationist, the unfortunate reality is that obtaining seismic data most often leads to the decision that an area does not have adequate subsurface structures or structures containing economic hydrocarbons and therefore no drilling will follow.

Types of Oil and Gas Drilling and Production

Oil and gas wells are drilled primarily with rotary drilling rigs. The rigs use mud or compressed air as a medium to cool the drilling tools, carry cuttings to the surface, and, in the case of mud, to stabilize the drilled hole. In the early days of drilling, the "cable tool" rig was the predominant method of drilling. Cable tools were largely replaced by rotary rigs in the 1950s. Some of the oldest wells still producing in Colorado were drilled with cable tool rigs.

The method of drilling is generally the same regardless of the target production. The depth of the target usually has more to do with the method of drilling than the type of production. In general, deeper wells require larger rigs which in turn require larger drill pads. Because oil is more valuable than gas, gas wells tend to be shallower in depth. The reason being that deeper wells cost more and the lower profitability of gas production means they do not bear the higher cost of deeper wells. The size of the anticipated production also has a bearing on the expense a given production will bear. For example, a very large gas producing reservoir may better bear the cost of deeper drilling than a shallow, low producing oil reservoir. But, all else being the same deeper reservoirs cost more to develop than shallow ones.

The biggest differences among the various types of oil and gas wells occur in the production phase of operations. The same basic rotary drilling methods are used for drilling all types of oil and gas wells.

Oil and Gas Co-Production

Reservoirs that produce both oil and natural gas require the siting of facilities for the production, clean-up, and storage and/or transportation of the products on location (i.e., the well pad). If the well produces naturally, that is the gas and oil flow to the surface under natural pressures, only a series of pipes and valves at the well "head" are required to regulate the flow of product to the surface. If there is no, or insufficient, natural pressure, a pump is installed to lift the product to the surface. Once the oil and gas comes to the surface, it travels through pipes to separation equipment where water and gases such as carbon dioxide are removed, and the gas and oil are separated. The water and oil are piped to respective storage facilities and the gas put into a transmission pipeline. In a few cases, separation/clean-up and/or storage facilities are located off of the well pad for common use by more than

one well. But, in the great majority of the wells in the Analysis Area, all facilities are located on the same pad on which the well was drilled.

Gas is transported to market through a network of gathering pipelines from each well to a transmission line. The gathering system usually consists of pipe of two-to-four inches in diameter which is laid on the ground or buried several feet below the surface. BLM most often requires that lines be laid near the access road or buried under it to save additional surface disturbance. Measurement of gas is usually through a differential pressure recorder on the well pad.

Oil is produced into tanks, either on the well pad or into a common tank near the well. The oil is measured for sale from these tanks and transported to distribution points by special truck. In the case of some highly productive fields, oil carrying pipelines may be laid to a distribution point or refinery. In these cases, there is a network of pipelines to each well similar to that for the gas gathering system. The oil gathering lines are usually four to six inches in diameter, and measurement is either through a sales tank or a sales meter attached to the line.

In some areas, hydrogen sulfide (also known as H₂S or sour gas) may be found with the hydrocarbon production. In these cases, special stainless steel pipe is used to contain the production until the hydrogen-sulfide can be separated from the hydrocarbons. The hydrogen sulfide is disposed of by incineration or neutralized by sulfur extraction.

Oil Production

Typically, oil is produced in association with water and gas; however, in some cases oil is produced with almost no water or associated gas. The facilities to produce such oil are the same as those described above without the equipment for gas clean-up and measurement.

Dry Gas Production

Dry gas is a term applied to any natural gas produced without oil. It usually has some water associated and may have a small amount of light liquid hydrocarbons, called "drip" or condensate. Dry gas wells typically have only a "Christmas tree" or valve/gauge assembly, showing above ground. Production facilities may include a pit or tank for the collection of separated produced water and a small tank for the storage of the liquid hydrocarbons. As with oil and gas production, there is a gathering pipeline and sales meter for gas distribution.

Carbon Dioxide Production

Carbon dioxide is produced in a manner similar to dry gas. But, carbon dioxide, in combination with water, may form carbonic acid which is very corrosive. Therefore, the produced gas must be "cleaned," that is have the impurities removed, as soon as possible after it reaches the surface. For that reason, stainless steel piping is used from well head to separator, and separators are placed as close as possible to the well head. Usually a single large separator is located so as to service several wells. The use of some stainless steel pipe and common separators are the two most distinguishing surface features of carbon dioxide production.

Coal Bed Methane Production

Methane is commonly found in association with coal. It is produced either from the coal beds themselves or from nearby reservoir rock to which it has migrated from coal beds. It is produced by the same drilling and production techniques as other gases. The one difference between coal bed methane and other natural gas production is that where it is produced with associated water, the water production begins at a relatively high rate and declines to a very small amount over the first two to three years while the gas production increases inversely. If production is interrupted, that is the well is "turned off"

or shut down; upon re-start the water-gas ratio will be approximately the same as when the well was first produced. This phenomenon means that a great deal of water must again be produced before economic gas production is re-established. Not all coal bed methane production involves large amounts of produced water.

Exploratory Drilling

Drilling does not begin until a lease has been acquired by the operator. When preliminary investigations are favorable and warrant further exploration, exploratory drilling may be justified. Stratigraphic tests and wildcat tests are the two types of exploratory drill holes.

Stratigraphic Tests

"Strat" tests involve drilling relatively shallow holes to supplement seismic data. These tests aid in revealing the nature of near-surface structural features. The holes are usually from 100 to several thousand feet deep, and are drilled primarily by rotary drill rigs. As the rock is drilled, the resulting rock chips are brought to the surface by a high-pressure airflow or circulating drilling mud. Samples of these chips are collected, bagged, and identified as to depth of origin. They are then studied by a geologist to determine such data as rock type, age, and formation.

Truck-mounted drilling equipment for "strat" tests is fairly mobile; therefore, roads and trails to test sites on level solid ground are temporary and involve minimal construction. In hilly or mountainous areas, more road building is necessary, and higher standard roads may be necessary to accommodate anticipated traffic.

A space of about two acres is leveled and cleared of vegetation for the average drill site. If high pressure air is used to remove rock chips or rock cuttings, rock dust may be emitted to the air when samples are not being collected. If mud is used as a drilling fluid, mud pits may be dug; more commonly, portable mud tanks are used. Usually one to three days are required to drill the test holes, depending on depth to and hardness of the bedrock. In areas with shallow, high-pressure, water bearing zones, casing may be required to keep water out of the hole.

After the surface and subsurface geological studies, the seismic, and other geophysical surveys, comes the evaluation of the prospect. Only by drilling a wildcat well (a well drilled in unproved territory) will the oil company know if the rocks in the prospect they have identified contain oil or gas.

Wildcat Wells

Nationally, about one in 16 wildcat wells produces significant amounts of oil or gas. Locally, success ratios may be as high as one in ten. The deeper wells may require several months or more to complete; shallower wells up to a few thousand feet deep may be completed in as little as a few weeks. As a general rule, the deeper the test, the larger the drilling rig and facilities required.

Prior to approval for drilling, on-site inspections are conducted with the proposed drill pad and access road staked out, to assess potential impacts and attach appropriate mitigative measures (Conditions of Approval) to the permit to drill. A drill "pad" (well site) from one to four acres in size is then cleared of all vegetation, and leveled for the drill rig, mud pumps, mud (or reserve) pit, generators, pipe rack, and tool house. Topsoil and native vegetation is usually removed and stockpiled for use in the reclamation process. The mud pit may be lined with plastic or bentonite to prevent fluid loss or prevent contamination of water resources. Other facilities such as storage tanks for water and fuel are located on the pad or are positioned nearby on a separate cleared area. If the well site is not large enough for the equipment required to rig-up (prepare the drilling rig for operation), a separate staging area may be constructed. Staging areas are usually no larger than 200 feet by 200 feet and may simply be a wide flat spot along the access road on which vehicles and equipment are parked.

Five thousand to 15,000 gallons of water a day may be needed for mixing drilling mud, cleaning equipment, cooling engines, etc., for each well. A surface pipeline may be laid to a stream or a water well, or the water may be trucked to the site from ponds or streams in the area.

The rigs are very large and may be moved in pieces. In some instances, rigs can be moved short distances on level terrain with little or no dismantling of equipment which will shorten the tearing-down and rigging-up time. Moving a dismantled rig involves use of heavy trucking equipment for transportation, and crews to erect the rig. Gross weight of vehicles may run in excess of 80,000 lb..

If suitable access does not exist to a proposed well site, road construction to prescribed standards will be necessary to provide for that access. Upgrade of existing access routes may also be necessary to accommodate the types and amounts of traffic required during the operation. Bulldozers, graders, and other types of heavy equipment are used to construct and maintain these roads.

The start of a well is called "spudding in." A short piece of tubing called conductor pipe is forced into the ground (sometimes with a pile driver), and cemented in place. This keeps surface sand and dirt from sloughing into the well hole. Next, the regular drill bit and drill string (the column of drill pipe) take over. These pass vertically through a heavy steel turntable (the rotary table) on the derrick floor and the conductor pipe. The rotary table is geared to one or more engines, and rotates the drill string and bit. As the bit bores deeper into the earth, the drill string is lengthened by adding more pipe to the upper end.

Once the hole reaches a depth of several hundred feet, another string of pipe (the surface casing) is set inside the conductor pipe and cemented in place by pumping cement between the casing and hole wall. Surface casing acts as a safety device to protect freshwater zones (aquifers) from drilling fluid contamination. To prevent the well from "blowing out" in the event the drill bit hits a high pressure zone, "blowout preventers" (large metal rams) are installed around the surface casing just below the derrick floor. These rams will close on the drill hole, crushing the drill string and sealing the well in the event of a blowout.

After setting the surface casing, drilling resumes using a smaller diameter bit. Depending on well conditions, additional strings of casings (intermediate casing) may be run (installed) before the well reaches the objective depth (total depth or "T.D.").

During drilling, a mixture of water, clay, and chemical additives known as "mud" are continuously pumped down the drill pipe. It exits through holes in the bit and returns to the surface outside the drill pipe. As the mud circulates, it cleans and cools the bit and carries the rock chips (cuttings) to the surface. It also helps to seal off the sides of the hole (thus preventing cave-ins), and to control the pressure of any water, gas, or oil encountered by the drill bit.

The mud is the first line of defense against a possible blowout since it is used to control pressure. It is for this reason that a pit full of "reserve" mud (the reserve pit) is maintained on location. The reserve mud is used in emergencies to restore the proper drilling environment when radical or unexpected changes in down-hole pressure are encountered.

The cuttings are separated from the mud and sampled so that geologists can note and analyze (log) the various strata through which the bit is passing. The rest of the cuttings pass into the reserve pit as waste. Compressed air is sometimes used as the drilling medium. It serves some of the same functions as drilling mud, by cooling and cleaning the bit, and evacuating the cuttings from the hole.

During or at completion of drilling activity, the well is logged. Logging means measuring with geophysical instruments the physical characteristics of the rock formations and associated fluids through which the borehole passed. These instruments are lowered to the bottom of the well, and slowly raised to the surface while recording data. Other measuring procedures include the drill stem test, in which pressures are recorded and fluid samples taken from zones of interest. After studying the data

from those logs and tests, the geologist and/or petroleum engineer decide if the well will produce petroleum.

If the well did not encounter oil and gas, it is plugged with cement and abandoned. The well pad and access road are recontoured and revegetated.

If the well will produce, casing is run to the producing zone and cemented in place. A proper cementing of the production casing string is required to provide coverage and prevent interzonal communication between oil and gas horizons and usable water zones. Initially, this is accomplished by placement of steel casing from the ground surface to a depth generally ranging between 200 and 1,000 feet. The actual length of this "surface casing" is dependent on factors such as depth of freshwater zones, anticipated formation pressures, and the length of the next smaller casing to be set. The annular space between the borehole and the exterior of the surface casing is required to be filled with cement. Cement is pumped down the casing and around the bottom until cement is returned to the surface outside of the casing. This ensures cement completely fills the annular space and precludes interzonal migration of formation fluids (i.e., groundwater). Following the placement of surface casing, the hole is drilled deeper and more casing is installed. Cement is placed in a fashion similar to the surface pipe; however, a quantity of cement sufficient to cover and isolate only those zones having hydrocarbons, usable water, or other mineral values is used.

There is an exception to this in some coal-bed methane wells. In order to ensure isolation and protection of all zones between the surface and total depth, cement is required to be circulated from bottom to top on the production casing as well as on the surface casing. If cement is not circulated to surface, shallow water may not be protected.

If the determination is made that water monitoring wells are necessary in a given area, a separate borehole specifically designed as a monitoring well should be completed. Logical placement of a monitoring well would be in a protected location at the edge or just off of the well pad (generally 100-200 feet from producing well bore). It should be noted also that monitoring wells and other relatively shallow boreholes have often had adverse impacts on the most critical groundwater source due to interzonal flows and introduction of bacteria and other contaminants into the system.

After these operations are accomplished the drill rig is usually replaced by a smaller rig which is used for the final phase of completing the well.

Development

If a wildcat well becomes a discovery well (a well that yields commercial quantities of oil or gas), development wells will be drilled to confirm the discovery, to establish the extent of the field, and to efficiently drain the reservoir. The procedures for drilling development wells are about the same as for wildcats, except there is usually less subsurface sampling, testing, and evaluation. If formation pressure can raise oil to the surface, the well will be completed as a flowing well. Several downhole acid or fracture treatments may be necessary to enhance the formation permeability to make the well flow. When a well is "acidized," this refers to the process of placing acid in the well bore across the productive interval which causes the solution of some of the mineral materials (e.g., calcite, dolomite, etc.) which reside around the pore space. Upon solution and removal of these minerals, porosity and permeability are enhanced. When a well is hydro-fractured, it simply means fluid, usually gelled water, is pumped down the well, through perforations in the casing and into the formation. Pumping pressures are increased to the point where the formation fractures or breaks, and sand is added to the injection fluid to "prop-open" the crack once the pressure is released. The pressures required to fracture a given formation is generally quite predictable based on rock type and depth. For some formations, especially coals, abnormally high pressures are required for fracture. Pressures, volumes, and rates are all measured and monitored during the fracture process. These parameters provide information as to how the formation is behaving and if the fracture is propagating within the desired interval (i.e., staying in zone). This is especially true in coals, as sustained "high" injection pressure indicates the fracture is moving

through the coal. If pressures fall off, it indicates the fracture has extended beyond the coals and the operation can be halted. In addition to using the foregoing parameters to monitor fracture behavior, other methods for fracture geometry and extent are available (e.g., tracer and tiltmeter surveys). Control is maintained throughout the fracture operation.

A free-flowing well is simply closed off with an assembly of valves, pipes, and fittings (called a Christmas tree) to control the flow of oil and gas to other production facilities. A gas well may be flared for a short period to measure the amount of gas per day the well can produce, then shut in or connected to a gas pipeline.

If the well is not free-flowing, it will be necessary to use artificial lift (pump) methods. These are explained, along with well production equipment and procedures, in the following section on production. After a pump is installed, the well may be tested for days or months to see if it is economically justifiable to produce the well and to drill additional development wells. During this phase, more detailed seismic work may be run to assist in precisely locating the petroleum reservoir and to improve previous seismic work.

Coal-bed methane wells generally require artificial lift to remove formation water which reduces the confining pressure causing gas to be released (desorbed) from the coals. Once the gas is freed from the coal surfaces, it moves toward the "pressure sink" which is the well bore. Once gas is liberated, it flows preferentially to the water (i.e., relative permeability is higher for gas); thereby reducing water production rates and increasing gas production rates. It is expected that in many cases the artificial lift equipment will no longer be necessary once sufficient gas flow is established.

As with wildcat wells, field development well locations will be surveyed. A well spacing pattern must be established by the State, with approval of the BLM.

Oil well spacing for production from Federal leases is usually a minimum of 40 acres. Most gas well spacing for production from Federal leases uses units of 160, 320, and 640 acres per well. Spacing for both oil and gas wells is based on the characteristics of the producing formation. If a field is producing from more than one formation, the surface location of the wells may be much closer than one per 40 acres. Once well spacing has been approved, development of the lease proceeds.

When lease or unit development is anticipated, an in depth transportation plan is prepared and the road system is greatly expanded as more wells are drilled.

Because it often takes several years to develop a field and determine field boundaries, the road system is usually built in segments based on information developed in the transportation plan.

Access roads are normally limited to an arterial or collector road to serve the lease areas, with a local road to each well. Generally, arterial and collector roads are 20-to-24 feet wide and local roads are normally 14-to-18 feet wide. These dimensions are for the driving surface of the road and do not account for additional surface disturbance related to ditches or cuts and fills. The steeper the side slopes, the more surface disturbance is required for a given driving surface. See tables on page F-1.

When an oil field is developed on the current minimum spacing pattern of 40 acres per well, the wells are 1,320 feet apart in both north-south and east-west directions. If a section (one square mile) is developed with 16 wells, at least four miles of access roads are built. In mountainous terrain, the length of access roads may be increased since steep slopes, deep canyons, and unstable soil areas must often be circumvented in order to construct stable access to the wells.

Surface use in a gas field may be similar to an oil field (though usually less) even though the spacing of wells is usually 160 acres. Though a 160-acre spacing requires only four wells per section, the associated pipeline system often has similar initial surface requirements (acreage of surface disturbance) particularly if pipelines are not placed in road corridors.

In addition to roads, other surface uses for development drilling may include flowlines; storage tank batteries; facilities to separate oil, gas and water (separators and treaters); and injection wells for salt water disposal. Some of the facilities may be installed at each producing well site, and others at places situated to serve several wells. These facilities are discussed more in the following production section.

As mentioned earlier, drilling in an undeveloped part of a lease to prevent drainage of petroleum to an offset well on an adjoining lease (protective drilling) is frequently required in fields of intermingled Federal and privately owned land. The terms of Federal leases require such drilling if the offset well is on nonfederal lands, or on Federal lands leased at a lower royalty rate.

Many fields go through several development phases. A field may be considered fully developed and produce for several years, then a well may be drilled to a deeper pay zone. Discovery of a new pay zone in an existing field is a "pool" discovery, as distinguished from a new field discovery. A pool discovery may lead to the drilling of additional wells--often from the same drilling pad as existing wells--with the boreholes separated only by feet or inches. Existing wells may also be drilled deeper.

Usually four-to-six inch diameter pipelines transport the petroleum between the well, the treating and separating facilities, and central collection points. These lines can be on the surface, buried, or elevated. Most pipelines in the Analysis Area are buried.

Trucking and pipelining are the two methods used separately or in conjunction to transport oil out of a lease or unitized area. Trucking is used to transport crude oil from small fields where installation of pipelines is not economical and the natural gas in the field is not economically marketable. It is not practical to truck natural gas.

Pipelines are the most common way to transport oil and gas. If a field has substantial amounts of natural gas, separate pipelines will be necessary for oil and gas. Pipelines move the oil from gathering stations to refineries. As existing fields increase production or new fields begin production, new pipelines may be needed. These new lines usually vary in size from 4 to 16 inches in diameter, and range in length from a few miles to tie into an existing pipeline, to hundreds of miles to supply a refinery. Construction of a pipeline requires clearing the right-of-way of vegetation, excavating the roadway and trench and hauling of equipment and materials. Blasting may be necessary in rocky terrain and construction of pumping stations and compressor stations may also be needed.

Natural gas pipelines transport gas from the wells (gathering or flow lines) to a trunk line then to the main transmission line from the area. Flow lines are usually two-to-four inches in diameter and may or may not be buried. Trunk lines are generally six-to-eight inches in diameter and are buried, as are transmission lines which vary in diameter from 10-to-36 inches. The area required to construct a pipeline varies from about 15 feet wide (for a two-to-four inch surface line) to greater than 75 feet for the larger diameter transmission lines (24-to-36 inches). Surface disturbance is primarily dependent on size of the line and topography of the area on which the line is being constructed.

Compressor stations may be necessary to increase production pressure to the same level as pipeline pressure. The stations vary in size from approximately one acre to as much as twenty acres for a very large compressor system.

Construction techniques for natural gas lines are similar to those used for oil pipelines.

Unitization

Surface use in an oil and gas field may be affected by unitization of the leaseholds. In many areas with Federal lands, an exploratory unit is formed before a wildcat is drilled. The boundary of the unit is based on geologic data. The developers unitize the field by entering into an agreement to develop and

generate it as a unit, without regard to separate ownerships. Costs and benefits are allocated according to agreed 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 operations are planned and conducted by a single unit operator, often resulting in fewer wells.

The rate of development well drilling depends on whether the field is operated on an individual lease basis or unitized, the probability of profitable production, the availability of drilling equipment, protective drilling requirements (drilling requirements to protect Federal land from subsurface petroleum drainage by off-setting nonfederal wells), and the degree to which limits of the field are known. The most important development rate factor may be the quantity of production. If the discovery well has a high rate of production and substantial reserves, development drilling usually proceeds at a fairly rapid pace. If there is some question whether reserves are sufficient to warrant additional wells, development drilling may occur at a much slower pace. An evaluation period to observe production performance may follow between the drilling of successive wells.

Development on an individual lease basis usually proceeds more rapidly than under unitization, since each lessee must drill his own well to obtain production from the field. On a unitized basis, however, all owners within the participating area share in a well's production regardless of whose lease the well is on. Spacing requirements are not applicable to unit wells. The unit is developed on whatever the operator considers to be the optimal spacing pattern to maximize recovery.

Production

Production in an oil field begins just after the discovery well is completed and is usually concurrent with development operations. Temporary facilities may be used at first, but as development proceeds and reservoir limits are determined, permanent facilities are installed. The extent of such facilities is dictated by the number of producing wells, expected production, volume of gas and water produced with the oil, the number of leases, and whether the field is to be developed on a unitized basis.

The primary means of removing oil from a well in the Analysis Area is by pumping jacks (familiar horsehead devices). The pumps are powered by electric motors (power lines required) or if there is sufficient casinghead gas (natural gas produced with the pumped oil), or another gas source is available, it may be used to fuel internal combustion engines.

Some wells drilled in the area produce sufficient water to require disposal during the operation of the well. Although most produced waters are brackish to highly saline, some are fresh enough for beneficial use. If water is to be discharged, it must meet certain water quality standards. Because water may not come from the treating and separating facilities completely free of oil, oil skimmer pits may be established between separating facilities and surface discharge.

Another method of disposing of wastewater is through subsurface injection. In Colorado, injection disposal wells are authorized by the Colorado Oil and Gas Conservation Commission (COGCC) under primacy of the U.S. Environmental Protection Agency. BLM engineers review the proposal for impacts to other minerals and groundwater, but have no approval authority over the well or target zone. When water is disposed of underground, it is always introduced into a formation containing water of equal or poorer quality. It may be injected into the producing zone from which it came or into other producing zones. In some cases, it could reduce the field's productivity and may be prohibited by State regulation or mutual agreement of operators. In some fields, dry holes or depleted producing wells are used for salt water disposal, but occasionally new wells are drilled for disposal purposes. Cement is squeezed between the casing and sides of the well to prevent the salt water from migrating up or down from the injection zone into other formations.

Underground oil is under pressure in practically all reservoirs. This pressure is usually transmitted to the oil through gas or water in the reservoir with the oil. When oil is pumped out of the well, pressure is reduced in the reservoir around the drill hole. This allows the gas or water in the reservoir to push more oil into the space next to the well. A reservoir that has mostly gas pushing the oil is called "gas drive," and one that has mostly water pushing the oil is called "water drive." Oil that is recovered under these natural pressures is considered primary production. Primary production accounts for about 25 percent of the oil in a reservoir.

Methods of increasing recovery from reservoirs generally involve pumping additional water or gas into the reservoir to maintain or increase the reservoir pressure. This process is called secondary recovery. Recently, the trend has been to institute secondary recovery processes very early in the development of a field. Surface disturbance from a water flooding recovery system is similar to drilling and development of an oil and gas well itself, i.e., a drill pad and access road are constructed and water pipelines may be built. Surface use is increased substantially since as many as four injection wells may be used for each oil well in the field (there are many different patterns as well as many other methods of secondary recovery).

Tertiary recovery methods increase recovery rates by lowering the viscosity of the oil either by heating it or by injecting chemicals into the reservoir so that the oil flows more easily. Heating of reservoir oil can be accomplished by injecting steam into the reservoir. Tertiary recovery methods are not yet widely used in this area. By the year 2000, ultimate recovery (including secondary and tertiary recovery) from any given oil reservoir is expected to average 40 percent nationally.

Crude oil is usually transferred from the wells to tank storage facilities (a tank battery) before it is transported from the lease. If it contains gas and water, they are separated before the oil is stored in the tank battery. The treating and separating facilities are usually located at a storage tank battery on or near the well site.

After the oil, gas, and water are separated, the oil is piped to storage tanks located on or near the lease. There are normally at least two tanks; so that one tank can be filling as the contents of the other are measured, sold, and transported. The number and size of tanks vary with the rate of production on the lease, and with the extent of automation in gauging the volume and sampling the quality of the tank's contents.

Horizontal Drilling

The recent development of horizontal drilling holds promise of further reductions in disturbance of surface resources and values. Use of directional, horizontal, and multiple-completion drilling technology could further reduce the number of surface locations and provide greater flexibility in siting locations. These techniques will also increase production and ultimately lower costs of production. However, there are many problems with these techniques yet to be solved before they will come into wide spread use. The two most pressing of these problems in Colorado at the moment are interference with spacing patterns and the cost of the operations. Most industry experts agree that the latter will be solved through additional experience and some additional technical advances. The problem of spacing patterns for horizontal holes more directly involves Federal and State policy.

Current spacing patterns are based on the most efficient recovery of the resource. Spacing patterns in Colorado are set by the COGCC. Spacing patterns on Federal lands are also set by the COGCC, but with the concurrence of the BLM, who has the responsibility for Federal lands. If the BLM and State government were to set different spacing patterns, the result would be unsolvable drainage conflicts, lost revenues, and lost resource. It could also mean the drilling of more wells than are necessary as competing companies developed reservoirs under differing jurisdictions.

In Colorado, most fields are developed on a 40, 80, 160, 320, or 640 acre pattern. Forty acres is the spacing pattern authorized for all unspaced areas. However, most new field operators apply for larger

spacing based on reservoir characteristics soon after field discovery. The spacing pattern is based on the calculated area of reservoir rock which one well can drain. The calculations are based on conventional, that is vertical, wells.

Horizontal wells are drilled to the producing formation, or close to it, then proceed horizontally through the producing formation. The advantage to these wells is that much more of the reservoir rock is exposed to the bore hole, and therefore, more product may be produced through one well. In addition, more than one horizontal hole may be extended from the same vertical bore or even from the horizontal portion of the bore, thereby limiting additional surface use. Spacing patterns frequently must be adjusted to permit this type of development.

For example, a field with 40-acre spacing may have one horizontal well drilled in the northwest quarter of the northwest quarter with the horizontal portion running east all the way to the northeast quarter of the northeast quarter. This well would penetrate and produce all four of the northern tier of well spaces, thereby eliminating the need to drill three wells. The elimination of the need to drill three wells would require Federal and State approval to circumvent the spacing order. Real life examples may get much more complicated than this one.

In many cases, such as the simple example given above, the oil and gas operator may have to apply for a variance to the State spacing order. The BLM, FS and COGCC are committed to working with industry on these problems to take full advantage of the new technology.

Abandonment

The life span of fields varies because of the unique characteristics of any given field. Reserves, reservoir characteristics, the nature of the petroleum, subsurface geology, and political, economic, and environmental constraints all affect a field's life span from discovery to abandonment. The life of a typical field is 15 to 40 years. Abandonment of individual wells may start early in a field's life and reach a maximum when the field is depleted.

Well plugging and abandonment requirements vary with the rock formations, subsurface water, well site, and the well. In all cases, all formations bearing usable-quality water, oil, gas, or geothermal resources, and/or prospectively valuable deposits of minerals will be protected. Generally, in a dry (never produced) well, the hole below the casing is filled with heavy drilling mud; a cement plug is installed at the bottom of the casing; the casing is filled with heavy mud, and a cement cap is installed on top. A pipe monument giving the location, lease number, operator, and name of the well is required unless waived by the Authorized Officer. If waived, the casing may be cut off and capped below ground level. Protection of aquifers and known oil and gas producing formations may require placement of additional cement plugs.

In some cases, wells that formerly produced are plugged as soon as they are depleted. In other cases, depleted wells are not plugged immediately but are allowed to stand idle for possible later use in a secondary recovery program. Truck-mounted equipment is used to plug former producing wells. In addition to the measures required for a dry hole, plugging of a depleted producing well requires a cement plug in the perforated section in the producing zone. If the casing is salvaged, a cement plug is put across the casing stub. The cement pumpjack foundations are removed or buried below ground level. Surface flow and injection lines are removed, but buried pipelines are usually left in place and plugged at intervals as a safety measure. After plugging, the drilling rig is removed and the surface, including the reserve mud pit if it has not been previously reclaimed, is restored to the requirements of the surface management agency. This may involve the use of dozers and graders to recontour those disturbed areas associated with the drill pad plus the access road to the particular pad. The reserve pit (the part of the mud pit in which a reserve supply of drilling fluid and/or water is stored) must be evaporated or pumped dry, and filled with soil material stockpiled when the site was prepared. The area will be reshaped to a configuration which will allow revegetation to take place, restore the landform as near as possible to its original contour, and minimize erosion. After grading the subsoil and spreading the stockpiled

topsoil, the site is seeded with a grass mixture that will establish good growth. A fence is normally erected to protect the site until revegetation is complete, particularly in livestock concentration areas.

Appendix H - Mitigation and Monitoring

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Mitigation

Mitigation, and standards and guidelines for oil and gas operations on NFS lands are expressed in Section 6 of the standard lease form (Form 3100-11; Offer to Lease and Lease for Oil and Gas), the BLM regulations at 43 CFR 3101.1-2 Surface Use Rights, the Forest Service oil and gas regulations (36 CFR 228.108), Onshore Oil and Gas Orders, the Forest Plan, the "Gold Book" (Oil and Gas Surface Operating Standards for Oil and Gas Exploration and Development) and Conditions of Approval that will be required prior to approval of the APD. Restrictions on surface use may also be imposed by specific nondiscretionary statutes such as: The Endangered Species Act, the Archaeological Resource Protection Act, the Clean Water Act, and the Clean Air Act. The following discussion represents general mitigation that is common to all alternatives except Alternative 3, the No Lease alternative.

Section 6 of Form 3100-11

Form 3100-11, the "Offer to Lease and Lease for Oil and Gas", referred to as the standard lease form is a contract between the purchaser of a lease and the government. Section 6 of the standard lease form contains provisions for the conduct of operations. The following is Section 6 of the standard lease form:

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-way. 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 the 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.

The BLM regulations at 43 CFR 3101.1-2 provides some clarification of what constitutes reasonable measures. The regulations state that the authorized officer may require reasonable measures to minimize adverse impacts to other resource values, other uses or users not addressed in the lease stipulations at the time operations are proposed. *To the extent consistent with lease rights granted, such reasonable measures may include, but are not limited to, modification of siting or design of facilities, timing of operations, and specification of interim and final reclamation measures.*

Surface Use Requirements (Forest Service regulations at 36 CFR 228.108)

Surface use requirements in the Forest Service oil and gas regulations (36 CFR 228.108) are as follows:

(a) General. The operator shall conduct operations on a leasehold on National Forest System lands in a manner that minimizes effects on surface resources, prevents unnecessary or unreasonable surface resource disturbance, and that is in compliance with the other requirements of this section.

(b) Notice of operations. The operator must notify the authorized Forest officer 48 hours prior to commencing operations or resuming operations following their temporary cessation (36 CFR 228.111).

(c) Access facilities. The operator shall construct and maintain access facilities to assure adequate drainage and to minimize or prevent damage to surface resources.

(d) Cultural and historic resources. The operator shall report findings of cultural and historic resources to the authorized Forest officer immediately and, except as otherwise authorized in an approved surface use plan of operations, protect such resources.

(e) Fire prevention and control. To the extent practicable, the operator shall take measures to prevent uncontrolled fires on the area of operation and to suppress uncontrolled fires resulting from the operations.

(f) Fisheries, wildlife and plant habitat. The operator shall comply with the requirements of the Endangered Species Act of 1973 (16 USC 1531 et seq.) and its implementing regulations (50 CFR chapter IV), and, except as otherwise provided in an approved surface use plan of operations, conduct operations in such a manner as to maintain and protect fisheries, wildlife, and plant habitat.

(g) Reclamation.

(1) Unless otherwise provided in an approved surface use plan of operations, the operator shall conduct reclamation concurrently with other operations.

(2) Within 1 year of completion of operations on a portion of the area of operation, the operator must reclaim that portion, unless a different period of time is approved in writing by the authorized Forest officer.

(3) The operator must:

(i) Control soil erosion and landslides;

(ii) Control water runoff;

(iii) Remove, or control, solid wastes, toxic substances, and hazardous materials;

(iv) Reshape and vegetate disturbed areas;

(v) Remove structures, improvements, facilities and equipment, unless otherwise authorized; and

(vi) Take such other reclamation measures as specified in the approved surface use plan of operations.

(h) Safety measures.

(1) The operator must maintain structures, facilities, improvements, and equipment located on the area of operation in a safe and neat manner and in accordance with an approved surface use plan of operations.

(2) The operator must take appropriate measures in accordance with applicable Federal and State laws and regulations to protect the public from hazardous sites or conditions resulting from the operations. Such measures may include, but are not limited to, posting signs, building fences, or otherwise identifying the hazardous site or condition.

(i) Wastes. The operator must either remove garbage, refuse, and sewage from National Forest System lands or treat and dispose of that material in such a manner as to minimize or prevent adverse impacts on surface resources. The operator shall treat or dispose of produced water, drilling fluid, and other waste generated by the operations in such a manner as to minimize or prevent adverse impacts on surface resources.

(j) Watershed protection.

(1) Except as otherwise provided in the approved surface use plan of operations, the operator shall not conduct operations in areas subject to mass soil movement, riparian areas and wetlands.

(2) The operator shall take measures to minimize or prevent erosion and sediment production. Such measures include, but are not limited to, siting structures, facilities, and other improvements to avoid steep slopes and excessive clearing of land.

Onshore Oil and Gas Orders

All operations on a Federal oil and gas lease by the operator are subject to Onshore Oil and Gas Orders. They can be issued by the Chief of the Forest Service or the Director of the BLM. The objective of oil and gas orders is to promote the orderly and efficient exploration, development and production of oil and gas (43 CFR 3160).

Order No. 1, Approval of Operations on Onshore Federal and Indian Oil and Gas Leases

Establishes procedures for obtaining approval to drill wells and conduct subsequent operations on oil and gas leases. This includes: requirements of Application(s) for Permit to Drill and Surface Use Plan(s) of Operations which must be submitted and approved prior to drilling a well; subsequent operations requiring additional approval, and the required forms (Notice(s) of Intent and Sundry Notice(s)); operating standards related to cultural and historic resources, endangered species, watershed protection, safety and reclamation.

Order No. 2, Drilling Operations

Details the standards for minimum levels of performance expected from lessees and operators when conducting drilling and abandonment operations on Federal and Indian lands. Also identifies enforcement actions that will result when violations are found and not corrected in a timely manner.

Order No. 3, Site Security

Establishes minimum standards for site security by providing a system for production accountability and covers use of seals, by-passes, self-inspection, transporters' documentation, reporting incidents of unauthorized removal or mishandling of oil and condensate, facility diagrams, record keeping and site security plans. Identifies acts of noncompliance, establishes allowable periods to correct noncompliance, provides for variances. Informs operators of rights under this order.

Order No. 4, Measurement of Oil

Establishes requirements and minimum standards for the measurement of oil, standard operating practices for lease oil storage and handling. Establishes periods to correct noncompliance, and informs operators of rights under this order.

Order No. 5, Measurement of Gas

Establishes requirements and minimum standards for measurement of gas on Federal and Indian oil and gas leases. Establishes periods to correct noncompliance and the penalties that will result for failure to correct noncompliance. Also informs operators of rights under this order.

Order No. 6, Hydrogen Sulfide Operations

Identifies necessary applications, approvals and reports; specific operating requirements for drilling, completion, workover and production operations in a hydrogen sulfide environment. Details enforcement actions and allowed variances from standards.

Order No. 7, Disposal of Produced Water

Specifies requirements for submittal of application for disposal of produced water; the design, construction and maintenance requirements for pits; the minimum standards to satisfy requirements and procedures for seeking variance from minimum standards. Also specifies noncompliance, corrective actions required and period allowed for correction.

Forest Plan Requirements for Surface Use

The Forest Plan provides long-range management direction for the Forest. All outstanding and future permits, and other occupancy and use subject to valid existing rights, must be consistent with the Forest Plan. The Forest Plan specifies management direction and standards and guidelines to be applied at the project level. The following are excerpts from the Forest Plan general Forest-wide management direction as applicable to oil and gas operations.

Visual Resource Management

- Blend soil disturbance into natural topography to achieve a natural appearance, reduce erosion, and rehabilitate ground cover.
- Revegetate disturbed soils. In large projects this may have to be done in stages.
- Revegetate disturbed soils by the following growing season.
- Choose facility and structure design, color of materials, location and orientation to meet the adopted visual quality objective for the management area.

Aquatic and Terrestrial Habitat Management

- Restrict activities within one mile of known bighorn sheep lambing grounds from May 1 - June 20 if they would cause unacceptable stress to lambing ewes.
- No activities shall be allowed within a quarter mile of an active Ferruginous hawk, Swainson's hawk, goshawk, osprey or prairie falcon nest from March 1 - July 31 if they would cause nesting failure or abandonment.

Wildlife and Fisheries Threatened, Endangered, and Sensitive Species

- No activities shall be allowed within a mile of an active bald eagle or peregrine falcon nest from February 1 to July 31 if they would cause nesting failure or abandonment.

Riparian Areas

- Locate and construct all roads to maintain the basic natural condition and character of riparian areas.

Water Resource Improvement and Maintenance

- Reduce to natural rate any erosion due to management activity in the season of disturbance and sediment yields within one year of the activity through necessary mitigation measures such as water barring and revegetation.
- Allow use of heavy construction equipment, residue removal, etc., during periods when the soil is least susceptible to compaction or rutting.
- Proposed land use facilities (roads and buildings) should not be located within floodplain boundaries for the 100 year flood. Protect present and future facilities that cannot be located out of the 100 year floodplain by structural mitigation deflection structures (riprap, etc.).

Soil Resource Management

- Maintain soil productivity, minimize man-caused soil erosion and maintain the integrity of associated ecosystems.
- Use site preparation methods which are designed to keep fertile, friable topsoil essentially intact.
- Give roads special design considerations to prevent resource damage on capability areas containing soils with high shrink-swell capacity.
- Provide adequate road cross drainage to reduce sediment transport energy.
- Revegetate all areas, capable of supporting vegetation, disturbed during road construction and/or reconstruction to stabilize the area and reduce soil erosion. Use less palatable plant species on cuts, fills, and other areas subject to trampling damage by livestock and big game to discourage grazing by herbivores.
- Prevent livestock and wildlife grazing which reduces the percent of plant cover to less than the amount needed for watershed protection and plant health.

- Provide permanent drainage and establish protective vegetative cover on all new temporary roads or equipment ways, and all existing roads which are being removed from the transportation system.

Transportation System Management

- Close all newly constructed roads to public motorized use unless:
 - 1) Use does not adversely impact other resources.
 - 2) Use is compatible with the ROS class established for the area.
 - 3) They are located in areas open to motorized use.
 - 4) They provide user safety.
 - 5) They serve an identified public need.
 - 6) The area accessed can be adequately managed.
 - 7) Financing is available or can be arranged for maintenance.

Local Road Construction and Reconstruction

- Construct and reconstruct local roads to provide access for specific resource activities with the minimum amount of earthwork.

Air Resource Management

- Comply with State and Federal air quality standards.

Management Prescription Standards and Guidelines

For each of the management areas on the Forest, general management direction and standards and guidelines have been developed. This information is also displayed in the Forest Plan. The following discussion focuses on oil and gas activities by management area, i.e., the standard and guidelines relate to activities applicable to specific land areas. Note that some of the management areas do not have direction and/or standards and guidelines that relate to the type of activities expected with oil and gas operations.

Management Prescription 1D

The goal of this prescription is to provide transmission corridors that blend with the local environment.

- All design, materials and construction, operation, maintenance and termination practices employed with oil pipelines shall be in accordance with safe and proven engineering practices and shall meet or exceed the following:

- 1) USA Standard Code for Pressure Piping, ANSI B 31.4 "Liquid Petroleum Transportation Systems"
- 2) Department of Transportation Regulations, 49 CFR part 195, "Transportation of Liquids by Pipeline".

- All design, materials and construction, operation, maintenance and termination practices employed with gas pipelines shall be in accordance with safe and proven engineering practices and shall meet or exceed the following:

1) ASME Gas Piping Standards Committee, "Guide for Gas Transmission and Distribution Piping System" (3rd edition, April 1976).

2) Department of Transportation Regulations, 49 CFR part 192, "Transportation of Natural and other Gas by Pipelines: Minimum Federal Safety Standards".

Management Prescription 2A

The goal for this management area is to provide for a semi-primitive motorized recreation experience.

- Design and implement management activities to provide a visually appealing landscape.
- Roads will not exceed design guides specified in FSH 7709.56 for local roads.
- Do not exceed an average open local road density of 2 miles/square mile in fourth order watersheds.

Management Prescription 2B

The goal for this management area is to provide for a rural or roaded natural recreation experience.

- Design and implement management activities to provide a visually appealing landscape.

Management Prescription 3A

The goal for this management area is to provide a semi-primitive non-motorized recreation experience.

- Design and implement management activities to provide a visually appealing landscape.
- Specific land areas or travel routes may be opened seasonally and with specific authorization to accomplish resource management activities.
- Local roads may be constructed for non-recreation purposes. Close local roads to public motorized use, and prohibit off-road vehicle (ORV) use.

Management Prescription 4B

The goal for this management area is to optimize habitat capability for all management indicator species.

- Design and implement management activities to provide a visually appealing landscape.
- Manage road use to provide for habitat needs of management indicator species, including road closures and area closures, and to maintain habitat effectiveness.

Management Prescription 4D

The emphasis of this management area is on aspen management.

- Manage road use to provide for habitat needs of management indicator species, including road closures and area closures, and to maintain habitat effectiveness.

Management Prescription 5A and 5B

The goals of these management areas are to optimize habitat capability for big game on nonforested and forested winter range, respectively.

- Design and implement management activities to provide a visually appealing landscape.

- Road traffic and road cut or fill slopes must not block big game movement in delineated migration routes or corridors.

- Allow new roads in the management area only if needed to meet priority goals on the management area or to meet big game goals on the management area. Obliterate temporary roads within one season after planned use ends. New permanent or temporary roads constructed in the management area must meet the following criteria:

- 1) There is no feasible alternative to build the road outside the area, and the road is essential to achieve priority goals and objectives of contiguous management areas, or to provide access to land administered by other government agencies or to contiguous private land.

- 2) The State Fish and Wildlife agency has been fully involved in the road location planning and alternative evaluation.

- 3) Planned management of road use during winter will prevent or minimize disturbance of wintering big game animals, or will allow hunting or other management activities needed to meet management objectives.

- 4) Roads are constructed to the minimum standards necessary to provide safety for the road use purpose.

- 5) Roads cross the winter range in the minimum distance feasible to facilitate the necessary use.

- 6) Road traffic and road cut or fill slopes must not block big game movements in delineated migration routes or corridors.

- During winter close existing roads, prohibit off-road vehicle use and manage non-motorized use to prevent stress. Opening of existing roads during winter can be approved if the following criteria are met:

- 1) There is no reasonable alternative for owners or managers of contiguous private land or public land to reach their lands during winter.

- 2) Road use, off-road vehicle use, or non-motorized use of the area is essential and is the minimum necessary to meet priority goals and objectives.

- 3) The State Fish and Wildlife Agency is fully involved in planning human use of the area during winter.

Management Prescriptions 6A and 6B

The goal of the 6A management area is to improve soil and vegetation condition and provide forage for livestock production.

The goal of the 6B management area is to maintain soil and vegetation condition and provide forage for livestock production.

- Design and implement management activities to blend with the natural landscape.

Management Prescription 9A

The goal for this management area is to provide for an upper mid-seral self perpetuating plant community. Meet established water quality standards.

- Design and implement management activities which sustain inherent visual values of riparian areas and blend with the natural surrounding landscapes. Do not exceed an adopted visual quality objective of partial retention.

- Proposed new land-use facilities (roads and buildings) will not normally be located within floodplain boundaries for the 100-year flood. Implement mitigation measures when present or unavoidable future facilities are located in the active floodplain to ensure that State water quality standards, sediment threshold limits, bank stability criteria, flood hazard reduction, and instream flow standards are met during and immediately after construction and to protect life and property.

- Limit sediment yield within threshold limits. Prescription-induced water yield increases should not exceed prescribed thresholds of allowable increase nor should the total yield of water and sediment exceed maximum allowable amounts. Treat disturbed areas, resulting from management activities, to limit sediment yields to acceptable levels during the construction field season.

- Require concurrent monitoring during mitigation to ensure that mitigative measures are effective and in compliance with State water quality standards.

- Rehabilitate and stabilize disturbed soil areas where unacceptable impacts would occur.

- Allow use of heavy equipment on a case-by-case basis. If heavy equipment is required for construction, it will be used only when the soil will not be susceptible to permanent damage.

- Minimize detrimental disturbance to the riparian area by mineral activities. Initiate timely and effective rehabilitation of disturbed areas and restore riparian areas to state of productivity comparable to that before disturbance.

- 1) Prohibit the depositing of soil material from drilling, processing, or site preparation in natural drainageways.
- 2) Locate the lower edge of disturbed or deposited soil banks outside the active floodplain.
- 3) Prohibit stockpiling of topsoil or any other disturbed soil in the active floodplain.
- 4) Prohibit mineral processing activities within the active floodplain.

- 5) Discontinue heavy equipment use when soil compaction, rutting and puddling are present.
- Locate mineral removal activities away from the water's edge or outside the riparian area.
 - 1) Locate drilling mud pits outside the active floodplain unless alternate locations are more environmentally damaging. If location is unavoidable, seal and dike all pits to prevent leakage.
 - 2) Drain and restore roads, pads, and drill sites immediately after use is discontinued. Revegetate to 80 percent of ground cover in the first year. Provide surface protection during stormflow and snowmelt runoff events.
 - Locate roads and trails outside riparian areas unless alternative routes have been reviewed and rejected as being more environmentally damaging.
 - 1) Do not parallel streams when road location must occur in or adjacent to riparian areas except where absolutely necessary. Cross streams at right angles.
 - 2) Necessary streamcourse crossings will insure fish passage, non-erosive water velocities and channel stability, and insure erosion control on cuts, fills and road surfaces.
 - Create artificial sediment traps with barriers where the natural vegetation is inadequate to protect waterway or lakes from accelerated sedimentation.
 - 1) Create temporary sediment traps to prevent construction induced sedimentation; emphasize the use of natural materials.
 - Minimize detrimental disturbance to the riparian area by construction activities.
 - 1) Complete or treat active construction projects prior to expected significant runoff periods to minimize sediment yields.
 - 2) Initiate timely and effective rehabilitation of disturbed areas and restore riparian areas so that a vegetation ground cover, or suitable substitute, protects the soil from erosion and prevents increased sediment yield.

Management Prescription 10A

The goal of this management area is to provide for Research Natural Areas.

- Generally, physical improvements, such as roads are not permitted.

Management Prescription 10E

The goal of this management area is to provide for municipal watersheds and municipal water supply watersheds.

- Prevent soil surface compaction and disturbance in riparian ecosystems. Allow use of heavy construction equipment for construction, residue removal, etc., during periods when soil is least susceptible to compaction or rutting.

- Proposed land use facilities (roads and buildings) should not be located within floodplain boundaries for the 100-year flood. Protect present and future facilities that cannot be located out of the 100-year floodplain by structural mitigation (deflection structures, riprap, etc.)
- Immediately rehabilitate man-caused disturbances and restore burned areas. Inspect rehabilitated areas annually and provide maintenance necessary to protect the watershed.

The "Gold Book" Surface Operating Standards

The "Gold Book" was prepared by the BLM/Forest Service Rocky Mountain Regional Coordinating Committee (January 1989) to aid the oil and gas operator in permit approval and conduct of oil and gas operations on Federal lands, from exploration to development and production, to abandonment.

Geophysical Operations

- The operator is required to file an application for a prospecting permit. The application will include maps showing access routes and location of lines and other activities.

Procedural Guidelines

- Access roads and pipelines outside the leasehold or unitized area require a special-use permit.
- Bonding is required (36 CFR 228.109) to protect the government against losses associated with failure to meet royalty obligations, plugging wells not properly abandoned on a lease, and/or surface restoration and cleanup on abandoned operations.

Well Sites

- To the extent permitted by the geologic target the locations for well sites, tank batteries, pits, and pumping stations, etc., should be planned to minimize long-term disruption of the surface resources. Design and construction techniques and other practices should be employed that would minimize surface disturbance and effects on other resources, and maintain the reclamation potential of the site.
- Construction procedures must conform to the approved Surface Use Plan of Operations.
- Soil stockpile locations should be located so wind and water erosion are minimized and reclamation potential is maximized.
- Fills should be completed to minimize the chance of slope failure. Snow and frozen soil material shall not be used in the construction of fill areas and pits.
- The drill rig, tanks, heater-treater, etc., are not to be placed on uncompacted fill material. The area used for mud tanks, generators, mud storage, and fuel tanks should be graded for drainage.

Roads and Access Ways

- All permanent roads constructed by nongovernment entities across NFS lands must be designed by, or constructed under the direction of, a licensed professional engineer.

- In areas of high environmental sensitivity, special road location, design and construction techniques may be required.
- When access involves the use of an existing road, the operator may be required to contribute to road maintenance.
- Road survey, design, design drawings and templates, and construction requirements vary by class of road (temporary, local, collector or arterial).

Drainage and Drainage Structures

- The most economical control measure should be designed to meet resource and road management objectives and constraints.
- Ditch grades should be no less than 0.5 percent to provide positive drainage and avoid siltation.
- All culverts should be laid on natural ground or at the original elevation of any drainage crossed. Culverts should be placed on a 3 percent minimum grade; reverse camber is not allowed. The outlet of all culverts should extend at least one foot beyond the toe of any slope.
- 18 inches is the minimum diameter allowable for a ditch relief culvert.
- Engineering approval at the Regional Office will be required for all major culverts and/or bridges with an end opening of 35 square feet or greater.

Road Maintenance

- Users may perform their share of road maintenance or may be required to deposit sufficient funds to provide for their share of road maintenance costs.
- A road maintenance plan for all roads constructed or used in conjunction with the drilling program may be required. Maintenance activities normally required include: blading, surface replacement, dust abatement, spot repairs, slide removal, ditch cleaning, culvert cleaning, brush removal, litter cleanup, weed control, and snow removal.

Pipelines and Flowlines

- Flowline routes should take advantage of road locations wherever practicable to minimize surface disturbance.

Drilling Operations

- All proposed drilling operations and related surface disturbance activities, as well as any change from an approved APD must be approved before such activities are conducted.
- The well location must be staked and access roads to be constructed flagged prior to the onsite predrill inspection. Staking includes the well location, two 200-foot directional reference stakes, the exterior dimensions of the drill pad, reserve pit, other areas of surface disturbance, cuts and fills, and centerline flagging of new roads with

road stakes being visible from one to the next. Cut and fill staking is required for the well site, reserve pit and any ancillary facilities.

Producing Operations

- Drilling and production reports are required to be submitted to the Minerals Management Service according to their regulations.
- A Well Completion or Recompletion Report and Log, Form 3160-4, is required to be filed within 30 days after completion of a well either for abandonment or production.
- Subsequent well operations to perform casing repair, alter casing, perform nonroutine fracturing jobs, recomplete a different interval, perform water shut-off, commingling production between intervals and/or conversion to injection or disposal well, etc., will require the submission of a Sundry Notice for prior approval.
- A subsequent report of routine fracturing or acidizing jobs, or recompletion in the same interval operations must be filed on Sundry Notices and Reports of Wells (Form 3160-5) within 30 days of completion of the operations.
- When additional surface disturbance will occur, a description of any subsequent new construction, reconstruction or alteration must be submitted to the authorized officer for environmental review and approval.
- Disposal of produced water by disposal/injection wells requires permit(s) from the State, EPA, the surface management agency (FS or BLM), and must be in accordance with applicable Onshore Oil and Gas Orders.
- All spills or leakages of oil, gas, produced water, toxic liquids or waste materials, blowouts, fires, personal injuries, and fatalities shall be reported by the operator to the BLM/FS in accordance with requirements of Notice to Lessees - 3A (NTL-3A), Reporting of Undesirable Events, or an Applicable Onshore Oil and Gas Orders. The BLM required immediate reporting of all Class I events (more than 100 barrels of fluid/500MCF of gas released or fatalities involved).
- Firewalls/containment dikes are to be constructed and maintained around all storage facilities/batteries.
- Inspections of leasehold operations are made to ensure compliance with applicable laws, regulations, lease terms, Onshore Oil and Gas Orders, NTL's and other written orders of the authorized officer.

Reclamation and Abandonment

- A reclamation plan will be part of the Surface Use Plan of Operations. Reclamation may be required of any surface previously disturbed that is not necessary for continued well operations.
- Well abandonment operations may not be started without prior approval of the Sundry Notices and Reports on Wells (Form 3160-5).
- Disturbed areas should be revegetated after the site has been prepared. The operator will be advised as to species, methods of revegetation and seasons to plant. Seeding and/or planting should be repeated until satisfactory revegetation is accomplished, as determined by BLM/FS.

- All activities which alter landforms, disturb vegetation or require temporary or permanent structures will comply with visual resource management objectives for the area.
- Pipelines and flowlines will be reclaimed and abandoned in accordance with an approved reclamation plan.
- Well sites will be reclaimed/recontoured to prevent erosion and encourage establishment of vegetation.
- Roads not on the SMA transportation system will be abandoned, closed, and obliterated. Reclamation will involve recontouring and revegetation to conform to the approved reclamation plan.
- A Final Abandonment Notice (FAN) must be filed upon completion of reclamation operations. Final abandonment will not be approved until the surface reclamation work required by the APD had been completed and accepted.

Conditions of Approval

A Condition of Approval (COA) is an assembly of the provisions or requirements under which an Application for a Permit to Drill (APD) is approved. The mitigation measures listed in this appendix represent the post-lease environmental protection to which the Forest Service is committed as a result of the analysis in this EIS. These COA's may be applied in addition to other requirements such as the Forest Plan, the regulatory and statutory requirements, and the Onshore Oil and Gas Orders. There may be some overlap between the COA's and the mitigation measures described previously in this appendix.

Some or all of these COA's may apply to some or all oil and gas development activities and associated rights-of-way for all alternatives. **The Authorized Officer will choose among these measures at the APD stage to mitigate environmental impacts identified in the site specific analysis. The selection of COA's will be made in the decision document analyzing the effects of the lessee's proposal for ground disturbing activity.**

Note that there is no commitment to the specific wording of a COA. The Authorized Officer is not limited to the COA's shown here. New COA's may be developed based on new information available at the APD stage, as long as the new COA's conform with the limitations of the granted lease rights and are consistent with this EIS and subsequent amendments. COA's are not attached to APD approval documents if they are not applicable on the lease in question.

The COA's shown in this appendix apply to all lease alternatives, and will apply to the alternative chosen in the Record of Decision.

Standard COA's

Pre-activity Inventories

When ground disturbing activities are proposed, inventories may be required to determine appropriate mitigation. The inventories shall be completed prior to approval of operating plans. Inventories may include:

1. Aquatic biota and riparian areas.
2. Known or realistically potential habitat for threatened or endangered species.

3. Sensitive species' habitat such as bighorn sheep lambing areas, elk calving areas, raptors, etc.
4. Areas of identified unstable slopes may require a geotechnical survey.
5. Cultural resource surveys. Guidance is provided in: "Handbook for Cultural Resources Inventory/Mitigation" (Colorado State Office Release 8-13), dated 1990. A Notice to Lessees for Cultural Resource Surveys, NTL-85-1-CO, will be attached to all leases issued by Colorado State BLM.
6. Vegetation. Appropriate survey method will be determined at APD.
7. Baseline water quality data.

Mitigation Plans

The following mitigation plans will be required prior to ground disturbing activities. The Surface Use Plan of Operations will include this information.

A Soil and Water Mitigation Plan shall be prepared for all ground disturbing projects. It is described as follows:

(1) Prior to construction activities, a detailed Erosion Control and Water Quality Monitoring Plan, hereafter called Erosion Control Plan, will be developed by the proponent which includes site-specific location of all mitigation measures. The Plan will be approved by the Forest Service before implementation begins. The Erosion Control Plan will be jointly administered by the Forest Service and the proponent.

(2) The Erosion Control Plan will contain specific measures or best management practices (BMP's) for minimizing or eliminating the nature and degree of specific impacts which may occur from oil and gas leasing activities. The mitigation measures are designed to be practical for on-the-ground implementation. They are not tied to site-specific locations at this time, due to the current broad scope of this project. There are numerous temporary and permanent erosion-control measures available, but mitigation that works well in certain locations may not be acceptable in other areas. BMP's include such measures as soil stabilization practice, re-vegetation, slope stabilization, velocity controls, sediment barriers, retention ponds etc.

Soil stabilization and re-vegetation practices include seeding, mulching, timing of construction activity and fertilization. Slope stabilization practices include netting, surface roughing, mulching, retaining walls, rip rapping. Velocity control practices include slope drains, spreaders, energy dissipaters, check dams, drop structures, diversion berms. Sediment barriers include straw bales, filter fence, inlet protection, siltation berms and siltation traps.

These specific mitigation measures that are identified as part of the Erosion Control Plan will be incorporated in the Surface Use Plan of Operations. Monitoring will be required to ensure that the specific mitigation measures are in place and are effective.

(3) The Erosion Control Plan is developed to address adverse impacts to the soil resource incurred through implementation of oil and gas development, and to protect water quality and aquatic life, as identified in Chapter IV of this EIS.

(4) Mitigation is required by the Forest Service, for impacts on National Forest System lands. The Erosion Control Plan will outline the Forest Service's authority and responsibility and the proponents authority and responsibility for implementing the Mitigation Plan, and for monitoring construction activities and mitigation measures.

Cultural resources discovered during the survey will have to be evaluated for significance according to the criteria for National Register eligibility. If determined eligible, the cultural resource should be avoided. A mitigation program will be designed and implemented for all significant cultural properties that cannot be avoided.

All companies will have a Spill Prevention Control and Countermeasure Plan (SPCC plan), Federal Register, Volume 38, No. 237 - Part II, Oil Pollution Prevention. Monitoring techniques, frequency and methodologies will be developed and included in activity plans. The monitoring level will be determined after an evaluation of the resource and potential impacts.

General Conditions for all Site-Disturbing Activities

Well pads, roads, and facilities will be located to minimize visual impacts.

All operations will be conducted in a manner that avoids jeopardizing protected fisheries, invertebrates, wildlife, plants, and their habitats in compliance with the Endangered Species Act of 1973, and its implementing regulations.

If historic or archaeological materials, cave systems, or paleontological resources are uncovered during construction, the operator shall immediately stop any work that might further disturb such materials and contact the Forest Service. The operator shall immediately bring to the attention of the Authorized Officer any and all antiquities or other objects of historical, paleontological, or scientific interest, including, but not limited to, prehistoric or historic ruins or artifacts discovered as a result of operations. The operator and the Authorized Officer shall consult and determine the best option for avoiding or mitigating site damage.

Operators shall remind all personnel in the area associated with the project that the removal, injury, defacement, or alteration of any object of scenic, archaeological, historical, or scientific interest is a Federal crime and may be punishable by fine and/or jail terms.

All merchantable timber harvested from site clearings shall be purchased by the operator at the appraised price, as determined by the Forest Service.

Fire precautions required of timber sale purchasers will be required of lessees. Refer to timber sale contract provisions FS-2400-6 (T), section BT 7.0 and special provision R2-CT 7.2.

Linear-type facilities such as roads, power lines, and pipelines shall use the same route unless otherwise approved by the Authorized Officer. Surface disturbance will be minimized.

Activities may be curtailed during periods when the soil and/or road subgrade is saturated.

Trash and garbage from all leasing operations must be contained in a closed receptacle and hauled to an approved county landfill. EPA listed nonexempt waste must be contained in a closed receptacle and recycled or disposed of at approved sites.

Raptor nests will be protected from all development activities.

All known populations of sensitive fish, wildlife and plants, and identified high priority remnant vegetation associations will be protected from surface disturbing activities. The area of protection will include the actual location of the populations or occurrences of important associated vegetation and shall be determined in consultation and coordination with the Colorado Natural Areas Program (CNAP).

Those populations/occurrences, which analysis determines needs protection shall be protected by: (1) requiring relocation or rerouting of proposed well sites, pipelines, roads, other surface facilities, etc.,

or (2) applying other protective mitigation (i.e., fencing). Forest Service will require operator to effectively mitigate potential impacts to important populations/occurrences.

Intensive wildlife habitat development schemes and mitigation measures should be implemented by the operator, to increase carrying capacities for wildlife to offset losses incurred during the operations. This will attempt to replace habitat lost through road construction and well site development.

Actions in all riparian types will be managed to maintain: (1) vegetation and soil conditions that sustain over 80% of capable ground cover of plants and litter; and (2) stable stream channels and favorable water quality and aquatic habitat.

Land vehicles in stream channels are prohibited except at designated crossings.

An area specific Waste Management Plan will be required at the time of the APD, as part of the SUPO.

Use filter strips along lakes, wetlands and streams to trap sediment before it reaches water bodies and impairs channel stability or aquatic habitat. Maintain over 80% of capable ground cover of plants and litter in filter strips. Design filter strip width, considering types of actions, vegetation, soils, and topography, to have over an 80% chance of trapping all sand size sediment.

Ensure that all activities maintain instream flows needed to protect channel stability, aquatic habitat, and riparian vegetation.

All reserve mud pits will be closed systems in municipal watersheds.

No roads will be permitted within 1/4 mile of surface water intake or spring developments in municipal watersheds (depending on the terrain).

No well pads, pipelines, storage sites or work areas will be permitted within 1/4 mile of surface water intakes or spring developments in municipal watersheds (depending on the terrain).

No disposal of wastewater will be allowed by subsurface injection. Produced water will be disposed off the National Forest in an EPA approved site unless water quality meets State standards.

No surface water diversions will be permitted.

Locate crew campsites out of key wildlife habitats.

Firearms and dogs for crew personnel should not be allowed in camps or on the job.

The wellsite should not be located on or near key wildlife habitats.

Firearms, ATV, motorcycle and snowmobile use by crew personnel should be prohibited.

When the Forest Service finds that pre-existing special use permit holders, such as outfitter guides, those whose most recent permit issuance date precedes the issuance of a specific oil and gas lease, are significantly impacted under the "Nonexclusive Use" clause*, the lessee, the Forest Service and the special use permittee shall develop acceptable mitigation through timing activities to avoid impacts, negotiating impact payments to the permittee, relocating the permittee's rights, or other acceptable means. *[Nonexclusive Use Clause: This permit is not exclusive; that is, the Forest Service reserves the right to use or permit others to use any part of the area for any purpose, provided such use does not interfere with the rights and privileges hereby authorized.]

Road Construction and Operations

Existing roads will be used to the extent possible. Additional roads, if needed, shall be minimized and approved by the Forest Service prior to construction. Upon determination of an impending field development, a transportation plan will be prepared by the proponent to reduce unnecessary access roads, control public access and minimize impacts to previously unroaded habitat. Roads will be constructed and maintained to Forest Service road standards unless otherwise approved. General standards are contained in the Gold Book.

Locate and design roads and drainage structures to prevent road or slope failure and minimize impacts to water quality. Locate service and refueling areas on ridges or benches upslope from floodplains and terraces, prevent spills offsite.

Roads will be located outside of riparian areas unless alternative routes have been reviewed and rejected as being more environmentally damaging. Cross streams perpendicular to channels on as gentle grades and slopes as possible. Install all crossings in manner that maintains stable channels and favorable water quality and aquatic habitat.

Locate new facilities outside of the 100 year floodplain. If not possible, facilities should be designed for and protected from a 100 year event.

All new roads shall be signed and closed with a lockable gate to prevent general use of the road. Use of closed road segments will be restricted to authorized agents of: 1) the operator and/or the subcontractor(s), 2) the Forest Service, 3) other agencies with a legitimate need (CDOW, other law enforcement agencies, etc.). Unauthorized use or failure to lock gates during specified time frames by the operator or its subcontractors will be considered a violation of the terms of the APD or associated grants. This will apply to all roads on public lands.

The access road to a well pad should be located such that it does not cross key wildlife habitats and should be aligned where sight distances will be minimal (a thick forested area rather than through an opening or sparsely vegetated area). To prevent long lines of sight along the roads themselves the road should be curved every 300 feet unless limited sight distances are already achieved by natural terrain features.

The operator shall regularly maintain all roads used for access to the lease operation. This shall include installation of additional surfacing and surface drainage control structures not foreseen during construction.

Air pollution sources such as dust from unpaved roads and cleared areas will be minimized.

Cattle guards heavy enough to handle proposed road traffic will be installed and maintained as required.

Improvement to existing access will be minimized, limited to a 12-foot running surface, with minimum disturbance of surrounding soil and vegetation. Surfacing material will not be placed on the access road or location without prior Forest Service approval.

The operator may be required to construct waterbars on abandoned roads and pipeline routes. The waterbars shall be constructed to drain freely to the natural ground level and to prevent siltation and clogging. No waterbars will drain directly into a stream without first flowing through a sediment trap.

Slash disposal shall not impede wildlife movements.

Traffic will be limited to roads and drill pads.

Drill Pad Development

In planning for well sites, tank batteries, sump, reserve and mud pits, and pumping stations, the operator shall select locations that involve the least disruption to scenic values and other surface resources. This may include:

Construction techniques and design practices, including selection of material, camouflage techniques, and rehabilitation practices that will preserve scenic aesthetic qualities.

Shape and grade drill sites to maintain the natural integrity of the area. Tier the site rather than one large level clearing.

Concentrations of development clearings should reflect the character of natural openings in the area.

Slope the site away from any viewpoints if bright or contrasting soils exist.

Minimize vegetation removal. Lop and scatter slash to a depth no more than 18 inches, or windrow.

Scallop horizontal and vertical edges of vegetation surrounding sites.

Use fencing with a non-reflective finish.

Silt barriers for pads within 200 feet of live water.

Avoid, where possible, development in the foreground zone.

Paint equipment being used to minimize contrast. The color selected shall have a flat, non-reflective finish. The Munsell soil color chart provides good examples. The following guidelines should be used:

| | |
|--------|------------|
| HUE | 10R - 10YR |
| VALUE | 2.5 - 5 |
| CHROMA | 0 - 6 |

Avoid, where possible, areas that will allow the drill rig to be silhouetted above the surrounding or background landscape to prevent "skylighting".

Maintain, where possible, a minimum distance of 1/4 mile from natural features, such as rock outcrops, peaks, cliffs, waterfalls, etc.

Pads and related development facilities (pits, tank batteries, etc.) will not be constructed in riparian areas or floodplains. Pads will be constructed in a manner that minimizes impacts to the areas.

Pads will be constructed with runoff controls.

Steep slopes shall be avoided where possible; the site shall be located on the most level location obtainable that will accommodate the intended use.

Pits

Excavations used for the permanent impoundment of usable water should be sloped at a 3:1 grade to establish safe access for humans, livestock, and wildlife. Pits shall not be constructed in either riparian or aquatic ecosystems.

Pits shall not be constructed in alpine, riparian or floodplain areas. In addition, pits shall not be constructed in a manner that results in materials seeping or being transported overground to these areas.

A minimum of two feet of free board will be maintained between the maximum fluid level and the top of the berm. These pits will be designed to exclude all surface runoff. The pits will be constructed in cut portion of well pad site.

Final written certification is required that there are no hazardous chemicals on the RCRA list left in the drilling fluids within the mud pit. If the operator cannot provide certification, the drilling fluids and pit liner must be disposed of at a Federally approved hazardous materials site.

Mud, separation pits, and other containments used during the exploration or operation of the lease for the storage of oil and other hazardous materials shall be adequately fenced, posted, and covered. Additional protective measures may be needed to minimize hazards and prevent access to humans, livestock, waterfowl, and other wildlife. The need and type of protective requirement will be determined on a case-by-case basis. Pit liquids should have free oil removed and be sampled for total dissolved solids (TDS) prior to pit closure. Pit liquids with TDS content greater than 3000 ppm should be removed from the reserve pits prior to pit closure.

All pits, cellars, rat holes, and other bore holes unnecessary for further lease operations, excluding the reserve pit, will be backfilled immediately after the drilling rig is released to conform with surrounding terrain. Pits, cellars and/or bore holes that remain on location must be fenced as specified for the reserve pit.

All reserve pits will be made impervious to leaks. Clay can be used to seal pits in areas where synthetic liners are not specifically required.

Synthetic pit liners will be used in areas located within 40 feet of ground water (or greater if soils are extremely permeable).

Pit liners must be approved by the Forest Service, be impermeable and resistant to weather, sunlight, hydrocarbons, aqueous acids, alkalis, salt, fungi, or other substances likely to be contained in the drilling fluids or produced water.

The liner will be underlain by a suitable bedding material, and other measures will be taken as needed to protect the integrity of the liner.

A leak detection system will be installed to monitor lined reserve pits. This system must be installed in order to detect liner leakage. The Leak Detection Plan must be submitted to and approved by the Authorized Officer during APD approval. This plan must include the system design including line installation, Monitoring Plan, and the individual responsible for the required monitoring.

If air or gas drilling, the operator shall control the blooie line discharge dust by use of water injection or other acceptable methods. The blooie line discharge shall be a minimum of 100 feet from the blowout preventer and be directed into the blooie pit so that the cuttings and waste are contained in the pit.

All pits should be covered with netting to prevent animals from falling in.

A reserve pit will be allowed between June 15 and October 15. After this date, a closed drilling system will be required. The pit will be lined with an impermeable liner with heat treated seams and a minimum of 125 lbs./sq.in. burst strength. During pit reclamation, the liner will either be folded in and buried in the pit with a minimum of 2 feet of cover, or removed to a certified disposal site. Prior to pit closure, non-exempt materials and liquids which have been placed in the pit must be hauled to a certified disposal site unless another method of disposal is approved in writing by the District Ranger. Initial pit closure must be completed by November 1 of the current drilling year. Trip tickets showing, at a minimum, the date, driver's name and address, company, location hauling from, location hauling to and amount of material being hauled, will be kept and made available to the District Ranger at their request. The reserve pit will be fenced on 3 sides during operations. Variation of dates could occur depending on the location.

Pipelines

Where possible utilize existing corridors.

Linear openings should have a turn or angle every 1/4 mile where practical.

Scallop horizontal and vertical edges of corridors.

Pipeline and transmission corridors should parallel contours on slopes greater than 20%.

Alignment, siting, and reclamation of pipelines and flowlines should be designed to conform to adjacent terrain and to prevent or minimize vehicular travel. If maintenance is necessary in problem areas, consider use of an all terrain vehicle (ATV) or snowcat etc., in lieu of regular truck. Relocation of portions of the line may be necessary to reduce the impact to surface resources.

Pipelines shall be constructed outside of riparian areas except when crossing perpendicular to stream riparian areas. Construction in riparian areas will be conducted in a manner that minimizes impacts to riparian areas at the discretion of the Authorized Officer.

For associated pipeline rights-of-way, except rights-of-way expressly authorizing a road after construction of the facility is complete, the right-of-way holder shall not use the right-of-way as a road for any purpose other than routine maintenance. Necessary routine maintenance will be determined through consultation with the Authorized Officer.

Pipeline routes will be graded to conform to the adjacent terrain, waterbarred, and reseeded in accordance with the Reclamation Plan.

Pipeline construction shall not block, dam, or change the natural course of any drainage. Suspended pipelines will provide adequate clearance for runoff.

Pipeline trenches shall be compacted during backfilling. These trenches will be maintained in order to correct settlement and prevent erosion. Waterbars and other erosion control devices will be repaired as necessary. Pipeline trenches will be constructed in a manner so as to not change the natural surface and groundwater flow regime.

Crossing of pipelines owned by other companies shall be in accordance with an agreement secured with that company.

Existing telephone, telegraph, power lines, pipelines, roads, trails, fences, ditches, and like improvements shall be protected during construction, operation, maintenance, and termination of an oil and gas facility. Damage caused by such activities shall be properly repaired to a condition which is satisfactory to the Authorized Officer.

When clearing is necessary, disturbance will be kept to a minimum. Bladed materials shall be placed back into the cleared route upon completion of construction.

Pumping stations shall be kept in a neat and well-maintained condition.

Production

Where electrical power lines are constructed in association with oil and gas development the operator will apply "Suggested Practices for Raptor Protection on Power Lines" (Olendorff, et al., 1981) and ensure power lines are properly grounded to prevent electrocution of raptors.

The BLM manages the venting or flaring of hydrocarbon gases associated with hydrogen sulfide (H₂S, sour gas) from Federal leases. Waste disposal and the appropriate equipment and action for hazardous geologic conditions, such as H₂S gas and high pressures, are considerations dealt with in the APD approval process prior to drilling.

Compaction and construction of the berms surrounding tank batteries will be done prior to storage of fluids and designed to prevent lateral movement of fluids through the construction materials. The berms must be constructed to hold at minimum 120 percent of the storage capacity of the largest tank within the berm. All loading lines will be placed inside the berm.

All improvements, including fences, gates, cattle guards, roads, trails, pipelines, bridges, water developments, and control structures will be maintained in a serviceable and safe condition.

Livestock, sewage systems, and petroleum facilities will be located a minimum of 100 feet from all wells. Design all well casings and collars for the lowest practical contamination risk.

Any release of production water on or across the land requires prior approval by the Forest Service. A NPDES permit will be required from the State for point discharge.

Small amounts of produced water which do not meet water quality standards will be disposed of in accordance with Notice To Lessee-2B and/or Environmental Protection Agency (EPA) guidelines (DRAFT Onshore Order #7 Disposal of Produced Water).

If the well or production facility is located within one half mile of residences, appropriate noise mitigation will be required to ensure Federal, State, and local noise standards are adhered to during production.

Within 60 days of completion of construction, the holder shall provide the Authorized Officer an as-built survey of facilities as constructed.

Reclamation

The Abandonment and Rehabilitation Plan will be part of the Surface Use Plan of Operations and must be approved prior to any activities. The plan may include removal of surfacing material from the road, recontouring, replacement of topsoil, seeding, mulching, and planting.

Well drilling equipment and debris will be removed and the site and service roads will be rehabilitated as soon after completion of project as possible. Seasonal weather should be considered for optimum results.

After reshaping the site, topsoil material should be distributed to a uniform depth to allow the establishment of desirable vegetation. The disturbed areas shall be scarified prior to replacement of surface soil material.

Lessee must establish a diverse, effective and permanent vegetation cover of the same seasonal variety native to the area of disturbed land and capable of self-regeneration and plant succession at least equal in extent of cover to the natural vegetation of the area. Introduced species may be used where desirable and necessary to achieve goals of the approved Reclamation Plan. Undesirable weedy species such as kuchia, cheatgrass, and other noxious weeds. The operator will continue re-vegetation efforts using any and all cultural methods available until this standard is met.

Immediately after seeding, the stockpiled trees and slash will be lopped and scattered evenly over the disturbed areas. The access will be blocked to prevent vehicular access. Logging slash will also be used to construct filter windrows below all fill slopes.

Seed certification tags from seed used in reclamation will be submitted to the Authorized Officer .

Noxious weeds which may be introduced due to soil disturbance and reclamation will be treated by biological, mechanical or chemical methods to be approved by the Authorized Officer. Should chemical methods be approved, the lessee must submit a Pesticide Use Proposal to the Authorized Officer 60 days prior to the planned application date.

Mulching of the seedbed following seeding may be required under certain conditions (i.e., expected severe erosion), as determined by the surface owner/manager.

Tree planting may be required on disturbed acres which are suitable for timber production. The standard will be to achieve minimum stocking per Chapter 70 of FSH 2409.26b, within 5 years after non-use. Aspen transplanting and portable irrigation or ripping may be required on localized areas to promote aspen regeneration. If aspen regeneration fails, conifer seedlings adapted to the sites will be planted.

Reclamation of riparian areas will be conducted in a manner that restores the impacted area to its original condition, in terms of soils, vegetation and hydrologic conditions. Stream and lake fishery habitat will also be restored to pre-project conditions, based on monitoring of the system. Stream habitat reclamation may include instream habitat improvement, erosion control and species replenishment if deemed appropriate by the Authorized Officer.

If a producing well is developed, the reserve pit and that portion of the location and access road not needed for production or production facilities will be recontoured (one which allows lease operations and avoids steep cut and fill slopes) as soon as possible. All of the topsoil stockpiled will be evenly disturbed over these recontoured areas. Brush cleared prior to construction of the well site shall be scattered back over the recontoured area.

Reserve pit fluids will be allowed to evaporate through the entire summer season (June-August) after drilling is completed, unless an alternate method of disposal is approved. Backfilling of the reserve pit will be done so that the muds and associated solids will be confined to the pit and not squeezed out and incorporated in the surface materials. There will be a minimum of three feet of cover (overburden) on the pit. Lined pits will be effectively folded over and effectively capped. When the work is complete, the pit area will support the weight of heavy equipment without sinking.

Cut and fill slopes shall be reduced and graded to conform the site to the adjacent terrain. The disturbed sites will be prepared to provide a seedbed for reestablishment of desirable vegetation and reshaped to blend with the natural contour. Such practices may include contouring, terracing, gouging, scarifying, mulching, fertilizing, seeding, and planting.

Reclamation and abandonment of pipelines and flowlines may involve; replacing fill in the original cuts, reducing and grading cut and fill slopes to conform to the adjacent terrain, replacing surface soil material, waterbarring, and revegetating in accordance with rehabilitation practices specified by the Forest Service.

Surface buildings, supporting facilities, and other structures, which are not required for present or future operations, shall be removed upon termination of use.

Coal Bed Methane COA's

These conditions may be applied in addition to Standard COA's when developing coal bed methane resources.

A cement bond log (CBL) will be required should cement fail to circulate to surface on the surface and production casing strings. The operator must file one copy of the log (with BLM) should cement fail to circulate.

Minimum pressure testing requirements for ram type BOPE are 250 psi for a low side pressure test and 2000 psi for the high side pressure test.

Operators must provide one copy of the well deviation survey should deviation exceed 10° from the vertical or have a rate of change exceeding 1° per 100' of depth.

Water quality analysis reports on subsurface water must be filed upon well completion and after adequate wellbore clean-up. The analysis must include major anions, cations, TDS, and conductance of the produced sample.

Operator must record and file static water level with the Well Completion Report (BLM Form 3160-4).

Operator must monitor and record cumulative water production.

Brandenhead testing will be required pursuant to NTL-MDO-91-1.

Those coal bed methane wells proposed adjacent (i.e. within a 1/2-mile radial distance) to existing conventional wells (producing and/or abandoned) may affect conditions in those wellbores due to pressure changes in the formation and/or gas liberation through desorption. Those existing wells will be evaluated and monitored to determine if mitigation/remedial work is necessary to maintain wellbore integrity and prevent migration of fluid between zones.

Should wellbore conditions warrant, primary cementing hardware such as properly spaced, turbulent flow inducing centralizers and reciprocating scratchers will be required. Also, cement slurry design changes such as volume, density, and fluid loss, may be necessary to eliminate possible adverse effects of the wellbore environment and to improve cement sheath effectiveness.

Monitoring

Pre-Lease

Prior to the actual authorization of a specific parcel for leasing, the decisions made in the ROD to this document will be monitored to verify that oil and gas leasing on the parcel has been adequately addressed in this EIS and is consistent with the Forest Plan; to ensure that conditions of surface occupancy are properly included as stipulations on the parcel; and to determine that occupancy could be allowed somewhere on the proposed lease parcel, except where stipulations would prohibit all surface occupancy. See also the attached Region 2 NEPA validation/verification/monitoring form.

Post-Lease

Site-specific monitoring requirements will be determined at the APD stage, when the actual location of ground disturbing activities is known. Prior to the approval of the APD, an on-site visit will be held to review the proposed plan of operations and to discuss potential issues.

At the time of an APD, the BLM engineer processing the APD assigns a priority for BLM inspection. APD's may be assigned a high priority for inspection by BLM petroleum technicians under several conditions, including: 1) there is a high risk for serious adverse impacts to public health and safety or subsurface resources; 2) past experience with the operator or contractor indicates the need for a greater presence during the operations.

Erosion Control and Water Quality Monitoring Plan

The operator may be required to develop an Erosion Control and Water Quality Monitoring Plan prior to any ground disturbance. This plan is subject to Forest Service approval.

Spill Prevention Control and Countermeasure Plan

The operator is required to develop a Spill Prevention Control and Countermeasure Plan which includes monitoring.

During Operations

During the conduct of operations, i.e., drilling, constructing roads, well pads, or laying pipeline, the operator is required to monitor activity for cultural resources, threatened and endangered species, and substantial unanticipated environmental effects. If any of the above is found during the course of the operations, the operator is required to immediately contact the lessor, in this case, the Forest Service (Section 6 of the Standard Lease Form - BLM Form 3100-11). The Forest Service oil and gas regulations at 36 CFR 228.108 also requires the operator to report findings of cultural and historic resources.

Also during the conduct of operations, Forest Service and BLM oil and gas administrators monitor all activity (road, well pad and pipeline construction and drilling) to ensure that required design and mitigation measures as specified in the Surface Use Plan of Operations were accomplished and effective. Monitoring of operations for impacts to surface resources and the effectiveness of mitigation measures is carried out by Forest Service staff to ensure compliance of approved activities. Infractions of non-compliance are brought to the attention of the operator and the BLM. Corrective action is required within a reasonable time-frame.

Activities in areas of major conflict between oil and gas activities and other significant resources or uses will also result in a greater presence of inspection personnel (Forest Service and BLM) during on-going operations. Although the Forest Service has the authority and responsibility to conduct environmental inspection of the surface, BLM inspectors routinely make observations for environmental concerns while conducting their technical inspections.

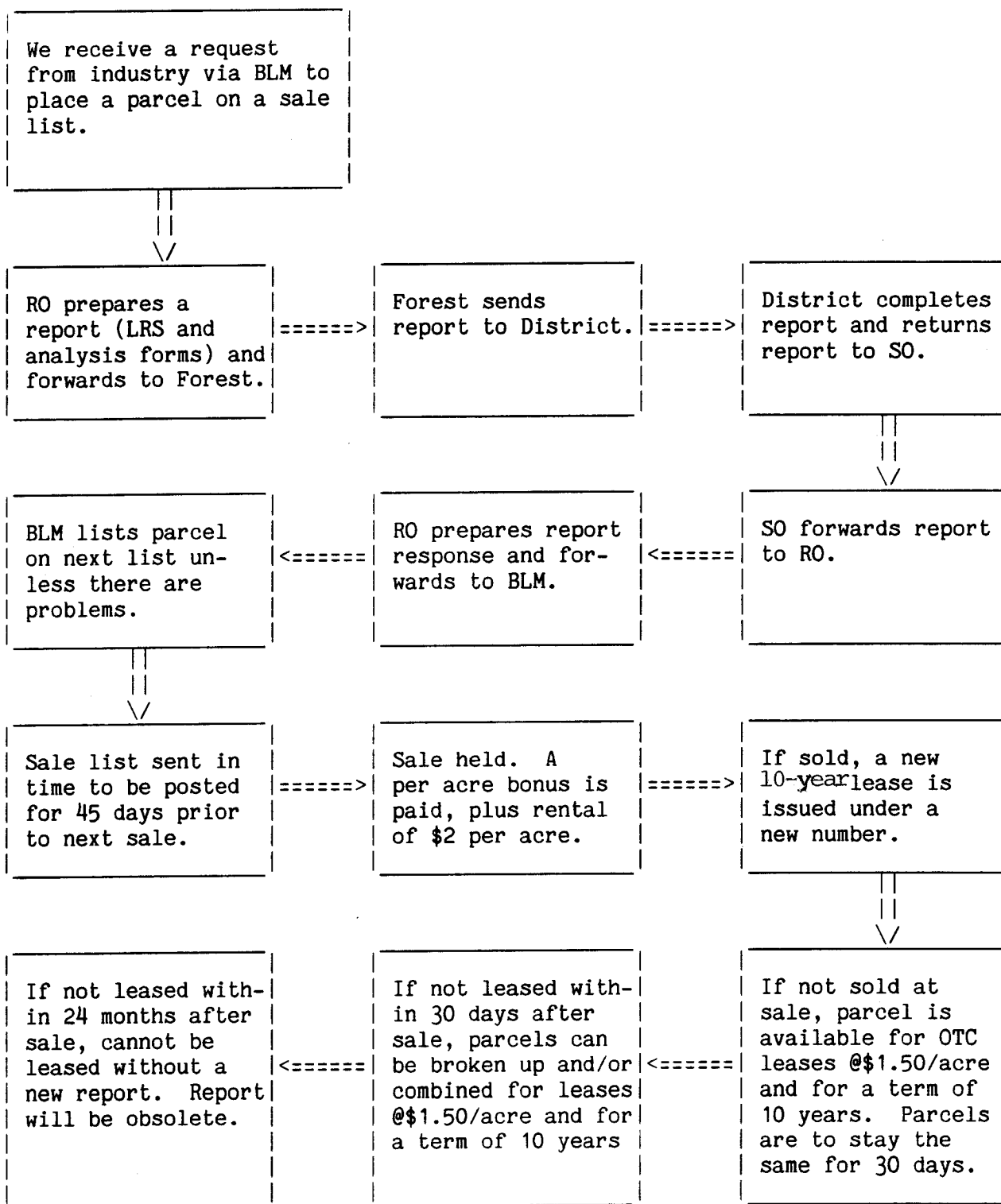
The BLM performs plugging inspections on all plugging and abandonment in areas of high environmental concerns, i.e., where there is high concern over the potential for contamination of aquifers.

Post-Operations

Reclamation as required in the SUPO is also monitored to ensure that the site is reclaimed prior to release of the operator's reclamation bond. (Note that some reclamation may be concurrent with the conduct of operations.) Sites of past oil and gas activity (and other Forest Service management activity) are informally visited by resource specialists to monitor the effectiveness of the mitigation measures that were applied to projects.

MINERAL LEASING FLOW CHART

10/92



*OTC - Over the Counter

SO PROCEDURES FOR MINERAL REPORTS

10/92

When a new request for a report is received from the RO, the SO needs to:

1. If two districts are shown on the Lease Record Sheet (LRS) send copies (which should be attached to request), to each district. If other Forests/Districts are involved, the RO will also send copies to them...coordination with shared Forests/Districts will be up to the lead District (District with most acres). If the area is about the same for each district, determining which district will handle the report will be up to the SO listed first on the LRS. Coordination between shared Districts/Forests will be initiated through that SO.
2. Please note on both the SO copy and the District copy of the LRS, the date the report is being forwarded to the District.
3. File report in Pending on District file.
4. If the request has come to the RO without a serial number, we will give it the date that it has been processed at the RO level, i.e., C*-19921001 (1), (*C, KSNM, SDM, WY)

When the report comes back from the district, the SO needs to:

1. Check to see if report is signed by District Ranger. If not signed, return for signature.
2. Pull SO pending file.
3. Check report for accuracy.
 - a. Is the NFS acreage filled in on the Lease Record Sheet?
 - b. Are the supplemental slips completed and attached?
 - c. Are there maps for wilderness and wilderness study areas?
 - d. Are maps color coded -- if so, return to district for non-color-code maps or convert to codes other than color.
 - e. Audit land descriptions on supplemental slips against lease proposal acreage.
4. Confirm as to Forest Plan and NEPA compliance.
5. Have Supervisor sign and date NEPA Validation/Verification/Modification form. Check that the "Preparer" and the District Ranger have both signed and dated the form.
6. Note on LRS date report returned to RO.
7. Make appropriate copies for SO file.
8. Combine these copies with your "pending in RO" file, discarding the SO's original copy of the LRS.
9. Return original of report to RO.

DISTRICT PROCEDURES FOR MINERAL REPORTS

10/92

When the request for report is received from the SO, the District:

1. Determine whether or not the lands are on your district. If not, return request to SO and SO will return to the RO to be sent to the right district. This is necessary to keep the files straight.
2. Determine whether or not the lands involved are NFS lands. If the report is for land that is not NFS, check the appropriate blank on the NEPA Validation/Verification/Monitoring form and return to the SO and the SO will return to the RO. The RO will notify BLM that the area is not Forest Service.
3. As indicated by RO, coordinate with the other district if the lands involve your district and another district. The district with the most acres will be the lead district and will be responsible for returning a report to the RO.
4. Determine if the lands will require a site-specific analysis. If it does, the district returns the Request for Report sheet with the number of the report and the reason for the delay. This should be sent to the SO, the SO will send to the RO, and the RO will notify BLM.
5. Determine if stipulations need to be attached.
6. Check for NEPA and Forest Plan compliance.
7. Complete Title Report Request for acquired minerals.
8. Prepare all necessary maps. Only wilderness area maps need to be sent to the RO -- keep all other maps in the district case file.
9. Prepare Additional Information Sheet.
10. Complete the NEPA Validation/Verification/Monitoring form checking appropriate blanks.
11. Fill in acres blanks on Lease Record Sheet. This requires only a grand total as far as the RO is concerned.
12. Enter a date for "Request for Report Returned to SO" on Lease Record Sheet.
13. Preparer and District Ranger must sign NEPA Validation/Verification/Monitoring form.
14. Make appropriate copies for district files and sends original of report to SO.

Serial Number:

REGION 2
NEPA VALIDATION/VERIFICATION/MONITORING
for
Oil and Gas Leasing Proposals

I. INTRODUCTION

A. FOREST: _____

DISTRICT: _____

Lease proposal area location:

B. Land Status:

1. Withdrawals recommended by Forest Plan: _____

2. Lease proposal:

- a. Includes NFS acquired lands? YES NO
If yes, attach Title Report Request.
- b. Includes private land with Federal minerals? YES NO
If yes, are NFS issues involved? YES NO N/A
If yes, attach Forest Service recommendations for private lands.

II. SPECIFIC LANDS DECISION VALIDATION

A. NEPA Verification (36 CFR 228.102 (e)(1))

1. Leasing the parcel is consistent with the _____
_____ Forest Land and Resource Management Plan?
 YES NO

If NO, The inconsistency is due to _____

_____ If NO, is additional documentation needed to amend or revise the Plan?
 YES NO

2. Leasing the parcel has been adequately addressed in the _____
_____ site-specific NEPA document?
 YES NO N/A

If NO, is additional NEPA documentation needed? YES NO

(attach additional information sheets behind last page of this form)

B. Conditions of Surface Occupancy (36 CFR 228.102(e)(2))

1. Indicate presence or absence of concern or characteristic by "X" in appropriate column. Identify site specific concern/characteristics in the Remarks column and identify any required stipulations/lease notices. Forest Service Stipulation 1 and the Standard Lease Terms will be attached to all leasing decision validations. Copies of supplemental stipulations/lease notices will be attached as required.

Stipulations include:

- a. No Surface Occupancy Stipulation (NSO)
- b. Timing Limitation Stipulation (TL)
- c. Controlled Surface Use Stipulation (CSU)
- d. Lease Notice (LN)

RECORD OF SITE SPECIFIC VALIDATION/VERIFICATION (FIELD) MONITORING

| | IF YES | | REMARKS | |
|--|---------|-------|---------|--|
| | IS STIP | INDI- | | |
| | NEEDED? | CATE | | |
| | NO | YES | STIP | |
| 1. Classified Areas (by basis for classification): | | | | |
| Scenic (state site-specific concern) | | | | |
| Historical | | | | |
| Botanical | | | | |
| Zoological | | | | |
| Paleontological | | | | |
| Geological | | | | |
| Archaeological | | | | |
| Experimental Forest | | | | |
| Research Natural Area | | | | |
| 2. Wilderness Study Area | | | | |
| Further Planning Area | | | | |
| 3. Wild and Scenic River Corridor or Study Area | | | | |
| 4. Slopes: Greater than 40% | | | | |
| Greater than 60% | | | | |
| 5. High Erosion Hazard | | | | |
| 6. High Geologic Hazard | | | | |
| 7. Areas With Extremely Sensitive/Unstable: | | | | |
| Soils | | | | |
| Water | | | | |
| Wetlands and/or Riparian Lands | | | | |
| Geological Situations | | | | |
| Alpine Vegetation | | | | |
| 8. Low VAC + Retention VQO | | | | |
| 9. Retention VQO | | | | |
| 10. Threatened & Endangered Species | | | | |
| Identify species: | | | | |
| Sensitive species: | | | | |
| 11. Critical Wildlife Habitat Identified in Forest Plan: | | | | |
| Winter Habitat | | | | |
| Birthing Area | | | | |
| Other specify: | | | | |
| 12. Developed Recreation Sites | | | | |
| 13. Recreation Opportunity Spectrum: | | | | |
| Primitive | | | | |
| Semi-Primitive - motorized | | | | |
| nonmotorized | | | | |
| 14. Range Improvements | | | | |
| 15. Timber Sale Areas | | | | |
| 16. Timber Plantations | | | | |
| 17. Timber Research or Special Study Areas | | | | |
| 18. Seed Production Area | | | | |
| 19. Travel Restrictions Per Travel Management Plan | | | | |
| 20. Areas Eligible For Inclusion In National Register (NRHP) | | | | |
| Identify Eligible Areas: | | | | |
| 21. Special Use Occupancies | | | | |
| 22. Other Unique Characteristics or Concerns Addressed: | | | | |

Serial Number:

C. Surface Occupancy (36 CFR 228.102(e)(3))

Approximate percent of the parcel available for surface occupancy. _____

IV. SUMMARY OF VALIDATION ANALYSIS AND RECORD OF CONSENT/DENIAL TO LEASE:

- () A. Consent to issuance of the lease subject only to Forest Service Stipulation 1 and Standard Lease Terms.
- () B. Consent to issuance of the lease subject to Forest Service Stipulation 1 and Standard Lease Terms.
 - _____ No surface Occupancy Stipulation (NSO)
 - _____ Timing Limitation Stipulation (TL)
 - _____ Controlled Surface Use Stipulation (CSU)
 - _____ Lease Notice (LN)
- () C. Object (deny) to lease for all or part of the lease parcel area (description of denied area and reason for denial attached.)
- () D. Defer decision on the lease parcel, as additional NEPA analysis is needed.

V. PREPARED BY:

_____, _____, _____
Minerals Specialist District Date

VI. COORDINATED WITH: (other than Forest Service)

_____, _____, _____
Name Organization Date

VII. RECOMMENDED BY:

_____, _____, _____
District Ranger District Date

VIII. APPROVED BY:

_____, _____, _____
Forest Supervisor Forest Date

**Appendix I -
Wilderness/Roadless
Opportunities within
Reasonable Distance of
the Forest Oil and Gas
Analysis Area**

WILDERNESS/ROADLESS OPPORTUNITIES WITHIN REASONABLE DISTANCE OF
THE GMUG OIL AND GAS ANALYSIS AREA

| | TOTAL NET ACRES | GMUG NF NET ACRES | ADJACENT NF NET ACRES |
|-------------------------|--------------------|----------------------|--------------------------|
| WILDERNESSES ON GMUG | | | |
| Big Blue Wilderness | 98,320 | 98,320 | 0 |
| Collegiate Peaks | 166,654 | 48,986 | 117,668 |
| La Garita | 103,986 | 79,822 | 24,168 |
| Lizard Head | 41,189 | 20,387 | 20,802 |
| Maroon Bells - Snowmass | 181,138 | 19,598 | 161,540 |
| Mt Sneffels | 16,505 | 16,505 | 0 |
| Raggeds | 59,519 | 43,062 | 16,457 |
| West Elk | 176,092 | 176,092 | 0 |

| | TOTAL NET ACRES | WR NF NET ACRES |
|--|--------------------|--------------------|
| WILDERNESSES ON THE WHITE RIVER WITHIN 100 MILES | | |
| Collegiate Peaks | 166,654 | 35,517 |
| Flat Tops | 235,035 | 196,165 |
| Holy Cross | 122,037 | 112,548 |
| Hunter - Fryingpan | 74,250 | 74,250 |
| Maroon Bells - Snowmass | 181,138 | 161,540 |
| Raggeds | 59,519 | 16,457 |

| | TOTAL NET ACRES | SJ NF NET ACRES |
|---|--------------------|--------------------|
| WILDERNESSES ON THE SAN JUAN WITHIN 100 MILES | | |
| Lizard Head | 41,189 | 20,802 |
| Weminuche | 459,604 | 294,889 |

| | TOTAL NET ACRES | RG NF NET ACRES |
|---|--------------------|--------------------|
| WILDERNESSES ON THE RIO GRANDE WITHIN 100 MILES | | |
| La Garita | 103,986 | 24,164 |
| Weminuche | 459,604 | 164,715 |

| | TOTAL NET ACRES | SI NF NET ACRES |
|---|--------------------|--------------------|
| WILDERNESSES ON THE SAN ISABEL WITHIN 100 MILES | | |
| Collegiate Peaks | 166,654 | 82,151 |
| Mt. Massive | 27,980 | 27,980 |

| WILDERNESS STUDY AREAS ON THE GMUG | NET ACRES |
|------------------------------------|-----------|
| Oh-Be Joyful | 5,500 |
| Fossil Ridge | 47,400 |

| FUTHER PLANNING AREAS FOR WILDERNESS ON THE GMUG | NET ACRES |
|--|-----------|
| Cannibal Plateau | 31,990 |

| ROADLESS AREAS (RARE II INVENTORY) ON GMUG | NET ACRES* |
|--|------------|
| 180 Elk Mountains - Collegiate | 140,540 |
| ** 181 Raggeds | 120,440 |
| ** 182 Drift Creek | 1,430 |
| ** 184 Springhouse Park | 16,000 |
| ** 185 Electric Mountain | 8,600 |
| ** 186 Clear Creek | 40,780 |
| ** 189 Hightower | 5,000 |
| ** 191 Priest Mountain | 102,580 |
| ** 192 Salt Creek | 10,880 |
| ** 193 Battlement Mesa | 36,800 |
| ** 194 Nick Mountain | 10,400 |
| ** 195 Kannah Creek | 29,650 |
| ** 196 West Elk | 206,940 |
| 198 Beaver - Castle | 62,200 |
| 199 Gothic Mountain | 6,660 |
| ** 200 Whetstone Mountain | 15,400 |
| ** 201 Flat Top Mountain | 19,850 |
| 202 Boston Peak | 48,640 |
| 203 Matchless | 35,100 |
| 204 Crystal Creek | 90,380 |
| 205 Kreutzer - Princeton | 13,300 |
| 206 Romley | 8,860 |
| 207 Canyon Creek | 13,100 |
| 209 Cochetopa Hill | 65,680 |
| 210 Cochetopa Dome | 7,000 |
| 211 Monchego | 3,520 |
| 212 Sawtooth Mountain | 45,400 |
| 215 Mineral Mountain | 51,600 |
| 217 Middle Fork | 6,390 |
| 218 Cannibal Plateau | 31,990 |
| 220 Carson Peak | 27,560 |
| 221 Crystal Peak | 5,300 |
| 223 Elk Creek | 3,000 |
| 224 Uncompahgre | 38,840 |
| 225 El Paso Creek | 3,200 |
| 226 Cimarron | 15,000 |
| 228 Baldy Peak | 10,080 |
| 229 Beaver Creek | 1,480 |
| 231 Upper W FK Dallas Creek | 1,880 |
| 232 Iron Mountain | 7,400 |
| 237 Sunshine Mesa | 1,120 |
| 238 Wilson Mesa | 1,960 |
| 239 Ophir Needles | 480 |
| 240 San Miguel | 9,360 |
| ** 241 Roubideau | 19,770 |
| ** 242 Tabeguache | 10,240 |
| ** 243 Kelso Mesa | 34,340 |
| 244 Black Point | 10,750 |
| 245 Ute Creek | 28,160 |
| ** 246 Campbell Point | 11,300 |
| ** 247 Johnson Creek | 10,330 |
| 358 Chipeta | 16,520 |
| 359 Sneva Mountain | 600 |

* 1979 acreages - some areas are no longer the same size.

** These are roadless areas which are within the analysis area and for which oil and gas leasing decisions are being made using this analysis.

| ROADLESS AREAS ON THE WHITE RIVER WITHIN 100 MILES | NET ACRES |
|--|-----------|
| 154 Red Dirt | 4,520 |
| 155 Sweetwater | 14,470 |
| 156 Hunns Peak | 13,570 |
| 158 Cow Lake | 2,830 |
| 159 Rurro Mountain | 13,100 |
| 160 White River | 34,550 |
| 163 North Elk | 19,990 |
| 164 Three Forks | 8,420 |
| 165 Butler Creek | 5,890 |
| 166 Main Elk | 48,330 |
| 167 Canyon Creek | 37,170 |
| 168 Grizzly Creek | 42,900 |
| 169 Grand Mesa | 6,340 |
| 170 Holy Cross | 135,870 |
| 171 Gardner Park | 6,660 |
| 172 Adam Mountain | 5,700 |
| 173 Seven Hermits | 6,260 |
| 174 Hardscrabble | 9,300 |
| 175 Red Table North | 18,880 |
| 176 Red Tables | 67,620 |
| 177 Porphyry Mountain | 54,990 |
| 179 Ivanhoe | 2,680 |
| 180 Elk Mountain - Collegiate | 138,530 |
| 182 Drift Creek | 5,890 |
| 183 Perham Creek | 25,980 |
| 187 Baldy Mountain | 6,910 |
| 188 Hourse Park | 9,920 |
| 193 Battlement Mesa | 34,200 |
| 348 Deep Creek | 11,060 |

| ROADLESS AREAS ON THE SAN JUAN WITHIN 100 MILES | NET ACRES |
|---|-----------|
| 235 Lizard Head | 17,440 |
| 240 San Miguel | 60,240 |
| 291 Graham Park | 12,090 |
| 293 Runlett Park | 6,610 |
| 294 Florida River | 50,380 |
| 296 Tenmile Creek | 380 |
| 297 Whitehead Peak | 600 |
| 298 Cunningham Creek | 1,280 |
| 302 East Animas | 18,220 |
| 303 West Needle | 24,550 |
| 304 Blackhawk Mountain | 17,750 |
| 305 Storm Peak | 52,270 |
| 306 Hermosa | 146,105 |
| 315 Ryman | 9,030 |

| ROADLESS AREAS ON THE RIO GRANDE WITHIN 100 MILES | NET ACRES |
|---|-----------|
| 220 Carson Peak | 87,630 |
| 278 Wheeler - Wason | 58,910 |
| 279 Bristol Head | 67,900 |
| 280 Deep Creek - Decker Creek | 120,200 |
| 299 Bear Creek | 6,740 |
| 300 Rio Grande Reservoir | 2,770 |
| 301 Ruby Lake | 4,090 |

| ROADLESS AREAS ON THE SAN ISABEL WITHIN 100 MILES | NET ACRES |
|---|-----------|
| 180 Elk Mountains - Collegiate | 113,980 |
| 205 Kreutzer - Princeton | 37,140 |
| 206 Romley | 6,600 |
| 259 Mount Massive | 26,100 |
| 260 Mount Elbert | 18,340 |
| 261 Mount Antero | 37,840 |

**Appendix J -
Road Maintenance
Level**

TRANSPORTATION SYSTEM MAINTENANCE HANDBOOK

Exhibit 1

General Relationship Between Maintenance Levels

| PARAMETERS | MAINTENANCE LEVEL | | | | |
|------------------------------------|--|---|--|--------------------------------|--------------------------------|
| | 1 | 2 | 3 | 4 | 5 |
| Service Life | Intermittent Service-Closed Status | Constant Service or Intermittent Service - Open Status (Some uses may be restricted under 36 CFR 261.50) | | | |
| Traffic Type | Open for non- motorized uses. Closed to motorized traffic. | Administrative, permitted, dispersed recreation, specialized, commercial haul. | All National Forest Traffic - General Use. Commercial Haul | | |
| Vehicle Type | Closed-N/A | High clearance, pick-up, 4x4, log trucks, etc. | All types - passenger cars to large commercial vehicles | | |
| Traffic Volume | Closed-N/A | Traffic volume increases with maintenance level | | | |
| Typical Surface | All types | None, Native, or Aggregate -- may be dust abated | Aggregate -- usually dust abated; paved | | |
| Travel Speed | Closed-N/A | Travel speed increases with maintenance level | | | |
| User Comfort and Convenience | Closed-N/A | Not a consider- ation | Low Priority | Moderate Priority | High Priority |
| Functional Classification | All Types | Local Collector | Local Collector Arterial | Local Collector Arterial | Local Collector Arterial |
| Traffic Service Level | Closed-N/A | D | A, B, C -- Traffic service level increases with maintenance level | | |
| Traffic Management Strategy | Prohibit or Eliminate | Discourage or Prohibit cars. Accept or Discourage high clearance vehicles. | Encourage, Accept | Encourage | Encourage |

**Appendix K -
Table of Required
Permits**

| FEDERAL, STATE AND LOCAL PERMITS, APPROVALS AND AUTHORIZING ACTIONS NECESSARY FOR CONSTRUCTION, OPERATION, MAINTENANCE AND ABANDONMENT OF OIL AND GAS OPERATIONS | | | |
|---|--|---|---|
| Issuing Agency/ Permit Name | Nature of Permit | Authority | Applicable Project Component |
| Federal Permits, Approvals and Authorizing Actions | | | |
| U.S. Department of Agriculture (U.S. Forest Service) | | | |
| 1. Timber Sales Contract | Accounts for timber cut, damaged or destroyed during mineral-related activities | National Forest Management Act of 1976 (16 USC 472a) and 36 CFR Parts 221 and 223 | All proposed action and alternative surface disturbing activities on NFS lands |
| 2. Special Use Authorization | Occupancy or use of NFS lands, i.e. rights-of-way | National Forest Management Act of 1976 (16 USC 472a) and 36 CFR Parts 221 and 223 | All proposed action and alternative surface disturbing activities on NFS lands, outside of lease boundaries |
| 3. Federal Antiquities Permit | All archaeological investigations on public lands | Archaeological Resource Protection Act of 1979 (16 USC 470); 36 CFR 1215 | All proposed action and alternative surface disturbing activities |
| 4. Surface Use Plan of Operations | Occupancy or use of NFS leased lands in conjunction with all oil & gas operations | Federal Onshore Oil & Gas Leasing Reform Act of 1987 (16 USC 478, 551) and 36 CFR Part 228 | All proposed action and alternative surface disturbing activities on NFS leased land |
| U.S. Department of the Interior (Bureau of Land Management) | | | |
| 5. Permit to Drill, Deepen or Plug back (APD) and Sundry Notice | Controls drilling for oil and gas on Federal onshore leases | Mineral Leasing Act of 1920 (30 USC 181 et seq.); Federal Onshore Oil & Gas Leasing Reform Act of 1987 (43 CFR Part 3160) | Wells and production facilities |
| 6. Approval of Unitization | Provides for efficient and timely development and production of Federal oil and gas leases | Mineral Leasing Act of 1920 (30 USC 181 et seq.); 43 CFR 3180 | Combine individual leases into unit. |
| 7. Rights-of-Way Grants and Temporary Use Permits | Right-of-way grants on BLM-managed lands | Mineral Leasing Act of 1920 (30 USC 181 et seq.) | Oil and gas pipelines on BLM-managed lands |

| FEDERAL, STATE AND LOCAL PERMITS, APPROVALS AND AUTHORIZING ACTIONS NECESSARY FOR CONSTRUCTION, OPERATION, MAINTENANCE AND ABANDONMENT OF OIL AND GAS OPERATIONS | | | |
|---|---|---|--|
| Issuing Agency/ Permit Name | Nature of Permit | Authority | Applicable Project Component |
| 8. Rights-of-Way Grants and Temporary Use Permits | Right-of-way grants on BLM-managed lands | Federal Land Policy and Management Act of 1976 (43 USC 1761-1771); 43 CFR 2800 | Roads on BLM-managed lands |
| 9. Approval to Dispose of Produced Water | Control of produced water disposal | Mineral Leasing Act of 1920 (30 USC 181 et seq.); 43 CFR Part 3160 and Federal Land Policy and Management Act, Title V, Section 501 | Disposal of any production water |
| U.S. Department of Interior (U.S. Fish and Wildlife Service) | | | |
| 10. Consultation Process: Endangered or Threatened Species | Preliminary Biological Assessment | Section 7 of the Endangered Species Act of 1973, as amended (16 USC Sec. 1344) | All proposed action and alternative surface disturbing activities |
| Department of Defense (U.S. Army Corps of Engineers) | | | |
| 11. Permit for Dredged or Fill Material (404 Permit); Nationwide | Placement of fill or dredged material in waters of the United States or adjacent wetlands | Section 404 of the Clean Water Act (40 CFR Parts 122-123); 33 USC Section 1344; 33 CFR Parts 323 and 325 | All proposed action and alternative surface disturbing activities affecting waters of the U.S. or wetlands |
| President's Advisory Council on Historic Preservation | | | |
| 12. Consultation & Signed Programmatic Agreement (PA) | Protection of significant cultural resources | Sec. 106 of National Historic Preservation Act (36 CFR 800) | All proposed actions and alternative surface disturbing activities |
| State Permits, Approvals and Authorizing Actions | | | |
| Colorado Department of Health | | | |
| 13. Air Pollutant Emissions Permit (non-PSD) | Permits for emissions from new or modified sources | CRS 25-7-112; 5 CCR 1001-5 | All fuel burning sources associated with proposed action or alternative |
| 14. Open Burning Permit | Control of all open burning | CRS 25-7-123; 5 CCR 1001-3; Reg. No. 1, Section II.C. | Any open burning |

| FEDERAL, STATE AND LOCAL PERMITS, APPROVALS AND AUTHORIZING ACTIONS NECESSARY FOR CONSTRUCTION, OPERATION, MAINTENANCE AND ABANDONMENT OF OIL AND GAS OPERATIONS | | | |
|---|--|---|--|
| Issuing Agency/ Permit Name | Nature of Permit | Authority | Applicable Project Component |
| 15. Pollutant Discharge System Permit | Issue permits for surface discharge of any pollutant | CRS 25-8-501 through 508; 5 CCR 1002-2 | Any point-source surface discharges |
| 16. Disposal of Production Water | Permits disposal of produced and waste water at authorized disposal site | CRS 25-8-501 through 508; 5 CCR 1002-2 | Disposal of any produced or waste water |
| Colorado Department of Highways | | | |
| 17. Transport Permit | Permits for oversize, overlength and overweight loads | CRS 42-4-409; 2 CCR 602-4 | Transportation of equipment and materials on State highways |
| 18. Access Permit | Permits for access to State highway system | CRS 43-2-147; 2 CCR 601-1; 2 CCR 601-1A | Any proposed access to State highway system |
| Colorado Department of Natural Resources (Division of Mines) | | | |
| 19. Application to Store and Use Explosives | Permit to use, store or transport explosives | CRS 34-47-104; 34-27-101; 2 CCR 403-1, 403-2 | All proposed action and alternative activities requiring the use of explosives |
| 20. Permit to Drill Deepen or Re-enter and Operate an Oil and Gas Well | State approval of drilling on all non-Federal lands within the State | CRS 1973, 34-60-101 et seq.; 2 CCR 404-1 (303, 315) | Wells |
| 21. Permit for Underground Disposal of Water | Regulates Class II underground injection wells on non-Indian lands | CRS 1973, 34-60-106(2)(d) and 34-60-106(9) | UIC wells |
| 22. Safety Regulations for Oil and Gas Activities | Regulates oil and gas activities to protect public safety | CRS 34-60-106; Oil and Gas Conservation Commission Order No. 1-34 | All proposed action and alternative components |
| Colorado State Historic Preservation Office | | | |
| 23. Consultation & Signed Programmatic Agreement (PA) | Protection of significant cultural resources | Sec. 106 of National Historic Preservation Act (State regs?????) | All proposed action and alternative surface disturbing activities |

| FEDERAL, STATE AND LOCAL PERMITS, APPROVALS AND AUTHORIZING ACTIONS NECESSARY FOR CONSTRUCTION, OPERATION, MAINTENANCE AND ABANDONMENT OF OIL AND GAS OPERATIONS | | | |
|---|---|-----------------------|--|
| Issuing Agency/ Permit Name | Nature of Permit | Authority | Applicable Project Component |
| Local Permits, Approvals and Authorizing Actions | | | |
| Delta County | | | |
| 24. Utility Permit | Regulates pipeline construction in County right-of-way | Land Development Code | Pipeline construction in County right-of-way |
| 25. Access Permit | Regulates access to County roads | Land Development Code | Any activity requiring access to County roads |
| 26. Special Transport Permit | Regulates moving oversized, overlength or overweight equipment on County roads | Land Development Code | Any transport of oversized, overlength or overweight equipment on County roads |
| 27. Sanitary Waste Permit | Permits construction of septic system | Land Development Code | Onsite sewage disposal in septic system |
| Garfield County | | | |
| 28. Special Use Permit | Permit for extraction and procession on private lands | Land Development Code | All proposed action and alternative components in Garfield County |
| 29. Road Use Permit | Overweight and overlength loads on County Roads | Land Development Code | Transportation of equipment and materials on County roads |
| 30. Building Permit | Controls construction of all structures in the County | Land Development Code | All proposed action and alternative components in Garfield County |
| 31. Solid Waste Permit | Regulates disposal of wastes in the County | Land Development Code | Construction and operational waste |
| Mesa County | | | |
| 32. Special Use Permit | Regulates drilling of gas wells in areas zoned as agriculture, forestry or transition | Land Development Code | Wells in Mesa County |
| 33. Road Use Permit | Overweight and overlength loads on County roads | Land Development Code | Transportation of equipment and materials on County roads |

| FEDERAL, STATE AND LOCAL PERMITS, APPROVALS AND AUTHORIZING ACTIONS NECESSARY FOR CONSTRUCTION, OPERATION, MAINTENANCE AND ABANDONMENT OF OIL AND GAS OPERATIONS | | | |
|---|---|-----------------------|---|
| Issuing Agency/ Permit Name | Nature of Permit | Authority | Applicable Project Component |
| 34. Solid Waste Permit | Regulates disposal of wastes in the County | Land Development Code | All proposed action and alternative components in Mesa County |
| 35. Building Permit | Controls construction of all structures in the County | Land Development Code | All proposed action and alternative components in Mesa County |
| 36. Utility Permit | Regulates pipeline construction | Land Development Code | Any pipelines 10-inches or greater in diameter |
| Montrose County | | | |
| 37. Septic Permit | Permits septic systems | Land Development Code | Any septic systems |
| 38. Building Permit | Permits building construction | Land Development Code | Any building constructed for commercial use |
| 39. Driveway Access Permit | Permits access off County roads | Land Development Code | Any access off County road to erect/store equipment for commercial use |
| 40. Road Cuts Permit | Permit alteration of County road rights-of-way | Land Development Code | Any alteration of County road rights-of-way, as for pipeline construction |

Appendix L - Existing Leases

GM-UNC-GUNNISON LEASES

| SEQ NUM | DISTRICT_1 | LEASE_NO | COUNTY_1 | T_1 | R_1 | SECTIONS_1 | STAT | TOT_AC | EFF_DATE | TERM | HELD |
|--------------------|----------------|------------|----------|------|-----|---------------------|------|---------|----------|------|------|
| 1 | Collbran | C-04461 | Delta | 10S | 91W | 2,3,4,10,11,14 | PD | 2220.00 | 19681101 | P | Held |
| 2 | Collbran | C-10679 | Mesa | 9S | 93W | 34,34 | PD | 1621.72 | 19700501 | P | Held |
| 3 | Collbran | C-12359 | Mesa | 11S | 94W | 3,4 | PD | 2274.46 | 19710401 | P | Held |
| 4 | Collbran | C-12552 | Mesa | 10S | 94W | 28,29,31-34 | PD | 2448.21 | 19710601 | P | Held |
| 5 | Collbran | C-13547 | Mesa | 11S | 96W | 3,14-18 | PD | 2369.83 | 19711001 | P | Held |
| 6 | Collbran | C-14169 | Mesa | 9S | 92W | 13:N2SE; 14:ALL; | PD | 2080.00 | 19711101 | P | Held |
| 7 | Collbran | C-2384 | Mesa | 9S | 93W | 35,36 | PD | 2174.89 | 19671001 | P | Held |
| 8 | Collbran | C-2385 | Mesa | 10S | 93W | 3,7,8,10,12,17,18 | PD | 2363.60 | 19671101 | P | Held |
| 9 | Collbran | C-26357 | Mesa | 10S | 94W | 23,27,34-36 | PD | 2527.36 | 19710501 | P | Held |
| 10 | Collbran | C-30029 | Gunnison | 9S | 92W | 17:N2, N2SW, NWSE | PD | 440.00 | 19860601 | 10 | |
| 11 | Collbran | C-30461 | Mesa | 9S | 91W | 33:ALL; 34:NW, S2 | PD | 1120.00 | 19810801 | P | Held |
| 12 | Collbran | C-30463 | Delta | 10S | 91W | 10:S2N2; 14:S2N2 | PD | 320.00 | 19811001 | P | Held |
| 13 | Collbran | C-30486 | Mesa | 10S | 94W | 15,16,22 | PD | 1124.70 | 19810601 | 10 | |
| 14 | Collbran | C-31558 | Mesa | 8.5S | 93W | 6:LTS 1-4 | PD | 223.80 | 19810701 | 10 | |
| 15 | Collbran | C-31559 | Garfield | 8W | 94W | 1,2,11,12 | PD | 1140.72 | 19810701 | 10 | |
| 16 | Collbran | C-34935 | Mesa | 10S | 92W | ALL OF HES 283 | PD | 158.57 | 19830701 | 10 | |
| 17 | Collbran | C-35530 | Mesa | 11S | 96W | 9,10,16,17,20 | PD | 798.15 | 19830301 | P | Held |
| 18 | Collbran | C-36211 | Mesa | 8S | 93W | 25,36 | PD | 198.08 | 19830401 | 10 | |
| 19 | Collbran | C-36484 | Mesa | 10S | 92W | 5-8: ALL | PD | 1691.00 | 19830701 | 10 | |
| 20 | Collbran | C-36491 | Garfield | 8S | 94W | 13,24,25 | PD | 1500.70 | 19830701 | 10 | |
| 21 | Collbran | C-36500 | Garfield | 8S | 35W | 13,14,15 | PD | 1263.70 | 19830801 | 10 | |
| 22 | Collbran | C-37569 | Mesa | 8S | 92W | 19,20,29,32,33 | PD | 3516.24 | 19840301 | 10 | |
| 23 | Collbran | C-38259 | Mesa | 11S | 95W | 4: SESE | PD | 40.00 | 19840401 | 10 | |
| 24 | Collbran | C-38994 | Mesa | 11S | 94W | 13,14,23-27 | PD | 3677.05 | 19840901 | 10 | |
| 25 | Collbran | C-39769 | Mesa | 10S | 91W | 10: S2 | PD | 320.00 | 19850701 | P | Held |
| 26 | Collbran | C-39801 | Mesa | 11S | 96W | 19,29-33 | PD | 3259.66 | 19850201 | 10 | |
| 27 | Collbran | C-41560 | Mesa | 11S | 92W | 1,4,7-9,12,17,18,27 | PD | 7271.00 | 19851001 | 10 | |
| 28 | Collbran | C-41567 | Mesa | 11S | 95W | 7,18 | PD | 2529.17 | 19851001 | 10 | |
| 29 | Collbran | C-42906 | Mesa | 10S | 93W | 23,27,34: ALL | PD | 1920.00 | 19860801 | 10 | |
| 30 | Collbran | C-43470 | Mesa | 10S | 92W | ALL OF HES 283 | PD | 1131.52 | 19870301 | 10 | |
| 31 | Collbran | C-43983 | Delta | 11S | 96W | 13: LTS 1-8; | PD | 962.53 | 19870301 | 10 | |
| 32 | Collbran | C-44371 | Mesa | 10S | 93W | 15,21,22 | PD | 1027.12 | 19870301 | 10 | |
| 33 | Collbran | C-45496 | Mesa | 11S | 95W | 4: SENW | PD | 40.00 | 19871001 | 10 | |
| 34 | Collbran | C-45874 | Mesa | 10S | 92W | 29-32: ALL | PD | 2206.00 | 19871001 | 10 | |
| 35 | Collbran | C-45876 | Mesa | 10S | 93W | 24-26,35,36: ALL | PD | 3913.10 | 19871001 | 10 | |
| 36 | Collbran | C-46739 | Mesa | 8S | 94W | 14,15,22,23,25 | PD | 2600.00 | 19871001 | 10 | |
| 37 | Collbran | C-47282 | Mesa | 8.5S | 94W | 3,4,5,6 | PD | 69.46 | 19880701 | 5 | |
| 38 | Collbran | C-47287 | Mesa | 9S | 95W | 9,10,17,18 | PD | 2541.44 | 19880601 | 5 | |
| 39 | Collbran | C-47288 | Mesa | 9S | 95W | 2-6 | PD | 1740.04 | 19880601 | 5 | |
| 40 | Collbran | C-52806 | Mesa | 8S | 93W | 23-26,35 | PD | 2324.89 | 19810601 | | |
| 41 | Collbran | C-52807 | Mesa | 8.5S | 93W | 1: LT 1, 2: LT1-4 | PD | 200.60 | 19810601 | | |
| 42 | Collbran | C-52810 | Mesa | 8S | 94W | 1-36 ALL | PD | 640.00 | 19880405 | | |
| 43 | Collbran | C-53972 | Garfield | 7S | 94W | 24-26 | PD | 230.57 | 19810701 | | |
| *DISTRICT_1 total. | | 43 Records | | | | | | | | | |
| 44 | Grand Junction | C-13509 | Delta | 12S | 94W | 8,11,19-21,28 | PD | 2468.84 | 19711101 | P | Held |
| 45 | Grand Junction | C-13562 | Mesa | 9S | 90W | 20,21,27,28: ALL | PD | 2560.00 | 19711101 | P | Held |
| 46 | Grand Junction | C-13563-A | Delta | 12S | 94W | 12,13,14: ALL | PD | 1920.00 | 19711001 | P | Held |
| 47 | Grand Junction | C-13710 | Mesa | 12S | 97W | | PD | 1787.19 | 19711101 | P | Held |
| 48 | Grand Junction | C-37570 | Delta | 12S | 92W | 6: ALL; 7: ALL | PD | 1548.87 | 19840301 | 10 | |

GM-UNC-GUNNISON LEASES

| SEQ NUM | DISTRICT_1 | LEASE_NO | COUNTY_1 | T_1 | R_1 | SECTIONS_1 | STAT | TOT_AC | EFF_DATE | TERM | HELD |
|-------------------------------|----------------|----------|------------|-----|-----|-------------------------|------|---------|----------|------|------|
| 49 | Grand Junction | C-38004 | Delta | 11S | 94W | 32: NE, E2NW, N2SE, | PD | 900.55 | 19840301 | 10 | |
| 50 | Grand Junction | C-39787 | Delta | 12S | 94W | 22-27, 34-36 | PD | 2511.44 | 19850201 | 10 | |
| 51 | Grand Junction | C-41292 | Delta | 12S | 94W | 3: LTS 5-8, S2N2, S2 | PD | 653.62 | 19860601 | P | Held |
| 52 | Grand Junction | C-41568 | Delta | 12S | 95W | 10, 15, 22: ALL | PD | 1871.36 | 19880801 | 10 | |
| 53 | Grand Junction | C-41571 | Mesa | 12S | 97W | 16: NWNW | PD | 40.00 | 19851001 | 10 | |
| 54 | Grand Junction | C-43224 | Delta | 12S | 93W | 16, 19: ALL | PD | 1280.00 | 19861201 | 10 | |
| 55 | Grand Junction | C-43290 | Montrose | 48W | 16W | 1: LTS 1-16, N2S2; | PD | 1406.48 | 19861001 | 10 | |
| 56 | Grand Junction | C-46752 | Mesa | 12S | 97W | 1-4, 10-14, 24: ALL | PD | 5800.80 | 19880301 | 10 | |
| 57 | Grand Junction | C-46987 | Delta | 12S | 95W | 11-14, 23-36 | PD | 9513.75 | 19880401 | 10 | |
| 58 | Grand Junction | C-47812 | Montrose | 48N | 16W | 2-5, 11 | PD | 2489.08 | 19881001 | 10 | |
| 59 | Grand Junction | C-48457 | Delta | 12S | 94W | 17, 18 | PD | 713.25 | 19881101 | 10 | |
| 60 | Grand Junction | C-48458 | Delta | 11S | 94W | 33: ALL | PD | 490.93 | 19881101 | 10 | |
| 61 | Grand Junction | C-48459 | Delta | 12S | 94W | 4, 5, 6, 7, 8 | PD | 1985.92 | 19881101 | 10 | |
| 62 | Grand Junction | C-48460 | Delta | 12S | 95W | 4, 5, 6, 7, 8 | PD | 2359.04 | 19881101 | 10 | |
| *DISTRICT_1 total. 19 Records | | | | | | | | | | | |
| 63 | Norwood | C-34425 | Montrose | 47N | 13W | 7, 17, 21, 27, 29 | PD | 2800.00 | 19820901 | 10 | |
| 64 | Norwood | C-36265 | Montrose | 46N | 13W | 17, 18, 21, 28, 33 | PD | 1202.00 | 19830401 | 10 | |
| 65 | Norwood | C-36598 | San Miguel | 43N | 13W | 7, 16, 22, 27, 28, 34 | PD | 2480.04 | 19830601 | 10 | |
| 66 | Norwood | C-36599 | San Miguel | 44N | 13W | 27, 33, 34 | PD | 1961.69 | 19840401 | 10 | |
| 67 | Norwood | C-37102 | San Miguel | 43N | 13W | 15: NESE; 17: SENE | PD | 80.00 | 19830701 | 10 | |
| 68 | Norwood | C-37105 | San Miguel | 44N | 14W | 10, 11, 12, 13, 33 | PD | 2600.00 | 19830701 | 10 | |
| 69 | Norwood | C-38074 | San Miguel | 43N | 13W | 17: SWNE | PD | 40.00 | 19840301 | 10 | |
| 70 | Norwood | C-39123 | San Miguel | 43N | 13W | 3: SW; 10, NENE, | PD | 360.00 | 19840901 | 10 | |
| 71 | Norwood | C-40038 | Montrose | 46N | 13W | 22, 23, 24, 30, 34 | PD | 1980.00 | 19850401 | 10 | |
| 72 | Norwood | C-41003 | Montrose | 46N | 12W | 20-22, 24-26, 28, 33-36 | PD | 4390.00 | 19850801 | 10 | |
| 73 | Norwood | C-41016 | Montrose | 47N | 14W | 7, 8, 17, 18, 20, 21 | PD | 1744.61 | 19850701 | 10 | |
| 74 | Norwood | C-41651 | Montrose | 46N | 13W | 24, 27 | PD | 920.00 | 19851001 | 10 | |
| 75 | Norwood | C-41652 | Montrose | 46N | 13W | 7: LTS 1-4, E2W2, SE | PD | 481.00 | 19851001 | 10 | |
| 76 | Norwood | C-42253 | Montrose | 47N | 14W | 17, 18, 34 | PD | 1282.83 | 19860301 | 10 | |
| 77 | Norwood | C-42985 | Montrose | 48N | 15W | 34: W2 | PD | 332.00 | 19861001 | 10 | |
| 78 | Norwood | C-43555 | San Miguel | 42N | 16W | 4-7, 9 | PD | 1681.37 | 19861201 | 10 | |
| 79 | Norwood | C-45589 | San Miguel | 44N | 13W | 14, 15, 23, 26 | PD | 1360.00 | 19871001 | 10 | |
| 80 | Norwood | C-45590 | Montrose | 46N | 13W | 1-6, 13, 14 | PD | 1680.11 | 19871001 | 10 | |
| 81 | Norwood | C-45593 | Montrose | 48N | 15W | 8, 9, 15, 16, 23, 24 | PD | 1760.00 | 19871001 | 10 | |
| 82 | Norwood | C-45973 | San Miguel | 42N | 12W | 18, 19, 20 | PD | 2548.28 | 19871001 | 10 | |
| 83 | Norwood | C-47875 | Montrose | 47N | 15W | 3, 6, 7, 10, 11, 14 | PD | 972.47 | 19881201 | 10 | |
| 84 | Norwood | C-48334 | San Miguel | 44N | 13W | 4, 5, 6, 9 | PD | 2574.15 | 19881101 | 10 | |
| 85 | Norwood | C-53998 | Montrose | 47N | 15W | 13: SW4SW4, E2SE4 | PD | 120.00 | 19870901 | 10 | |
| *DISTRICT_1 total. 23 Records | | | | | | | | | | | |
| 86 | Paonia | C-13483 | Gunnison | 11S | 90W | 16-20 | PD | 1866.35 | 19711101 | P | Held |
| 87 | Paonia | C-13484 | Gunnison | 11S | 90W | 3, 4, 8, 9, 14, 15 | PD | 2401.86 | 19711101 | P | Held |
| 88 | Paonia | C-13561 | Mesa | 9S | 90W | 29, 32, 33, 34: ALL | PD | 2560.00 | 19711101 | P | Held |
| 89 | Paonia | C-13572 | Gunnison | 10S | 90W | 8, 9, 17, 20 | PD | 1600.00 | 19711001 | P | Held |
| 90 | Paonia | C-13573 | Delta | 10S | 91W | 12, 13, 24, 25: ALL | PD | 2558.00 | 19711101 | P | Held |
| 91 | Paonia | C-13599 | Gunnison | 10S | 90W | 4, 5, 6, 7: ALL | PD | 2069.00 | 19711101 | P | Held |
| 92 | Paonia | C-13600 | Gunnison | 10S | 90W | 18, 19, 30: ALL | PD | 2069.00 | 19711001 | P | Held |
| 93 | Paonia | C-13601 | Gunnison | 10S | 90W | 27:E2; 28:E2; 29:E2 | PD | 2496.00 | 19711001 | P | Held |
| 94 | Paonia | C-13602 | Gunnison | 10S | 90W | 31: E2; 32: E2 | PD | 962.00 | 19711001 | P | Held |

GM-UNC-GUNNISON LEASES

| SEQ NUM | DISTRICT_1 | LEASE_NO | COUNTY_1 | T_1 | R_1 | SECTIONS_1 | STAT | TOT_AC | EFF_DATE | TERM | HELD |
|--------------------|--------------|-------------|----------|-----|-----|----------------------|------|-----------|----------|------|------|
| 95 | Paonia | C-13627 | Mesa | 10S | 91W | 1,36: ALL | PD | 722.00 | 19711101 | P | Held |
| 96 | Paonia | C-13934 | Gunnison | 10S | 90W | 1,2,3,10,13 | PD | 1793.01 | 19711101 | P | Held |
| 97 | Paonia | C-13935 | Gunnison | 10S | 90W | 11-16 | PD | 2480.00 | 19711101 | P | Held |
| 98 | Paonia | C-14829 | Gunnison | 9S | 90W | 36: N2, N2S2 | PD | 471.00 | 19720301 | P | Held |
| 99 | Paonia | C-16076 | Gunnison | 11S | 90W | 7, 10 | PD | 677.95 | 19720801 | P | Held |
| 100 | Paonia | C-16186 | Gunnison | 10S | 90W | 34, 35 | PD | 676.10 | 19720701 | P | Held |
| 101 | Paonia | C-16187 | Gunnison | 10S | 90W | 21, 22, 25, 26 | PD | 1914.85 | 19720701 | P | Held |
| 102 | Paonia | C-16188 | Gunnison | 10S | 90W | 13,14,23,24 | PD | 2234.26 | 19720701 | P | Held |
| 103 | Paonia | C-24432 | Gunnison | 10S | 90W | 34,35 | PD | 77.70 | 19810601 | P | Held |
| 104 | Paonia | C-30459 | Gunnison | 10S | 90W | 25:SWNE, NWNW, S2NW; | PD | 480.00 | 19820301 | P | Held |
| 105 | Paonia | C-30465 | Delta | 10S | 91W | 20-23, 26-30: ALL | PD | 5814.00 | 19810501 | P | Held |
| 106 | Paonia | C-30890 | Gunnison | 10S | 90W | 1: LTS 1,2,5,6,W2SE | PD | 532.15 | 19830801 | P | Held |
| 107 | Paonia | C-39762 | Gunnison | 9S | 89W | 21,22,27-34 | PD | 3150.21 | 19850301 | 10 | |
| 108 | Paonia | C-42314 | Gunnison | 11S | 90W | 8: SWNE,NW,SENE,N2NE | PD | 320.00 | 19711101 | P | Held |
| 109 | Paonia | C-42520 | Gunnison | 10S | 89W | 6,7,17-20,29-32 | PD | 4033.07 | 19860301 | 10 | |
| 110 | Paonia | C-43457 | Gunnison | 11S | 89W | 10,11,12,13 | PD | 2520.00 | 19870101 | 10 | |
| 111 | Paonia | C-43458 | Gunnison | 12S | 89W | 24: S2; 25: ALL; | PD | 1280.00 | 19870101 | 10 | |
| 112 | Paonia | C-43972 | Delta | 11S | 91W | 32: ALL; 33: ALL | PD | 1229.00 | 19870301 | 10 | |
| 113 | Paonia | C-44948 | Gunnison | 10S | 89W | 33, 34: ALL | PD | 2105.08 | 19870601 | 10 | |
| 114 | Paonia | C-44951 | Delta | 12S | 91W | 30: ALL; 31: ALL | PD | 1770.66 | 19870601 | 10 | |
| 115 | Paonia | C-45870 | Gunnison | 10S | 89W | 27: ALL; 28: ALL | PD | 1280.00 | 19871001 | 10 | |
| 116 | Paonia | C-45871 | Gunnison | 11S | 89W | 1: LTS 1-12, S2 | PD | 551.35 | 19871001 | 10 | |
| 117 | Paonia | C-46730 | Gunnison | 9S | 90W | 25: S2S2 | PD | 153.50 | 19880401 | 10 | |
| 118 | Paonia | C-46969 | Gunnison | 13S | 89W | 12,13,14,23: ALL | PD | 2560.00 | 19880401 | 10 | |
| 119 | Paonia | C-46975 | Delta | 11S | 92W | 2,3,10,11,13-15, | PD | 7794.00 | 19880501 | 10 | |
| 120 | Paonia | C-54334 | Gunnison | 11S | 89W | 21,22,27,28,33 | PD | 2360.00 | 19810601 | 10 | |
| 121 | Paonia | C-54335 | Gunnison | 11S | 90W | 1:LTS 1-16,E2SW,W2SE | PD | 800.00 | 19810601 | 10 | |
| *DISTRICT_1 total. | | 36 Records | | | | | | | | | |
| 122 | Taylor River | C-46968 | Gunnison | 14S | 86W | 28, 29, 32, 33 | PD | 2360.00 | 19880401 | 10 | |
| *DISTRICT_1 total. | | 1 Records | | | | | | | | | |
| Grand Total. | | 122 Records | | | | | | 220593.65 | | | |

**Appendix M -
Oil and Hazardous Spills
Contingency Plan**

OIL AND HAZARDOUS SPILLS CONTINGENCY PLAN
FOR THE
GRAND MESA, UNCOMPAHGRE AND GUNNISON NATIONAL FORESTS

A. Introduction

This plan is for use by all Forest and District personnel who may encounter a spill situation. The primary emphasis will be on safety by alerting personnel to the hazards of known and unknown spill materials. Personnel will not be expected to take any direct action in controlling, neutralizing or cleaning up spills. Their primary responsibilities will be:

1. Safeguarding themselves and others by providing for a safe security area at a spill site.
2. Contacting appropriate officials and communicating pertinent information about the situation.

Following are specific definitions:

Spill or Discharge - includes, but is not limited to, any spilling, leaking, pumping, pouring, emitting, emptying or dumping of oil or hazardous materials.

Oil - means oil of any kind or in any form, including, but not limited to, petroleum, fuel oil, sludge, oil refuse, and oil mixed with wastes other than dredged spoil. Any amount constitutes a reportable spill.

Hazardous Material - means any material of any description or origin (other than petroleum related products) which, when discharged into any waters of the State, present an imminent and substantial hazard to public health or welfare, fin-fish, shellfish, or other wildlife and shorelines and shall include all materials so designated by the EPA in their comprehensive hazardous substance list.

The amount of material spilled or discharged that constitutes a hazard varies widely depending on the chemical properties. Therefore, all spills or discharges will be reported and the determination of hazard and response will be made by the EPA Regional On-Scene-Coordinator at the time a report is made.

Chemicals dumped on the ground, remote from surface water also constitute a hazard and must be reported.

On-Scene-Coordinator - the Federal official pre-designated by the EPA or the U.S. Coast Guard to coordinate and direct the Federal response to spill and discharge removal efforts at the scene of a discharge.

B. Personnel Assignment and Responsibilities

All Forest and District personnel are expected to take prudent action upon discovery of a spill at any time or location. On non-National Forest System lands, when an On-Scene-Coordinator is assigned or arrives, responsibility for further involvement will be terminated, except for requested assistance that can be reasonably and safely performed within the scope of the employee's authority. On National Forest System lands along with the above, the District will be responsible for either interim or final reports covering cleanup and restoration or rehabilitation of the site. Other responsible agencies such as Division of Wildlife or Water Associations will be responsible for assessing or collecting damages within the scope of their authority.

As no personnel is expected to take direct action in handling spilled material, no specific training is deemed necessary. It is recommended that all units include and document a review of this plan at least annually at a unit meeting. Also, it is recommended that verification of the presence of an "Oil and Hazardous Material Spill Report Information Check List" in vehicle log books be made part of annual WCF vehicle inspections.

C. Hazards and Resources

This Forest has very high possibilities for hazardous spill situations because of many major traffic routes, certain dangerous pass crossings and large amounts of hazardous cargos. Specific vulnerable areas are Monarch Pass, Cochetopa Canyon and Pass, Blue Mesa Pass, Cerro Summit, Black Mesa, Red Mountain, Unaweep Canyon, McClure Pass and Plateau Creek Canyon. Generally steep stream gradients of Forest streams and significantly high precipitation conditions present the threat of rapid transport of hazardous materials an appreciable distance from spill sites. Consequently, speedy communication and handling of all spill incidents is important.

The primary initial response point will be either the local County Sheriff or State Highway Patrol station. Contacts should be made directly to these points or relayed through the Ranger District or Supervisor's Office.

D. Operational Response

Following are actions or procedures to be followed upon discovery of a spill incident:

1. Provide emergency first aid or rescue that can be done without serious personal self endangerment.
2. Read and follow instructions on the "Oil and Hazardous Spills Report" document which will be contained in the vehicle log book.
3. Provide for security of the spill area to control public access except for authorized personnel.
4. Follow up on contacts to insure that responsible officials have been notified and are responding.

Appendix N - Biological Assessment

**GRAND MESA, UNCOMPAHGRE AND GUNNISON NATIONAL FORESTS
OIL AND GAS LEASING ENVIRONMENTAL IMPACT STATEMENT
BIOLOGICAL ASSESSMENT
FOR
THREATENED, ENDANGERED, AND PROPOSED SPECIES**

Prepared by: *Thomas M. Holland 3/12/93*
THOMAS M. HOLLAND
Forest Wildlife Biologist

Prepared by: *John J. Cameron 3/12/93*
JOHN J. CAMERON
Forest Fisheries Biologist

Received by: *Robert L. Storch 3/12/93*
ROBERT L. STORCH
Forest Supervisor

Biological Assessment

Introduction

The Environmental Impact Statement for Oil and Gas Leasing on the Grand Mesa, Uncompahgre, and Gunnison National Forests must include a Biological Assessment to determine what effect, if any, oil and gas leasing will have on any threatened, endangered, or proposed species that may occur within the area under analysis. To properly do this, a species list must be requested of the U.S. Fish and Wildlife Service (USFWS) which identifies any threatened, endangered, or proposed species that may occur in the area of consideration. This list was requested by the Forest Service and was received on July 1, 1992 (Appendix 1) from the USFWS.

The Forest Service must prepare a biological assessment to determine whether any threatened, endangered, or proposed species are likely to be adversely affected by the proposed action. 50 CFR 402.12.

The Draft Oil and Gas Environmental Impact Statement for the Grand Mesa, Uncompahgre, and Gunnison National Forests was completed in August of 1992. A Final Oil and Gas Environmental Impact Statement will be released in March of 1993.

The objective of this biological assessment is to serve as a document for disclosure of potential impacts on threatened, endangered, and proposed species or their habitat as a result of oil and gas leasing and to help identify potential impacts to wildlife from all phases of oil and gas activity that could occur at a later date. This assessment is based on existing information in the EIS, current research findings for the species involved, and existing data on the Grand Mesa, Uncompahgre and Gunnison National Forests.

All oil and gas development and production activities are subjected to the provisions of the Endangered Species Act. To comply with these provisions and requirements, all oil and gas activities would be evaluated first for species occurrence and secondly for the potential effects on any threatened, endangered, or proposed species at the operational stage (Application for Permit to Drill-APD) on a case by case basis, rather than at the leasing stage. However, at the ADP stage a "may affect" situation will automatically arise for the endangered Colorado River fishes because the U.S. Fish and Wildlife Service has determined that any depletion of water in the Colorado River Basin will further endanger these listed fish species.

Definitions (16 U.S.C. 1532)

Critical Habitat: that habitat which is essential to the conservation of a threatened or endangered species (There is no designated critical habitat anywhere within the National Forest lands covered in this analysis- FWS letter of July 1992).

Endangered Species: a species which is in danger of extinction throughout all or a significant portion of its range.

Proposed: any species proposed for listing as an threatened or endangered species by the U.S. Fish and Wildlife Service.

Species: includes any sub-species of fish, wildlife, or plants and any distinct segment of any vertebrate species of fish or wildlife which interbreeds when mature.

Threatened Species: a species that is likely to become endangered within the foreseeable future.

Project Description

The EIS documents the analysis of five alternatives developed for possible management of oil and gas leasing on approximately 1/3 of the 3 million acres administered as the Grand Mesa, Uncompahgre and Gunnison National Forest. Alternatives include: 1) Current management (specified in the current Forest Plan); 2) leasing approximately 125,980 acres under Standard Lease Terms, 687,200 acres under supplemental stipulations, and the discretionary removal of 138,270 acres from leasing; 3) No new leasing Forest-wide; 4) leasing the entire analysis area under Standard Lease Terms; 5) the same as alternative 2 with the exception that all Roadless Areas and Semi-primitive Non-motorized Areas (3A Management Areas) would be No Lease. The analysis area covered in this EIS includes those areas of high and moderate potential for oil and gas resources and those areas of low and no known potential for oil and gas resources that are currently leased. The analysis area contains approximately 951,450 acres and the lease options by alternatives are described in the following table:

| ACRES OF LEASE OPTIONS BY ALTERNATIVE | | | | | | | | | | |
|---|----------------------|----------|----------------------|----------|----------------------|----------|----------------------|----------|----------------------|----------|
| LEASE OPTIONS | Alternative 1 | | Alternative 2 | | Alternative 3 | | Alternative 4 | | Alternative 5 | |
| | Acres* | % | Acres* | % | Acres* | % | Acres* | % | Acres* | % |
| No Lease (NL) | 0 | 0 | 138,270 | 15 | 951,450 | 100 | 0 | 0 | 349,150 | 37 |
| No Surface Occupancy (NSO) | 58,400 | 6 | 151,835 | 16 | 0 | 0 | 0 | 0 | 78,350 | 8 |
| Controlled Surface Use (CSU) | 463,600 | 49 | 215,170 | 23 | 0 | 0 | 0 | 0 | 130,250 | 14 |
| Controlled Surface Use & Timing Limitations | 202,350 | 21 | 239,755 | 25 | 0 | 0 | 0 | 0 | 202,950 | 21 |
| Timing Limitations (TL) | 81,600 | 9 | 80,440 | 8 | 0 | 0 | 0 | 0 | 77,950 | 8 |
| Standard Lease Terms (SLT) | 145,500 | 15 | 125,980 | 13 | 0 | 0 | 951,450 | 100 | 112,800 | 12 |

* Analysis area = 951,450 acres.

Alternative two is the proposed action as identified in the Final Environmental Impact Statement. All of the alternatives will result in the potential development of oil and gas resources. All alternatives are subject to compliance with Forest Plan Standards and Guidelines or guidelines established in this Biological Assessment. The Reasonably Foreseeable Development Scenario (RFD) predicts the level of

oil and gas exploration and development which will occur on the Forest in the next 15 years. Under this RFD the projected well distribution on the Forest is expected to be:

- 12 on the Grand Mesa N.F
- 12 on the Gunnison N.F.
- 3 on the Uncompahgre N.F.
- 20 wells on areas already under Unit Agreement.
- Forty-seven (47) wells are projected on the Forest over the next 15 years.
- Only seven (7) wells are predicted to be drilled on new leases.
- A typical well will physically disturb approximately 10.7 acres, and will utilize 0.1 ac. ft. of water.
- Total projected ground disturbance is estimated to be 503 acres.

Threatened, Endangered and Proposed Species in the Area

All oil and gas activities are subject to the provisions of the Endangered Species Act. To comply with the requirements of the Endangered Species Act, all oil and gas activities would be cleared for species occurrence, prior to ground disturbance at the operational stage (APD) on a case by case basis, rather than at the leasing stage. Oil and gas exploration and development has the potential to adversely affect threatened, endangered, and proposed plant and animal species on the Forest unless species and their habitat are protected where they are known to occur, and provisions are made to protect new populations, new species, and new habitat when located. Threatened, endangered, and proposed species are protected by law, regardless of lease stipulations. Where future biological assessments indicate that these species could be adversely affected, appropriate measures will be required to prevent impacts on any of these species.

The following species are either found on these Forests or habitat exists that may be suitable for these species (U.S. Fish and Wildlife Service Letter dated June 29, 1992):

Endangered

| | |
|---------------------------|--|
| Peregrine falcon | <i>(Falco peregrinus)</i> |
| Bald eagle | <i>(Haliaeetus leucocephalus)</i> |
| Black-footed ferret | <i>(Mustela nigripes)</i> |
| Spineless hedgehog cactus | <i>(Echinocereus triglochidiatus var. inermis)</i> |

The following species of fish are not found on National Forest lands, however they are found downstream in the main Colorado River. These species are:

| | |
|--------------------|-------------------------------|
| Colorado squawfish | <i>(Ptychocheilus lucius)</i> |
| Humpback chub | <i>(Gila cypha)</i> |
| Bonytail chub | <i>(Gila elegans)</i> |
| Razorback sucker | <i>(Xyrauchen texanus)</i> |

Threatened

Ute ladies'-tresses orchid

*(Spiranthes diluvialis)***Proposed**

Mexican spotted owl

(Strix occidentalis lucida)

(Proposed for listing as a threatened species on Nov. 4, 1991 by the USFWS)

The gray wolf (*Canis lupis*) and the grizzly bear (*Ursus arctos*), both endangered species, were not included in the species list letter from the USFWS on June 29, 1992 for this analysis area. Neither species has been documented within the analysis area in recent times although reports of these species occasionally occur. Both of these species are indigenous to the area and suitable habitat still exists for the gray wolf and grizzly bear. These species will not be discussed in this Biological Assessment, but future Assessments written at the time a proposal for oil and gas activity is received may include these species if sightings have occurred in that area or if re-introductions have taken place.

| |
|---|
| <p>Threatened and Endangered Species Surveys Completed or Proposed</p> |
|---|

Peregrine Falcon

The U.S. Fish and Wildlife Service (letter dated June 29, 1992) identifies a confirmed peregrine falcon eyrie in the vicinity of Joe Davis Hill. This eyrie is not on National Forest System lands. The portion of the Uncompahgre National Forest adjacent to this area is administered by the San Juan National Forest. Crested Butte, South Saddle Mountain, and the entire Gunnison Curecanti National Recreation Area are listed as potential peregrine falcon habitat. Peregrine falcon surveys will be conducted in these areas in the spring of 1993 to determine if any peregrine falcon activity is occurring.

Bald Eagle

Nesting surveys specifically designed for bald eagles have not been conducted because there has been no recent nesting activity documented on these Forests. Bald eagle surveys are planned for early next summer on Grand Mesa where high quality habitat exists for nesting bald eagles. Occasional sightings of bald eagles occur on the Forest during the summer breeding season but no nests have been found. Bald eagle wintering sites will be mapped this winter in an effort to determine more accurately where concentration areas might exist. Bald eagles are known to winter along all major rivers and streams that remain ice free in southwestern Colorado. Wintering bald eagles are quite numerous on big game winter ranges within the analysis area.

Black-footed Ferret

No surveys have been conducted for black-footed ferrets on the Forests. There have not been any verified sightings of ferrets in recent history in this area. Most of the Grand Mesa, Uncompahgre and Gunnison National Forests are too high in elevation to support prairie dog colonies which are essential for black-footed ferrets. All known prairie dog colonies will be mapped so that potential black-footed ferret habitat can be assessed. At this time there does not appear to be any active prairie dog colonies directly on National Forest System lands. However, several prairie dog colonies are located immediately

adjacent to the National Forest. No black-footed ferrets are known to occur on any of these sites at the present time.

Endangered Fish

No surveys have been conducted for the Colorado squawfish, humpback chub, bonytail chub or the razorback sucker because none of these species are known to occur on National Forest System lands. They are being discussed only as "off site" species that could be affected by the depletion of water from the upper Colorado River caused by any activity which depletes water resources. These fish are found in the main Colorado River downstream from the oil and gas leasing area.

Spineless Hedgehog Cactus

This plant species is known to exist on Grand Mesa and may possibly occur on the Uncompahgre Plateau. While some site locations are known, there have been no broad area surveys conducted for this species. Most inventories have been conducted in conjunction with site specific project proposals. Inventories on this plant species will continue to be project related because of the extremely large area where this species may occur.

Ute Ladies'-tresses Orchid

This species was listed as a threatened species on January 17, 1992. It is believed to be found more on the eastern slope of the Rocky Mountains in Colorado than in Western Colorado. However, since so little is known about this species efforts will be made to inventory this species in conjunction with surveys for the spineless hedgehog cactus. All known sites for this species are near major streams or along abandoned meanders, where ample subsurface water percolates through the stream gravels underlying lush meadows. At some locations the orchid actually grows in running water (Colorado Native Plant Society 1989). The Ute ladies'-tresses is found only at elevations less than 6,500 feet (personal communication USFWS 12/4/92).

Mexican Spotted Owl

Intensive surveys have been conducted on the Forests for this owl during the 1990 and 1991 nesting seasons. No Mexican spotted owls were found and no responses to calling was heard during these surveys. Surveys were concentrated on the Uncompahgre Plateau and on the Naturita Division of the Uncompahgre National Forest. Potential Mexican spotted owl habitat has been identified and mapped in these areas as a result of these surveys and through literature searches of optimum habitat. Efforts were concentrated in these areas because Mexican spotted owls are known to occur on adjacent areas on the Manti-La Sal and San Juan National Forest areas, and these areas typify preferred Mexican spotted owl Habitat.

Additional Species

The potential exists that additional species may be listed, or species already listed but not known to occur in this area at the present time, will be found here between the time of this writing and the time an APD is received. This situation will result in the necessity to conduct additional inventories to document the presence or absence of these plant or animal species. These inventories will be conducted prior to issuance of an APD in all areas affected by the proposed action. Provisions in the oil and gas lease will provide for requiring inventories to relocate oil and gas activities to avoid threatened, endangered, and proposed listed Federal species of plants and animals.

Background Information on Threatened and Endangered Species in the Area

Peregrine Falcon

The peregrine falcon utilizes the Grand Mesa, Uncompahgre and Gunnison National Forests primarily as a spring and fall migrant. No active nests are known to occur within the area being considered for oil and gas leasing. However, several areas within the analysis area are considered to be suitable peregrine falcon nesting habitat. The peregrine falcon is generally associated with larger valleys that contain high cliffs suitable for nesting. Valleys are used by the peregrine for preying on small birds and waterfowl.

Peregrine falcons feed almost entirely on birds (Hickey ed. 1969), and it is highly likely that peregrines frequent Forest stream and river bottoms and riparian zones in search of prey during their spring and fall migration. It is also important to note that there are several active eyries on Bureau of Land Management, National Park Service and private lands near or adjacent to the Grand Mesa, Uncompahgre and Gunnison National Forests. Peregrine falcons begin nesting activity in March and continue into July. The peregrine falcon is sensitive to human disturbance activities at or near its nesting site.

Bald Eagle

Bald eagles utilize the Grand Mesa, Uncompahgre and Gunnison National Forests primarily as a spring and fall migrant and as a winter resident. During migration, the bald eagle uses a wide variety of habitats in search of prey or carrion. Big game winter ranges are frequented in the winter and spring where winter killed big game may be abundant. Fall migrants probably utilize streams or lakes where fish are abundant. Winter residents congregate primarily on the larger streams and rivers where open water is abundant. Associated with these feeding areas are winter roost sites where one or more bald eagles congregate. These areas are extremely important to the bald eagles' winter survival rate. At the present time we have no known bald eagle nesting territories within the oil and gas leasing analysis area. It is not unlikely that bald eagles could or will nest in the future on the Forest, particularly in areas like Grand Mesa where an abundance of open water exists. Bald eagles, like peregrine falcons are very sensitive to disturbance from the initiation of courtship to young fledging. This time period is roughly from mid-December to mid or late June. During this time period bald eagles are extremely sensitive to human disturbance activities because nest abandonment and desertion of long established territories may occur.

Black-footed Ferret

The black footed ferret is a carnivore that is mostly nocturnal. It is the only ferret native to North America. Its historical range included the area under analysis in this EIS as its range included both western Colorado and Utah. However, black-footed ferrets are not believed to be present on the Grand Mesa, Uncompahgre and Gunnison National Forests. There have been no documented sightings of ferrets in this area of Colorado. No active prairie dog colonies are known to exist on the Forest at the present time. Prairie dogs are the principal prey source for the ferrets. The black-footed ferret is dependent on prairie dogs and their burrows for food and shelter, respectively. Searches for black-footed ferrets have not been conducted on National Forest System lands because of the low probability of expected occurrence and the lack of active prairie dog colonies. However, if any prairie dog colonies were located on the Forest, ferret searches would be initiated in any area where future management activities might occur.

Endangered Fishes

The endangered status of these fishes can be primarily attributed to the construction and operation of large dams and reservoirs beginning in the 1950's, with subsequent concomitant changes in flow and temperature regimes. In addition, a variety of land-use practices, primarily channelization and lower instream flows eliminated access to historic backwater spawning and nursery areas. The introduction of exotic sportfish species within the basin also exacerbated the decline of the endangered fishes through inter-specific competition and predation. At present, water depletions in the upper Colorado River basin have been recognized as a major adverse impact on remaining populations and their habitats.

The four endangered fishes occur in the Colorado River downstream of the boundary of the Grand Mesa, Uncompahgre and Gunnison National Forests. Information on remnant population locations, important habitats, and life history requirements relevant to the proposed action are as follows:

Colorado squawfish: The Colorado squawfish was listed as Endangered on March 11, 1967. Historic range of the Colorado squawfish included the main channels and major tributaries of the entire Colorado River basin. In the upper basin, squawfish occurred on the Colorado River as far upstream as the town of Rifle, CO. Present distribution of this species is restricted to the upper Colorado River system above Glen Canyon Dam.

In general, Colorado squawfish utilize a variety of riverine habitats with varying depths and velocities. Shoreline, eddy, and main channel areas are extensively used by adult squawfish year-round with pool and backwater habitats seasonally important (Holden and Wick, 1982). Spawning occurs in late June and July when water temperatures have reached 20 degrees C for a few days. In Colorado, insufficient instream flows which lower or dewater backwater habitats during the time period when rearing of squawfish fry and juveniles occur is especially of concern in the 15-mile reach of the Colorado River from Palisade, CO to the confluence with the Gunnison River. Pursuant to the criteria identified in the "Colorado Squawfish Recovery Plan" (U.S. Fish and Wildlife Service, 1991a) downlisting would be considered when the reach from Palisade, CO downstream to Lake Powell on the Colorado River has been documented as maintaining a self-sustaining population.

Bonytail chub: The bonytail chub was listed as Endangered in April, 1980. Historic distribution included the main channels and larger tributaries of the Colorado River system. Present distribution and abundance of the bonytail chub in the Upper Colorado River Basin has been described by Holden and Stalnaker (1975a) and Tyus et al (1982a, 1987). The upper limit of bonytail distribution on the Colorado River is the Black Rocks area of Ruby Canyon (Kaeding et al, 1986). Juvenile bonytails have been collected from Desolation Canyon (Green River) and Cataract Canyon (Colorado River); Holden (1978); Valdez (1988). Bonytail recruitment in the upper Colorado River basin has been identified as "nonexistent" or "extremely low" (U.S. Fish and Wildlife Service, 1990).

Habitat requirements and general ecology of the bonytail chub is largely unknown due to only a few individuals which remain in the wild. Miller (1946) reported that the few captures of bonytails in the wild (excluding the lower basin reservoirs) in the past two decades have been in canyons with deep, fast currents. However, the general consensus among researchers is that adult bonytails utilize primarily pool and eddy habitat types with slow currents (Vanicek, 1967; Joseph and Sinning, In: U.S. Fish and Wildlife Service, unpub). No information is available on habitat preferences of juveniles and young-of-year bonytails. Bonytail chub diet consists primarily of aquatic and terrestrial invertebrates. Spawning occurs when river temperatures reach approximately 18 degrees C.

Critical habitat for this species has not been identified due to the absence of information available relative to bonytail reproduction and ecological requirements. The USFWS has ranked the bonytail chub as "5C" or "a high degree of threat and a low recovery potential for a species which is in conflict with some form of economic activity."

Razorback sucker: The razorback sucker was listed as Endangered on October 23, 1991. Historic range of the razorback sucker in the Upper Colorado River basin is similar to that of the bonytail and squawfish but was always more common within the lower basin. At present, razorbacks have been documented in the Green River (below its confluence with the Yampa River), and the mainstem Colorado River upstream from the confluence of the Green River to De Beque, CO (approximately 30 miles upstream of Grand Junction, CO) (Behnke and Benson 1983). In 1991, razorback suckers were collected near Rifle, CO from a gravel pit once hydrologically connected to the Colorado River (K. Rose, pers. comm.).

Unique morphological characteristics of the razorback sucker suggest it is adapted to a large riverine system with turbulent flows. However, in the upper Colorado River basin the majority of razorback captures have been in low velocity, off-channel areas in low gradient reaches. Food consists primarily of small invertebrates and organic debris on the bottom. Spawning occurs within low velocity backwaters over gravel substrate where predation by non-native fish species may contribute to low survival. Spawning occurs when river temperatures range from 12-16 degrees C.

A "Recovery Plan" for this species which will identify critical habitat has not yet been approved by USFWS. With the exception of the bonytail chub, the razorback is the rarest of the remaining Colorado River endangered fishes. Almost no recruitment within existing senile populations has been documented since the mid 1960's.

Humpback chub: The humpback chub was listed as Endangered in March, 1967. Humpback chubs were the last of the Colorado River fishes to be described in the scientific literature (Miller, 1946). Therefore, little is known of its historic distribution within the Colorado River system. At present, humpback chubs occur in the upper Colorado River. Humpback chubs are found in a variety of habitats but have primarily been documented in areas associated with fast currents, deep pools, and boulders (Ferriole, 1988, In: U.S. Fish and Wildlife Service, unpub). In general, humpback chubs appear to be highly specialized with regard to habitat utilization. Lack of movement by adults out of riverine canyon habitats and relatively low number of other fish species utilizing these reaches indicate that all life history requirements are met exclusively in canyons (Valdez and Wilson, 1982, In: U.S. Fish and Wildlife Service, unpub); Archer et al, 1985). Humpbacks are primarily bottom feeders but will feed on both aquatic and terrestrial invertebrates which occur throughout the water column (U.S. Fish and Wildlife Service, 1990a). Spawning is thought to occur over gravel-cobble substrate in backwaters which are associated with preferred deep canyon habitats when water temperatures approach 16 degrees C. These water temperatures normally coincide with spring runoff conditions (Valdez and Clemmer, 1982).

Recovery goals outlined in the "Humpback Chub Recovery Plan" (U.S. Fish and Wildlife Service, 1990a) target protection and/or restoration of five viable, self-sustaining populations within the entire Colorado River basin and maintenance of the integrity of habitats utilized by these populations. While "Critical Habitat" has not been identified as such in the Plan, the two highest concentration areas for this species (Little Colorado and Colorado Rivers of the Grand Canyon, and the Black/Rocks/Westwater Canyon area of the Colorado River) are recognized as areas which are key to meeting recovery goals.

Spineless Hedgehog Cactus

The spineless hedgehog cactus is the only plant currently listed as endangered within this analysis area at the present time. The range of this plant is from the Abajo Mountains near Monticello, Utah, north to the Uncompahgre Plateau and Grand Mesa in Colorado. When listed, only four widely dispersed localities were known. Since that time, additional plant localities have been located. The cactus is generally found on mesa tops and the surrounding areas, but *inermis* is limited to the parts of the mesas and benches in the pinyon pine and Utah juniper woodlands (Blankenship, 1983). The plant may be found in partial shade, in duff accumulations under pinyon pine trees and infrequently among sagebrush, on cool exposures between 5,000 and 8,000 feet in elevation. Plants are believed to be susceptible to grazing and trampling by livestock. The plant's habitat is also threatened by

energy/mineral exploration, including road construction (Anderson, 1985). Pinyon chaining projects and removal by plant collectors has also led to the species' decline.

The spineless hedgehog cactus seems to occupy such a specific habitat that it is possible to predict where new populations may be found. Sites are characterized by shallow soils with bedrock exposed, usually sandstone strata of the Cretaceous Dakota and Burro Canyon formations (Blankenship, 1983). The datil yucca appears to be the most correlative species associated with the spineless hedgehog cactus.

Ute Ladies'-tresses Orchid

At the present time it is not known whether the range of this species lies within the area under consideration of this oil and gas EIS assessment. This species is believed to be most likely in habitats located east of the Continental Divide.

Mexican Spotted Owl

The Mexican spotted owl has been proposed for listing as a threatened species on Nov 4, 1991 by the U.S. Fish and Wildlife Service. To date, no Mexican spotted owl sightings or nests have been confirmed on the Forests. However, the Mexican spotted owl's range may include portions of the Grand Mesa, Uncompahgre and Gunnison National Forests. The Mexican spotted owl has been found in similar habitats to the west and south of this area. Portions of the Uncompahgre National Forest are believed to be suitable habitat for this owl. Nesting pairs of this owl have been located on the Manti-La Sal National Forest, sites near the San Juan National Forest, and in and around Mesa Verde National Park. Habitats where these owls have been nesting are very similar to those found on the Uncompahgre Plateau and on the Naturita Division of the Uncompahgre National Forest. Some habitat in these areas has been identified as potential suitable habitat for the Mexican spotted owl as a result of two years of survey efforts in these areas, even though no documented sightings were observed.

Based on 10 known Mexican spotted owl nests in Colorado, suitable habitat can be categorized as either prime or possible habitat, and are described as:

Prime habitat consists of: Deep, narrow canyons characterized by sheer, often tiered rock walls. Vegetation may be dominated by pinyon-juniper in an old age class, or with a mixed conifer component such as Douglas-fir, ponderosa pine, white fir, spruce, and limber pine. A typical nest site might be along or beneath a canyon rim or cliff, especially where a smaller drainage comes into a main canyon. The area would be characterized as having pinyon-juniper on the tops of the rims and mixed conifer forests in the actual drainages themselves, and also may have some oak or cottonwood trees mixed in these forested stands.

Possible habitat consists of: any steep slope over 20%, with mixed conifer vegetation (based on New Mexico and Arizona data). Preliminary studies indicate that the Mexican spotted owls prefer dense mature conifer stands and steep slopes. It is not yet known if this owl requires old growth forests. Three owl nests have been located in montane (mixed conifer) forests on steep slopes and four from steep-walled canyons with montane and pinyon-juniper forests. A typical nest site might be along or beneath a canyon rim or cliff especially where a smaller drainage comes into a main canyon. Nest sites could be in an old raptor or magpie nest, a large tree cavity or where a large limb has broken off the main tree trunk, a woodrat nest on a cliff ledge or in a "witches broom" mistletoe defect. Nests are often located inside the hollow top of a broken off tree bole. Roosting occurs during the day when the these owls retire to a secluded roost on a limb in a large shady tree or to a ledge of a cave. The spotted owl preys upon bushy-tailed woodrats, rabbits, gophers, squirrels, mice, voles, bats, large insects and other prey species. Potential spotted owl habitat has been identified and mapped on the entire Uncompahgre Plateau and in the Lone Cone and Naturita areas.

Affect on Threatened and Endangered Species in the Area

The proposed Federal action is the leasing of National Forest System lands for the purposes of potential oil and gas development. The authorization of a lease, in and of itself, does not create any environmental effects. However, authorization to lease implies that oil and gas development may take place at a future time with identified restrictions as outlined in the EIS. Current Federal regulations direct the Forest Service to consider subsequent actions authorized under a lease and, therefore, are considered to be "connected actions" under NEPA (40 CFR 1502).

Oil and gas development is accomplished in three phases: exploration, field development, and production. All of these phases contain activities that have the potential to directly or indirectly affect wildlife, fish, or plant species and must comply with the Endangered Species Act. Compliance will require that all oil and gas activities are cleared for species occurrences at the APD or operational stage. This will occur on a case-by-case basis rather than at the leasing stage for all Federally listed threatened and endangered species.

Potential effects of the proposed action on Federally listed threatened and endangered species are as follows:

Peregrine Falcon

One of the greatest effects associated with oil and gas activities upon the peregrine falcon is the potential to preclude use of occupied sites such as nest sites, hunting areas, and perching sites because of oil and gas associated disturbance activities. The peregrine falcon is very sensitive to human disturbance, especially during the nesting period. All phases of oil and gas activity could preclude peregrine nesting if the activity occurred in close enough proximity of a suitable cliff which would cause a disturbance during the nest site selection period, or the nesting period itself. Direct or indirect impacts to migrating peregrine falcons temporarily using the National Forest are assessed as being very minimal in nature. Feeding or roosting sites of peregrines probably vary considerably by year while migrating through the area. The opportunity for these birds to execute temporary displacement, and shift perching and hunting areas away from points of oil and gas related disturbances is high. Disturbance to breeding pairs of peregrine falcons, should they be located, is an important factor to consider from the time of initial courtship displays to the time of young fledging. Peregrine pairs can abandon courtship activities near nesting sites if human related disturbance occurs. After egg laying and young rearing begins, disturbance can cause outright nest abandonment or can cause stress on adults causing them to leave the nest for extended time periods, resulting in egg chilling or predation. Placement of roads and well pads would be most critical if peregrine falcon eyries are located.

Another adverse effect associated with oil and gas activities upon the peregrine falcon is the potential to preclude future occupancy of suitable but unoccupied habitat because of associated disturbance activities. The types of potential impacts identified for the peregrine may be controlled with the use of seasonal activity restrictions and or no surface occupancy leasing in various zones around key habitat. Special management zones should be established around all known peregrine falcon nests or known perching sites to prevent disturbance to these species by any resource activity.

Bald Eagle

One of the greatest effects associated with oil and gas activities upon the bald eagle is the potential to preclude use of occupied habitat (nest sites, feeding areas, winter roosts, concentrations etc.) because of oil and gas associated disturbance activities. Bald eagles are sensitive to human disturbance,

especially at nest sites, and abandonment can easily occur. If a nesting site, feeding area, or roost site is involved, then blasting, helicopter operations, heavy equipment use, vehicle traffic, and human presence could cause abandonment, decreased productivity, or preclude use altogether if the activity was close enough to cause a disturbance during the nesting period or winter roost use period at a roost site, or at feeding concentration areas which may coincide with fall and spring fish runs.

Direct or indirect impact to migrating bald eagles could be of concern if disturbances occurred in key feeding sites. The bald eagle is more limited than the peregrine falcon in areas where it may obtain a ready source of food. Winter roosting sites are extremely important for the bald eagle because these sites are located where a readily available food source is present. Activities must be restricted wherever winter roosting or feeding sites have been located.

Another adverse effect associated with oil and gas activities upon the bald eagle is the potential to preclude future occupancy of suitable, but presently unoccupied habitat, because of associated disturbance activities. Potential impacts identified for the bald eagle may be controlled with the use of seasonal activity restrictions and/or no surface leasing in various zones around key habitats. Special management zones should be established at this time around all known bald eagle nests or concentration sites to prevent disturbance to these species by any resource activity.

Black-footed Ferret

Any indirect effects or impacts of oil and gas development on ferrets (should they exist or be reintroduced) would likely be as a result from effects to prairie dog colonies themselves. Improved access into areas previously remote could result in increased hunting of prairie dogs by humans. This could result in the direct killing of black-footed ferrets as they were mistaken for prairie dogs. Direct effects of oil and gas leasing and development on prairie dogs could have the potential to increase prairie dog habitat and the associated increase in actual prairie dog town size. Prairie dog habitat may actually be improved through the disturbance of native vegetation and soil (Cartright, 1992). Such disturbances may include oil and gas activities like the construction of roads, pipelines, well sites and powerlines. Soil disturbance in or near prairie dog towns can cause the town to spread since the prairie dogs find it easier to develop burrows in the disturbed soil (Cartright, 1992). Indirect effects of oil and gas activities on the prairie dogs are the potential to increase sport shooting. Sport shooting of prairie dogs is increasing in popularity and the potential of reducing towns though this activity also exists (Clark, 1979).

Endangered Fish

The Federally listed Endangered Colorado squawfish, humpback chub, bonytail chub, and razorback sucker are not known to occur within the project area. However, these species do occur downstream within the Colorado River basin. Projected oil and gas exploration and gas production activities could adversely effect downstream populations. The two primary adverse impacts associated with oil and gas activities include: 1) potential water quality deterioration (both surface and ground water); and 2) water depletions (both surface and ground water).

Adverse direct, indirect, and cumulative impacts to water quality from sediment, can occur from oil and gas activities. Adverse impacts related to sediment entering streams could occur on local aquatic populations. However, for the downstream endangered fish populations and their habitats, these adverse effects would not be quantifiable. This is due to: 1) the distance downstream of the project to existing populations; and 2) the dilution factor when tributary waters enter the mainstem Colorado River and channel hydraulics.

Potential direct and indirect adverse impacts from oil and gas activities can also be associated with contamination of both ground and surface water and water depletion.

Groundwater

Requirements for the protection of groundwater resources from oil and gas operations are provided in several Federal statutes. These include; the Safe Drinking Water Act, Clean Water Act, and Resource Conservation and Recovery Act. Under the Clean Water Act, Sections 319 and 402(p), and the National Pollutant Discharge Elimination System point and non-point surface discharge of water from oil and gas exploration and production operations is regulated. This is important to groundwater quality as watersheds on Federal lands serve as important recharge areas.

Potential adverse indirect effects on groundwater quality can result from the storage of drilling fluids, reserve pit wastes, and other fluid stocks (diesel fuel, mud additives) used on the surface. These contaminants can reach groundwater through the well itself and/or through tank or pit seepage-failure with site runoff and infiltration to shallow aquifers. Unlined reserve and mud pits (especially those constructed below the water table) have the highest potential for contaminating groundwater. Potential adverse impacts to groundwater quality can also result from improperly cased wells or a failure of the casing or cement. The extent of potential adverse impacts to adjacent aquifers would depend on the volume and constituents of escaping fluids, depth of groundwater, and geologic permeabilities of the surrounding area. Potential contaminants include heavy metals, hydrocarbons, and chlorides.

Surface Water

Oil and gas development has the potential to adversely affect surface water quality through the introduction of sediment and toxic substances from drilling, accidental spills, and road construction and maintenance activities. Well pad, road, and pipeline construction could produce sediment which could enter surface waters. When roads, pads and pipelines are properly located, with adequate filter strips, only a fraction of the sediment produced on-site will reach surface waters. Under the proposed action, direct adverse effects from sediment would not be quantifiable on downstream endangered fish populations.

A second potential adverse impact on surface water could occur from reserve and mud pit seepage and overtopping. This could result in migration of contaminants to surface waters. During drilling activities, oily wastes and miscellaneous chemicals (mud additives, diesel oil, lubrication oil, rigwash, etc.) may accumulate in soils. Surface runoff may transport such wastes to surface waters, potentially impacting aquatic populations and degrading surface water quality. The level of adverse impacts depends on the contents of a pit.

Although measures would be in place to protect surface water quality, leaks or a spill of contaminants could occur. Off-site spills can occur from trucking accidents, pipeline leaks, or by a construction mishap. Adverse effects could impact local aquatic populations depending on the timing, duration, and type and concentrations of contaminants entering adjacent waters. As described under "Groundwater" the risk to downstream endangered fish populations would probably not be quantifiable due to the distance downstream from project boundaries, and the dilution of contaminants once they reached the mainstem Colorado River from the small tributaries.

Water Depletions

Water "depletion" is defined by the USFWS as "water which would contribute to the river flow if not intercepted and not returned to the system". This includes both surface and groundwater. When these waters contribute to instream flows in the Upper Colorado River Basin, they are considered "tributary waters". Water is required during drilling of both exploratory and production wells. In addition, a small quantity of water will be required over the life of a production well for maintenance. The estimated amount of water used to drill one well in Colorado (both exploration and production) is approximately 0.10 acre-foot per well. As this quantity of surface or groundwater would not be available for instream flows, this would be considered a "depletion", and may potentially impact downstream fish.

Spineless Hedgehog Cactus

Spineless hedgehog cactus habitat has been destroyed or impacted by previous development activities. The potential for future habitat destruction exists wherever this plant exists. Roads into these developments result in more access for plant collectors to illegally take these plants. Adverse impacts to the species can result from these actions. Inventories must be conducted throughout the area affected by an APD to determine if the spineless hedgehog cactus is found in the area prior to any ground disturbing activity. If located, provisions will be necessary so that the plant or its habitat will not be affected by the activity. Indirect effects, such as roads into the general area providing easy access to plant collectors, must also be considered in addition to direct effects.

Ute Ladies'-tresses Orchid

By the time any APD is received, additional information on this plant and its habitat requirements and geographical range will become available. If it is determined that this plant is found in the area it will receive the same protection that the spineless hedgehog cactus receives. Inventories will be conducted to determine if the plant is located in any area prior to any ground disturbing activity.

Mexican Spotted Owl

Oil and gas development activities could have the potential to effect the Mexican spotted owl or its habitat because of the potential to preclude use of occupied habitat such as nesting sites, foraging areas, or day roost sites. Prior to any ground disturbing activities a minimum of two years worth of surveys will need to be completed to determine, if in fact, whether this owl species does occur within the area. Some surveys have been conducted in the area under analysis, but additional surveys will need to be completed. Management guidelines and restrictions will be used to protect the Mexican spotted owl. If spotted owl nesting territories are located, they will be protected by establishing core habitat areas. These core habitat areas will consist of nesting, feeding, and roosting areas and are not considered to be overlapping. Mexican spotted owl territories are estimated to be 2000 acres.

Where multiple Mexican spotted owl sightings have occurred, but a confirmed nest site or roosting area has not been located, seismic and surface disturbing activities will be restricted within the 450 acres of the total territory of 2000 acres (BLM, 1991). In the remaining area, other surface activities may be allowed pending impact assessments conducted through the NEPA process. In areas where a confirmed nest or roost site has been identified, all surface management activities will be restricted. The core area of a confirmed nest site is 1,480 acres and all surface disturbing activities within this area will be restricted. There cannot be any exceptions to these restrictions (BLM, 1991).

The Mexican spotted owl's nesting and fledging habitat use occurs from February 1 to July 31. All activities proposed in spotted owl habitat will be restricted during these time periods. Another potential adverse effect associated with oil and gas activities on the Mexican spotted owl is the potential to preclude future occupancy of suitable, but presently unoccupied habitat, because of the associated disturbance and development related activities.

Cumulative Effects - Impacts from Federal, State and Private Projects

Also important to consider is that the cumulative effect of oil and gas leasing and subsequent activities and other projects planned for the Grand Mesa, Uncompahgre and Gunnison National Forests may be greater than the total effect of oil and gas activities considered alone. The cumulative effect of oil and gas leasing and its subsequent activities and adjacent activities (timber sales, subdivisions, recreationists, etc.) on T&E species is largely unknown at this time. Future Biological Assessments for oil and gas activities must be closely coordinated with the Five Year Timber Management Plan, Forest Plan direction, T&E species recovery plans and other existing resource management documents. Developments in T&E species habitat can reduce habitat quality or eliminate the species altogether. One activity considered alone may cause a temporary displacement of wildlife species, but when several activities are occurring simultaneously in adjacent drainages, permanent displacement or outright elimination could occur because of a lack of necessary habitat.

At the present time, threatened and endangered species habitat disturbance activities are occurring on the Grand Mesa, Uncompahgre and Gunnison National Forests. These activities include intensive timber harvest, increased developed and dispersed recreation, subdivision development, road construction, livestock grazing, etc. These activities will complicate the evaluation of future cumulative effects of oil and gas activities. Because of the inability to identify where or when specific oil and gas activities are going to occur, it is impossible to accurately evaluate cumulative effects of future activities at this time. Each specific project Biological Assessment will have to assess cumulative effects of the proposed project in light of the completed or ongoing activities in the zone of influence of the proposed activity. The evaluation of cumulative impacts will be a critical factor in determining the effects of oil and gas activities on the T&E species in the area under analysis. All future Biological Assessments will analyze cumulative effects.

Mitigation Guidelines at Time of Application for Permit to Drill (APD)

Surveys to document occurrences and potential affects on all listed and proposed species of plants and animals is required at the APD analysis stage and prior to on-the-ground activities. Water depletion issues and possible impacts to T&E fish will be addressed, assessed and resolved at the APD stage for all oil and gas activities that may have the potential to affect these T&E species. In addition, these mitigation guidelines and any others developed at a later date shall apply:

A. Helicopters:

1. Helicopters should stay far enough away from cliffs and river corridors so as to prevent disturbance or possible mortality to peregrine falcons and bald eagles.
2. Most wildlife species are active during the dawn and dusk hours. Travel in helicopters should be restricted during these time periods.
3. Helicopters should be kept to specific, pre-determined lanes of travel or corridors.

B. Roads:

1. Roads should be constructed to the minimum standard necessary and placed away from sensitive wildlife, fish or plant habitats.

2. Road construction should be severely restricted or prohibited in riparian areas.
3. Oil and gas activity roads should be closed to all other vehicle traffic, except authorized administrative use. Locked gates will be necessary and enforcement, including manning and patrolling, may be necessary.
4. Roads should be permanently closed and rehabilitated once their use for oil and gas has terminated. Physical barriers should be used to close the roads. Close to all motorized vehicles yearlong.
5. Following permanent closure, all roads should be seeded to clover, grasses, and shrubs identified as valuable to wildlife and native to the area if at all possible.
6. Regulate oil and gas activity traffic to control the numbers and timing of vehicles using the roads, especially during sensitive wildlife periods.
7. Straight stretches of roads should be avoided by placing curves at least every 1,000 feet or less, except where line of sight is restricted by natural means.
8. Whenever possible, roads should be placed in timbered areas where visibility into other areas will be limited. This screening will also reduce road traffic noise.
9. Maximum utilization should be given to existing access routes so that new road construction will be held to the absolute minimum.
10. Roads should be properly drained in order to prevent sediment from entering streams.
11. Roads should be constructed so that if trucks carrying potential pollutants go off the road, they will not spill into streams.
12. Roads will be closed to all vehicle travel except administrative and project personnel.
13. Roads will not be located near streams or important wildlife habitats such as prairie dog colonies, sage grouse leks, wallows, mineral licks, nest sites, etc.
14. Roads cannot be placed near any population of endangered plant species that would provide easier access for plant collecting.

C. Oil and Gas Associated Activities:

1. Seasonal and temporal restrictions of activities should be made during periods of high wildlife use.
2. Oil and gas activities should be restricted so that disturbance is not occurring simultaneously in adjacent drainages.
3. Oil and gas activities should be restricted so that the number of seismic lines, roads, utilities, etc. can be minimized.
4. All oil and gas activities should have timing restrictions to minimize or eliminate disturbances to wildlife (see Appendix 1 for time periods when restrictions may be necessary).
5. Blasting, drilling, helicopters, human activity, etc. must be restricted or prohibited around sensitive wildlife, fisheries and/or plant areas.

D. Water Quality:

1. For point-source discharges the Forest will require that water quality standards as defined in Section 401 of the Clean Water Act be met to ensure protection of downstream aquatic resources.
2. Developments will be located outside of riparian and wetland areas unless alternative routes have been reviewed and rejected as being more environmentally damaging. Pits shall not be constructed in alpine, wetland/riparian, or floodplain areas. In addition, pits shall not be constructed in a manner that results in materials seeping or being transported overground to these areas.
3. Compliance with Executive Orders 11988, Floodplain Management, and 11990 Protection of Wetlands will be required and evaluated, using U.S. Water Resources Council Floodplain Management Guidelines 43 FR 6030 for any proposals that could affect these resources. Locate new facilities outside of the 100 year floodplains (Executive Order 11988).
4. Whenever possible, avoid the addition of muds of known or suspected hazardous additives to protect ground and surface water resources.
5. Casing integrity tests should be required to reduce the potential for migration of fluids between water-bearing zones, as required by the BLM.
6. Install surface casing to below the deepest underground source of drinking water to seal the well from tributary groundwater bearing formations.
7. All operations shall be conducted in such a manner as to prevent damage, interference, or disruption of water flows associated with all springs, wells, lakes, streams and rivers. Unforeseen damage, interference, or disruption will be mitigated appropriately.

E. Oil and Gas Developments:

1. Powerlines should be designed in such a manner that birds of prey cannot be electrocuted.
2. Pipelines should follow existing roads so that additional loss of habitat will not occur. Pipelines must be placed so that they do not inhibit the movement of wildlife. Slash will be disposed of properly.
3. Drill sites should not be located near riparian zones, streams or wildlife watering areas.
4. Avoid locating drill sites, test holes, etc. near special wildlife habitats such as mineral licks, travel corridors, burns, migration paths, prairie dog colonies (USFWS, 1991), etc.
5. Drill sites and pads should be located within forested areas, wherever possible, to lessen noise levels and reduce disturbances.
6. Sump ponds, settling ponds, or toxic sumps should be fenced, covered, and placed where danger to fish and wildlife is minimized and where breakage, should it occur, could be easily contained.
7. Pipelines and major pipeline rights-of-way should accommodate more than one line to reduce habitat destruction (Stubbs and Markam, 1979)

F. Wildlife/Human Interactions

1. No firearms or pets should be allowed by project personnel during the life of the project. Hunting will not be permitted by project personnel.
2. Travel to and from work sites during high wildlife use periods will be restricted.

G. Water Depletion:

Water depletion impacts from the proposed project will be compensated for by the Lessee through implementation the following mitigation measures prior to the initiation of any ground disturbing activities:

Payment of Depletion Charge: the Lessee will make a one-time contribution consistent with the "Endangered Upper Colorado River Fishes Recovery Implementation Program" in the amount of \$11.50 per acre-foot of the project's average annual depletion. The average annual depletion of water (acre-feet) will be based on the number of exploratory and production wells, including maintenance water, as identified in the Lessee's Application to Drill (APD). This APD is submitted to the Bureau of Land Management (BLM) by the Lessee for approval prior to any surface disturbing activities (43 CFR Part 3160 "Onshore Oil and Gas Order No. 1). In addition, the "Surface Management Agency" (the Forest Service) can require that stipulations or measures be placed on an APD and that permit approval be contingent on implementation (43 CFR 3164.3(c)).

This payment will be calculated by multiplying the project's average annual depletion (X# of acre-feet) by the depletion charge in effect at the time. For fiscal year 1992 (October 1, 1991 to September 30, 1992) the depletion charge was \$11.50 per acre-foot of the average annual depletion. This amount is adjusted annually for inflation on October 1 of each year and is based on the previous year's Composite Consumer Price Index. Ten percent of the total payment will be provided to the USFWS at the time of issuance of the APD permit. The balance will be due at the time construction or exploration commences. Payments will be made out to the "National Fish and Wildlife Foundation", accompanied by a dated letter signed by the Lessee. The total payment required by the Lessee will be included as a APD permit stipulation by the Forest Service as a condition of surface occupancy (43 CFR 3164.3(c)).

Coordination and Additional Data Requirements

Five basic types of information will be required at the time an activity is proposed, to adequately evaluate the effects of oil and gas projects that are being proposed in the area.

1. A determination if any threatened, endangered, or proposed species or its habitat occurs in the area.
2. Identification of the key habitat components in sufficient detail on the ground, so coordination measures can be implemented. This type of data will be gathered in the following manner:
 - a. General data on importance of specific habitats for the species involved, gleaned from current research findings applicable to the area.
 - b. Specific locations of important habitat components will, for the most part, be identified at the project specific assessment. The scope of these assessments

will consider the dates identified in the stipulations used to protect wildlife and fisheries habitat reflect average conditions. Site specific assessments could identify variances in these distances or dates because of differences in topography, vegetative screening, or reproductive behavior.

3. Refinement of information on effects of oil and gas activities on T&E Species, and specific coordination measures needed to control the identified effects. This type of information will be gathered from current research findings applicable to the area.
4. Specific information on what type and level of oil and gas activities are going to occur and where these activities are proposed. This information can only be obtained from the specific applications for exploration or development permits. This information is essential, and the assessment of effects cannot be undertaken without it.
5. A detailed cumulative effects analysis will be done at the time of an APD, which will include the proposed oil and gas activity, recreation activity, timber harvest, range activities, etc.

Whenever a determination is made that any subsequent oil and gas activity proposal will result in a "May Affect" situation for any threatened, endangered, or proposed species or their habitat, Formal Consultation with the USDI Fish and Wildlife Service will be requested and initiated.

Determination of Effect and Decision

The recommendation for oil and gas leasing, as identified in the Final Oil and Gas Leasing Environmental Impact Statement, will have "No Effect" on any threatened, endangered, or proposed species or their habitats. This "No Effect" determination is based on the assurance that project specific Biological Assessments and/or Biological Evaluation will be completed before any land disturbance activity can commence (T&E Stipulation); the ability to preclude oil and gas activities to protect T&E Species (T&E Stipulation); and the inclusions of other stipulations, coordination requirements, and guidelines which can control key habitat disturbances, restrict human access, and coordinate activity patterns.

Subsequent oil and gas activity proposals resulting from this recommended leasing action will require a site specific Biological Assessment for each activity or APD that may occur. Any one of these future assessments could conclude that a "May Affect" situation exists for any of the threatened, endangered, or proposed species discussed in that site specific or project related Biological Assessment. These site specific Biological Assessments will discuss all those species discussed here and any other animal, fish, or plant species or their habitat that may be added to the threatened, endangered, or proposed lists issued by the U.S. Fish and Wildlife Service between the present time and when an activity is proposed. Any future "May Affect" determination would be determined by the presence of any threatened, endangered, or proposed species or their habitat in an area where the activity may occur and the subsequent nature of the proposal. Variables such as timing, location, magnitude, restrictions, and mitigation will all be factors in the determination of effects.

Oil and gas development activities could adversely affect the four listed fishes and their critical downstream habitats. If this is the case, these "May Affect" determinations will require formal consultation with the USFWS under Section 7 of the Endangered Species Act and these consultations will be carried out at the APD stage. Section 7 mandates that actions authorized, funded or implemented by a Federal agency will not likely jeopardize the continued existence of a listed Endangered or Threatened species or result in the destruction or adverse modification of critical habitat.

The probability that a specific activity "May Affect" any one of these species increases as you progress through the phases toward production, because of the greater length of the potential disturbance periods involved in the later stages of oil and gas development.

At this point in time, there is insufficient information on where specific activities are going to occur to make a determination of effect on any one particular project resulting from leasing. Project specific Biological Assessments will be required and conducted in order to identify where adverse effects could occur and to identify applicable coordination measures to assure compliance with the Endangered Species Act. The incorporation of the T&E species Stipulation in all of the leases assures that the Endangered Species Act will be complied with at all activity phases of oil and gas development. See Appendix 2 for specific elements that should be addressed in all future site specific Biological Assessments.

Conferencing and Consultation with Fish and Wildlife Service

- 6/4/92- The Grand Mesa, Uncompahgre and Gunnison National Forests requested a species list from the U. S. Fish and Wildlife Service.
- 7/1/92- The Forest received letter from Fish and Wildlife Service describing species found within the analysis area.
- 8/10/92- Informal consultation between Tom Holland (FS) and Terry Ireland (FWS) on their review of the Draft.
- 12/15/92- Informal consultation between Tom Holland (FS) and Terry Ireland (FWS). Discussion centered around the determination of "Will Not Effect" for the Final "programmatic" EIS. Terry felt that this was an appropriate way to assess and to confirm with Keith Rose. Terry also thought we should include the Ute Ladies'-tresses orchard in our assessment as so little is known about its geographical distribution that we should bring it to attention.
- 1/22/93- Informal consultation with Keith Rose, Assistant Colorado State Supervisor. Conversation centered around the Final Oil and Gas Leasing EIS's determination of "No Effect". Keith agreed with this determination at the programmatic stage and stated that this procedure was their preference at this time, because there is no site specific information available until an activity is proposed. At that time, the Biological Assessment or Biological Evaluation would then conclude that either a "May Affect" or a "No Effect" situation existed. If so, formal consultation would begin.

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APPENDIX 1: Time periods important to threatened, endangered, or proposed species that will require timing restrictions or coordination:

| | <u>Habitats Found</u> | <u>Critical Time Periods</u> |
|----------------------------|------------------------|------------------------------|
| Peregrine Falcon | Cliff Complexes | March 16 to July 31 |
| Bald Eagle | Nesting Habitat | December 15 to June 15 |
| | Winter Roost Site | November 16 to April 15 |
| Black-footed Ferret | Prairie Dog Colonies | March 1 to August 31 |
| Spineless hedgehog cactus | Drier lower elevations | Yearlong |
| Ute ladies'-tresses orchid | Below 6,500 feet | Yearlong |
| Mexican Spotted Owl | Nesting/Fledging Hab. | February 1 to July 31 |

APPENDIX 2: Resource Considerations for Site Specific Project Biological Assessments.

Site specific biological assessments to determine the potential effects upon Threatened, Endangered, and Proposed Species should include an analysis of at least the following:

1. Direct impact from road, drill pad, well site, construction etc. on key habitats utilized. (Appendix 1)
2. Disturbances which could influence the use of key habitats (Appendix 1); e.g. blasting, helicopter operation, heavy equipment operation, vehicle traffic or human presence.
3. Water depletions during the exploration and development of wells and any other activities related to oil and gas development activities, i.e., road construction and use.
4. Increased human disturbance and the probability of human/wildlife conflicts.
5. Direct mortality from oil and gas activities; e.g., toxic sumps, powerlines, illegal shooting, etc.
6. Disruption of wildlife travel corridors and migration routes.
7. Disturbances which could affect nesting success or productivity of the peregrine falcon, bald eagle, or Mexican spotted owl (See Appendix 1).
8. Disturbances which could preclude the use of suitable, currently unoccupied habitat.
9. Comprehensive analysis of cumulative effects.
10. Analysis of habitat modification.
11. Conduct a "May affect" analysis of effects of activities on Colorado squawfish, humpback chub, bonytail chub, and razorback sucker as it relates to water depletion.
12. Two year protocol survey requirements will be required in identified Mexican spotted owl potential habitat.
13. Black-footed ferret searches must be conducted in all prairie dog towns prior to any action to determine if black-footed ferrets are present or absent.
14. The lessee will be responsible to see that thorough searches are made for threatened, endangered, or proposed plants species within any area where activities might occur.
15. The lessee will be responsible to see that bald eagle and peregrine falcon surveys are conducted prior to any activity.
16. Threatened, endangered and proposed plants usually require a specific time window when they can be observed or identified, and some plant taxa require checking several times a year for both flowers and fruits or seeds. Some taxa may require multiple year surveys to determine if the plant does or does not exist within an area. For example, climate conditions may prevent a listed plant from emerging (annuals) or blooming during the year.



UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

FISH AND WILDLIFE ENHANCEMENT
 Western Colorado Sub-Office
 529 25 1/2 Road, Suite B-113
 Grand Junction, CO 81505-6199



PHONE: (303) 243-2778

FAX: (303) 245-6933

JUL - 1 '92

IN REPLY REFER TO:

FWE/CO:FS:GMUG
 MS 65412 GJ

June 29, 1992

Mr. Robert L. Storch
 Forest Supervisor
 Grand Mesa, Uncompahgre, and Gunnison National Forests
 2250 Highway 50
 Delta, Colorado 81416

| | |
|---------------------|--|
| SUPERVISOR | |
| EXECUTIVE ASSISTANT | |
| PAO | |
| ADMIN | |
| FWFE/TIMBER/FIRE | |
| LMP/NEPA/SWM | |
| REC/CULT RES/LANDS | |
| ENGINEERING | |
| RANGERS | |
| <i>Storch</i> | |
| PROMISE CARD | |

Dear Mr. Storch:

This responds to your June 4, 1992, letter regarding the preparation of an Environmental Impact Statement for oil and gas leasing on portions of the Grand Mesa, Uncompahgre, and Gunnison National Forests. You have requested a list of federally listed species that may occur in the analysis area.

The following federally listed species may occur within the analysis area.

FEDERALLY LISTED SPECIES

- | | |
|----------------------------------|----------------------------------|
| Peregrine falcon | <u>Falco peregrinus</u> |
| Bald eagle | <u>Haliaeetus leucocephalus</u> |
| Mexican spotted owl ¹ | <u>Strix occidentalis lucida</u> |
| Black-footed ferret | <u>Mustela nigripes</u> |
| Colorado squawfish | <u>Ptychocheilus lucius</u> |
| Humpback chub | <u>Gila cypha</u> |
| Bonytail chub | <u>Gila elegans</u> |
| Razorback sucker | <u>Xyrauchen texanus</u> |

Peregrine falcon

A confirmed peregrine falcon eyerie is located in the vicinity of Joe Davis Hill. Potential peregrine falcon eyeries are designated in the vicinity of Crested Butte, South Saddle Mountain, and along the entire Gunnison Curecanti National Recreation Area. Your evaluation should, therefore, determine the current status of peregrine falcon at these sites to assess potential impacts. Current status of peregrine falcons at confirmed and potential nest cliffs can be obtained by contacting Jerry Craig with the Colorado Division of Wildlife (303/484-2836).

¹ Proposed as threatened 11/4/91 (56 FR 56344)

Bald eagle

We have no records of bald eagle nests at any of the Forest Service sites. However, bald eagles are common winter visitors to Colorado. Bald eagles are known to fly up to 18 miles from night roosts to feeding areas and it is likely that even greater distances are traveled searching for food. The species may therefore occur in the project area. Your biological evaluation should determine whether wintering bald eagles occur at any of the Forest's streams or reservoirs. If they do occur, the Forest Service should evaluate potential impacts.

Mexican spotted owl

Mexican spotted owls may occur in those areas identified in San Miguel County. Two consecutive years of searches for owls should precede any leasing in these areas.

Black-footed ferret

The black-footed ferret is dependent on prairie dogs and their burrows for food and shelter, respectively. It is our position that any impact to prairie dogs may impact the ferret unless a ferret search is completed to conclude their absence. Your evaluation should determine whether prairie dogs occur on the Grand Mesa, Uncompahgre, or Gunnison National Forests. If prairie dogs do occur, the Forest Service should conclude that ferrets may also occur and assess potential impacts associated with oil and gas leasing. Please contact this office prior to initiating any black-footed ferret searches.

Federally listed fish

We consider the depletion of water from the upper Colorado River an adverse impact to habitat for all the above federally listed fish species. Consequently, any activity authorized by the Forest Service that results in a net depletion of water from the upper Colorado River basin should trigger a "may affect" finding by the Forest and formal consultation with this office under authority of the Endangered Species Act.

The Forest Service should review their proposed Federal action and determine if the action would affect any listed species. If the determination is "may affect" for listed species, the Forest Service must request in writing formal consultation from our office. At that time, your agency should provide this office a biological assessment and/or any other relevant information used in making the impact determinations.

Federal Candidate Species

We believe your evaluation should also consider the following species which are candidates for official listing as threatened or endangered species [(Federal Register, Vol. 55, No. 35, February 21, 1990, and Federal Register, Vol 56, No. 225, November 21, 1991 (copy enclosed)]. While these species presently have no legal protection under the Endangered Species Act, it is

within the spirit of the Act to consider project impacts to potentially sensitive candidate species. Additionally, we wish to make you aware of the presence of Federal candidates should any be proposed or listed prior to the time that all Federal actions related to the project are completed.

The list was compiled from Colorado Division of Wildlife latilong surveys and other general literature. We have no specific records for the Forest Service properties identified in your letter.

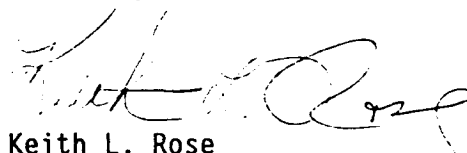
FEDERAL CANDIDATE SPECIES

| | |
|--------------------------------|-------------------------------------|
| Ferruginous hawk | <u>Buteo regalis</u> |
| Loggerhead shrike | <u>Lanius ludovicianus</u> |
| Northern goshawk | <u>Accipiter gentilis</u> |
| Baird's sparrow | <u>Ammodramus bairdii</u> |
| Western snowy plover | <u>Charadrius alexandrinus</u> |
| | <u>nivosus</u> |
| Black tern | <u>Chilodrias niger</u> |
| White-faced ibis | <u>Plegadis chihi</u> |
| Flannelmouth sucker | <u>Catostomus latipinnis</u> |
| Roundtail chub | <u>Gila robusta</u> |
| Colorado River cutthroat trout | <u>Oncorhynchus (=Salmo) clarki</u> |
| | <u>pleuriticus</u> |
| <u>Penstemon mensarum</u> | Grand Mesa penstemon |

There is no designated critical habitat within the Forest Service properties you identify. Our agency is presently classifying critical habitat for the federally listed fish species. This designation should be proposed in the Federal Register within the next year.

We appreciate your attention to federally listed and candidate species. Please contact Bob Leachman if there are any question.

Sincerely,



Keith L. Rose
Assistant Colorado State Supervisor

cc: FWS/FWE, Golden
FWS/FWE, Salt Lake City
CDOW, Grand Junction
CDOW, Montrose

Appendix O - Biological Evaluation

**GRAND MESA, UNCOMPAHGRE AND GUNNISON NATIONAL FORESTS
OIL AND GAS LEASING ENVIRONMENTAL IMPACT STATEMENT
BIOLOGICAL EVALUATION
FOR FEDERAL CANDIDATE SPECIES AND SPECIES OF CONCERN**

Prepared By: Thomas M. Holland 3/12/93
THOMAS M. HOLLAND
Forest Wildlife Biologist

Received By: Robert L. Storch 3/12/93
ROBERT L. STORCH
Forest Supervisor

Biological Evaluation

Introduction

This Environmental Impact Statement for Oil and Gas Leasing on the Grand Mesa, Uncompahgre and Gunnison National Forests includes a Biological Evaluation to document the potential effects oil and gas leasing will have on Federal Candidate, Species of Concern or Sensitive Species that may occur within the area under analysis. To properly do this, a species list must be requested of the U.S. Fish and Wildlife Service (USFWS) which identifies Federal Candidate species that may occur in the area of consideration. This list was requested by the Forest Service and was received on July 1, 1992 (Appendix 3) from the USFWS. In addition, some of the species identified by the Forest Service as proposed Sensitive Species are also addressed within this Biological Evaluation. The purpose of this Biological Evaluation is to discuss whether the potential effects of the proposed leasing are likely to contribute toward the Federal listing of any of these species. No Regional conservation strategies have been completed for any of the species covered by this evaluation.

The Draft Oil and Gas Environmental Impact Statement for the Grand Mesa, Uncompahgre and Gunnison National Forests was completed in August 1992. A Final Oil and Gas Environmental Impact Statement will be released in March 1993. This evaluation is based on existing information in the EIS, current research findings for the species involved, and existing data on the Grand Mesa, Uncompahgre, and Gunnison National Forests.

All oil and gas development and production activities are subjected to the provisions of the Endangered Species Act, other laws, and requirements outlined in the Forest Plan. Some of the species discussed in this Biological Evaluation, especially the Candidate Species, may be listed species under the Endangered Species Act (ESA) at the time of a specific project proposal or Application for Permit to Drill (APD) in the future. At the present time, these species do not legally fall under the protection of the ESA, but since these species have been identified as those whose population levels have dropped in recent years or their habitat is threatened, they are identified and discussed here in relation to the proposed action of oil and gas leasing. To comply with these provisions and requirements, all oil and gas activities would be cleared for species occurrence at the operational stage on a case by case basis, rather than at the leasing stage. A site specific Biological Evaluation for Federal Candidate Species and species the Forest Service identifies as Sensitive will be conducted for each subsequent oil and gas activity as a result of this leasing EIS.

Definitions (16 U.S.C. 1532)

Critical Habitat: That habitat which is essential to the conservation of a threatened or endangered species (There is no designated critical habitat anywhere within the National Forest lands covered in this analysis- FWS letter of July 1992).

Candidate Species: Those plant and animal species that, in the opinion of the USFWS, may become threatened or endangered. The USFWS has recognized three categories of Candidate species for listing as endangered or threatened:

- a. Category 1 are taxa for which the FWS has substantial information on hand to support the biological appropriateness of proposing to list the species as endangered or threatened. Currently, data are being gathered concerning essential habitat needs, and for some taxa, the precise boundaries for critical habitat designations. Development and publication of proposed rules on such species is anticipated.

b. Category 2 are taxa for which information now in possession of the FWS indicates that proposing to list the species as endangered or threatened is possibly appropriate, but for which conclusive data on biological vulnerability and threat(s) are not currently available to support proposed rules.

c. Category 3 are taxa that are no longer being considered for listing as endangered or threatened and are not regarded as candidate species.

Species of Concern: Those plant and animal species identified by the Regional Forester for which population viability is a concern, as evidenced by:

a. Significant current or predicted downward trends in population numbers or density.

b. Significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution.

These species will probably be designated as "Sensitive Species" by the Regional Forester in the future.

Species: Includes any sub-species of fish, wildlife, or plants and any distinct segment of any vertebrate species of fish or wildlife which interbreeds when mature.

Project Description

The EIS documents the analysis of five alternatives developed for possible management of oil and gas leasing on approximately 1/3 of the 3 million acres administered as the Grand Mesa, Uncompahgre and Gunnison National Forests. Alternatives include: 1) Current management (specified in the current Forest Plan); 2) leasing approximately 125,980 acres under Standard Lease Terms, 687,200 acres under supplemental stipulations, and the discretionary removal of 138,270 acres from leasing; 3) No new leasing Forest-wide; 4) leasing the entire analysis area under standard lease terms; 5) the same as Alternative 2 with the exception that all Roadless Areas and Semi-primitive Non-motorized areas (3A Management Areas) would be No Lease. The analysis area covered in this EIS includes those areas of high and moderate potential for oil and gas resources and those areas of low and no known potential for oil and gas resources that are currently leased. The analysis area contains approximately 951,450 acres.

| ACRES OF LEASE OPTIONS BY ALTERNATIVE | | | | | | | | | | |
|---|---------------|----|---------------|----|---------------|-----|---------------|-----|---------------|----|
| LEASE OPTIONS | Alternative 1 | | Alternative 2 | | Alternative 3 | | Alternative 4 | | Alternative 5 | |
| | Acres* | % | Acres* | % | Acres* | % | Acres* | % | Acres* | % |
| No Lease (NL) | 0 | 0 | 138,270 | 15 | 951,450 | 100 | 0 | 0 | 349,150 | 37 |
| No Surface Occupancy (NSO) | 58,400 | 6 | 151,835 | 16 | 0 | 0 | 0 | 0 | 78,350 | 8 |
| Controlled Surface Use (CSU) | 463,600 | 49 | 215,170 | 23 | 0 | 0 | 0 | 0 | 130,250 | 14 |
| Controlled Surface Use & Timing Limitations | 202,350 | 21 | 239,755 | 25 | 0 | 0 | 0 | 0 | 202,950 | 21 |
| Timing Limitations (TL) | 81,600 | 9 | 80,330 | 8 | 0 | 0 | 0 | 0 | 77,950 | 8 |
| Standard Lease Terms (SLT) | 145,500 | 15 | 125,980 | 13 | 0 | 0 | 951,450 | 100 | 112,800 | 12 |

* Analysis area = 951,450 acres.

Alternative 2 is the proposed action as identified in the Final Environmental Impact Statement.

All of the alternatives will result in the potential development of oil and gas resources. All alternatives are subject to compliance with Forest Plan Standards and Guidelines or guidelines established in this Biological Evaluation.

The Reasonably Foreseeable Development Scenario (RFD) predicts the level of oil and gas exploration and development which will occur on the Forest in the next 15 years. Under this RFD the projected well distribution on the Forest is expected to be:

- 12 on the Grand Mesa N.F
- 12 on the Gunnison N.F.
- 3 on the Uncompahgre N.F.
- 20 wells on areas already under Unit Agreement.
- Forty-seven (47) wells are projected on the Forest over the next 15 years.
- Only seven (7) wells are predicted to be drilled on new leases.
- A typical well will physically disturb approximately 10.7 acres
- Total projected ground disturbance is estimated to be 503 acres.

Candidate and Proposed Sensitive Species in the Area, and Background Information

Federal Candidate Species

Category 1

Southwestern willow flycatcher (*Empidonax trailii extimus*): Status Declining. The willow flycatcher is one of eight species in the genus *Empidonax* all of which are very similar in appearance. The southwestern willow flycatcher is the palest in color of the races. Willow flycatchers arrive on their breeding territories in early May when the males begin singing. Nesting occurs between late May and late July. Clutches of 3-4 eggs are laid in mid-June to mid-July. Willow flycatchers are closely associated with riparian habitats such as willow or alder thickets along streams, on the shores of ponds, or bordering marshy areas. They also are found in the brushy margins of fields, along mountain streams, and in shrubby floodplain areas. They prefer areas of high shrub densities interspersed with openings or meadows. The woody component of their habitat is almost exclusively deciduous including willows, alders, cottonwoods, aspens, and shrubs such as chokecherry, hawthorn, sumac, and wild rose. Their breeding territories are approximately 1.5 acres and densities of 9-14 pairs/100 acres can be found. Willow flycatchers migrate in the fall to wintering areas in Central and South America. Habitat loss and brown-headed cowbird (*Molothrus ater*) nest parasitism are the two main causes of willow flycatcher declines. Degradation of riparian habitats by livestock has contributed to riparian habitat loss. Other possible threats include pesticides and degradation of winter habitat. Management of the willow flycatcher should include protection and restoration of riparian areas and control of cowbird populations (Spahr et al.).

Category 2

Fishes

Colorado River Cutthroat Trout (*Oncorhynchus clarki pleuriticus*): Status Declining. Of all the trout species known to exist on the Forest, this is the most sensitive to changes in habitat quality and the most limited in its range, in terms of habitat quality and quantity. Spawning occurs in late spring when the water temperature reaches 45°. This trout requires cool clear water and well vegetated streambanks. It prospers at high elevations. Hybridization with introduced non-native trout has drastically altered the genetic purity of this subspecies. Historically, this species occupied most of the streams in the analysis area, but due to habitat loss, competition from introduced species and changes in habitat quality, their numbers have steadily declined. The Forest is currently in the process of cooperating with the Colorado Division of Wildlife in preparing a conservation plan designed to keep this species from becoming listed as endangered.

Flannelmouth Sucker (*Catostomus latipinnis*): Status Declining. The flannelmouth sucker is a native to the Colorado River system and populations are believed to have declined in the past decade. Populations of flannelmouth suckers were found throughout the Colorado River system in rocky pools, runs, and riffle habitat of the medium to large rivers, less often in creeks and small rivers. The construction of dams on the larger rivers has segmented the river system and created barriers to movement, isolating populations into smaller reaches. Similar to the endangered fish of the Colorado River system, declines in populations of flannelmouth sucker have been closely correlated with the construction of dams and reservoirs, the introduction of non-native fishes, and the removal of water from the Colorado River system.

Roundtail Chub (*Gila robusta*): Status Declining. The roundtail chub is native to both the Colorado River system in the U.S. and Rio Piaxtla in northwestern Mexico. Roundtail chubs were found

throughout the Colorado River system in rocky runs or pools within creeks or the small to large rivers. The construction of dams on the larger rivers of the Colorado system has segmented the river system and created barriers to movement, isolating populations into smaller reaches. Similar to other native fish of the Colorado River system, declines in populations of the roundtail chub have been closely correlated with the construction of dams and reservoirs, the introduction of non-native fishes, and the removal of water from the Colorado River system.

Birds

Loggerhead Shrike (*Lanius ludovicianus*): Status Unknown. At the present time little is known of the present distribution or abundance of the loggerhead shrike on the Forests, except that it may be present in limited numbers in a variety of habitats. In this area, it prefers chaparral habitat types such as the ponderosa pine/Gambel oak ecosystem; nests in dense shrubs or trees; may produce two broods of 4-8 young per year; and prefers areas with an abundance of perches that it hunts from. Prey items include insects, and occasionally small birds, mammals, and reptiles. Population trend is undetermined at the present time.

Northern Goshawk (*Accipiter gentilis*): Status Stable. The goshawk represents the mature aspen successional stage and is a good indicator of certain types of old growth habitat. It occupies coniferous and mixed forest habitats, in addition to the aspen ecosystems. Goshawks seem to select for specific structural characteristics in nest trees and nesting stands. Goshawk nesting territories include 2-5 nest trees per nest territory. These nest trees are almost always within 0.6 miles of each other (Reynolds, 1975). Goshawks usually show up on their breeding territories in early March and nesting activity is completed when young fledge in July or August. Goshawk nest stands have consistently been described as mature to old growth. Forest stands selected for nesting may be either multi-storied or single story. Stands are characterized by having high basal areas, open understory, gently to moderately steep slopes, on northerly aspects, and are fully stocked with trees. Nest trees are often in very old large aspen trees that have an understory of coniferous trees. Prey items include red squirrels, Abert's squirrels, snowshoe hares, cottontail rabbits, ground squirrels, blue grouse, woodpeckers, jays, robins, and others. Goshawk home ranges can be from 1-4 miles apart (Shuster and others, 1976).

Baird's Sparrow (*Ammodramus bairdii*): Status Declining. This sparrow is believed to be an uncommon migrant on the Forest and does not breed on the Forest. Population numbers are in a downward trend. It frequents grassy areas with scattered shrubs during migration.

Western Snowy Plover (*Charadrius alexandrinus nivosus*): Status Declining. Most of the Forest is above the elevational range of this species. It can be considered an infrequent migrant to most of the Forest area.

Black Tern (*Chilodrias niger*): Status Declining. The Forest may be within the lower latitudinal range of this species. It is a breeder on lakes and fresh marshes. The abundance and distribution of this species on the Forest is largely unknown at this time. The Forest does not provide the necessary habitat requirements for this species, so it is doubtful this species is a summer breeder on the Forest.

Mountain Plover (*Charadrius montanus*): Status Unknown. This species is not known to occur on the Forests within the area covered by this analysis.

White-faced ibis (*Plegadis chihi*): Status Unknown. This species is probably not found on the Forest in the area covered by this analysis.

Harlequin Duck (*Histrionicus histrionicus*): Status Declining. The Harlequin duck is not known to breed on the Grand Mesa, Uncompahgre and Gunnison National Forests. However, no surveys have been conducted for this species to verify its population status. A relatively small duck and the most oddly colored of all North American waterfowl, it arrives on breeding sites by late April through mid-May.

They return to the same area each year. Nests contain 3-8 eggs. They feed primarily on clear water benthic aquatic insects. This species is threatened by habitat degradation and human disturbance. Logging near riparian areas and roading is detrimental. Harlequin ducks require relatively undisturbed, low gradient (<3°), meandering mountain streams with dense shrubby riparian areas, (50% streamside vegetation) and woody debris for nesting, loafing and brood rearing (Spahr et al.).

Columbian Sharp-tailed Grouse (*Tympanuchus phasianellus columbianus*): Status Declining. The Columbian sharp-tailed grouse, commonly referred to as the mountain sharptail, was once much more common on the Forest than it's current distribution would indicate. Populations are still known to exist on the north end of the Uncompahgre Plateau and possibly on the north side of Grand Mesa. These populations occur on small open parks generally between 6,500 and 9,000 feet in elevation. Adequate cover is needed by sharptails for nesting, roosting, and escape cover. During the breeding season the sharp-tailed grouse congregate on dancing grounds or leks from March to June. At least 4 leks have been documented on the Uncompahgre Plateau (Rogers, 1969). Nesting begins in April and May when 12 eggs are laid. Food is varied depending on location, but includes buds, leafy vegetation, seeds, fruits, and insects. Lack of shrubs and depletion of grass ranges appear to be factors limiting the habitat of sharptails. Loss of native grassland vegetation appears to be the primary reason for decline in populations. The Sharptail is a very wary bird and is susceptible to disturbance.

Mammals

Southwest otter (*Lutra canadensis sonora*): Status Unknown. The river otter has been reintroduced into the Gunnison and San Miguel River Systems. The otter spends most of its time in or adjacent to the river itself, where it feeds on fish it catches. One to five young are born per year. Otters are active both day and night. There is a possibility that river otters have colonized streams within the analysis area.

North American Wolverine (*Gulo gulo luscus*): Status Unknown. The wolverine is the largest terrestrial member of the weasel family. It is on the State list of endangered species in Colorado. Wolverines once occupied the area in low numbers and likely still occur in some areas within the analysis area. Wolverines are a naturally low-density species throughout their range. They are a solitary animal with large home ranges. Hornocker (1981), estimated a density of one wolverine per 25 square miles on a study area in northwest Montana. Young (2-3) are born every two or three years at den sites in February, March or April. This breeding characteristic adds to the wolverine's low reproductive potential. Wolverines feed on small mammals, forest grouse, ptarmigan, fish, fruits, and ungulate carrion. The wolverine inhabits coniferous forests and alpine areas during the summer and move to somewhat lower elevations during the winter, where carrion or weak big game animals could be present. Riparian zones are preferred feeding areas. This species prefers large unroaded areas where contact with humans is minimal. Current threats to its survival include intentional and unintentional trapping, incidental poisoning, and logging and road development in its existing habitat. Because wolverines are a naturally low-density species throughout their range, they have a low viability. Records of sightings exist for Delta, Ouray, and Gunnison Counties. Many historical sightings have come from Grand Mesa (Armstrong, 1972).

North American Lynx (*Felis lynx canadensis*): Status Stable. The lynx is also on the Colorado State endangered species list. While never abundant in Colorado it has suffered population declines across most of its southern range. The lynx prefers boreal forest situations consisting of spruce, fir, lodgepole pine, and mixed aspen-conifer, because it's principal prey species, the snowshoe hare, frequents these sites. The snowshoe hare makes up the majority of the lynx's diet, while mice, small mammals, and birds make up the rest. Breeding occurs from mid March to early April. Females give birth to 3-4 young in late May to early June in rock crevices or in hollow trees or stumps. Lynx densities are also low, ranging from 6-10 square miles per individual. While dense stands of young conifers are used for preying on snowshoe hares, mature stands of conifers are used for denning, cover, and as travel corridors. Like the wolverine, the lynx's range has dwindled due to hunting, trapping pressure, and predator control programs. Lynx densities range 1 lynx per 6-10 square miles. Continued threats to

the lynx include: forest fragmentation caused by roading and logging of timber. Roads result in increased accessibility for trappers on foot or on snowmobiles.

Spotted Bat (*Euderma maculatum*): Status Unknown. The spotted bat may be found in a variety of habitats including open ponderosa pine, desert shrub, and pinyon-juniper woodlands. They roost alone in rock crevices high up on steep cliff faces. Cracks and crevices 1-2" wide in limestone or sandstone cliffs are critical roosting sites. They are found in relatively remote, undisturbed areas suggesting that they may be sensitive to human disturbance. This bat apparently breeds in late February to early April and gives birth to one young in late May to early July. Little is known of this bat's food habits except that it may feed primarily on moths. It may return annually to the same roosting areas. This bat migrates south for winter hibernation. The spotted bat is rare and may be limited by available roosting sites. Limestone cliffs, canyon walls, caves and mine shafts are important to this species of bat.

Fringed-tailed Myotis (*Myotis thysanodes phasapensis*): Status Unknown. This is a colonial bat that lives primarily in caves. Little is known of the population status of this bat in the area. It may not be abundant anywhere within its range. This bat gives birth in the spring to one young per year. It prefers coniferous woodlands and desert shrub situations. Records from Montrose County exist (Armstrong, 1972).

Butterflies

Regal Fritillary Butterfly (*Speyeria idalia*): Status Declining. This is an orangish-brown butterfly that occurs as scattered local populations. Adults appear mid-June to mid-September. They are found in wet meadows or marshlands. The population status of this species is largely unknown at this time on these Forests.

Great Basin Silverspot Butterfly (*Speyeria nokomis nokomis*): Status Declining. A brownish-orange butterfly, who as adults, appear in late August or September. Known localities are widely separated due to restricted habitat, which consists of boggy streambanks or marshy areas. One known locality is Mount Sneffels in Ouray County. (Tilden and Smith 1986)

Reptiles and Amphibians

Boreal Western Toad (Southern Rocky Mountain Population) (*Bufo boreas boreas*): Status Declining. The boreal western toad is a species that has rapidly declined over its range in the southern Rocky Mountains. This toad was once widespread on the Grand Mesa and areas to the east. Grand Mesa, the Uncompahgre Plateau, and the West Elk Mountains still have these toads present. The preferred habitat of this species is willow patches, sedge meadows, abandoned beaver ponds, and in shallow water near mud flats around lakes, ponds, marshes, and wet meadows at elevations above 8000 feet. It is found near water but not generally in it, except in the tadpole stage. Breeding habitat includes both permanent and temporary water sources. Breeding occurs in late May or June. In late July and August masses of black tadpoles are found in shallow water that is inaccessible to fish. This toad is expected to be placed on the threatened or endangered species list in the near future.

Plants

Gunnison Milkvetch (*Astragalus anisus*): Known to occur in one locality in Gunnison County up to 7,700 feet in elevation. It prefers dry sagebrush slopes at lower to middle elevations. Flower appears whitish, plant is 5-10 cm. tall.

Debeque Milkvetch (*Astragalus debequaeus*): White flowered milkvetch growing in sandy areas on bare clay slopes in the vicinity of DeBeque, CO. Since only six populations have been found

and all are within a few miles of town, it is believed this species geographical range is well below the Forest boundary.

Skiff Milkvetch (*Astragalus microcymbus*): This plant has been identified as present in the Elk Mountains and is likely to be present within the analysis area. Habitat at known sites is in sandy soils on sagebrush slopes, at elevations around 7,000 to 8,000 feet. Little is known about the plant at this time and it has been found only in a few locations. Skiff milkvetch is a rather tall, freely-branching plant with many quarter inch long white flowers. The equally small pendulous fruits look like an inverted skiff; the scientific name translates as "little boat", (Colorado Native Plant Society, 1989).

Grand Junction Cat's Eye (*Cryptantha aperta*): Found in 1892 in the Grand Junction area and has never been re-discovered, thus it is presumed to be extinct. If not, its described habitat is well below the National Forest boundary.

Colorado Desert Parsley (*Lomatium concinnum*): Found in Delta County near Paonia. Few populations exist in Delta, Montrose and Ouray Counties. Endemic to barren adobe hills derived from the decomposition of the Mancos shale, it grows in saltbush communities. It displays shiny green leaves and yellow flowers. Sometimes occurs with *Penstemon retrorsus* and *Eriogonum pelinophilum*. It is believed all these species habitats lies well below the National Forest boundary. (Colorado Native Plant, 1989).

Canyonlands lomatium (*Lomatium latilobum*): Found southwest of Grand Junction on steep rocky talus derived from red sandstone and in cracks on slick rock. It is known only from a few sites in Mesa and Montrose counties. Probably found below National Forest boundary.

Paradox Valley Lupine (*Lupinus crassus*): Known only from western Montrose County, it grows beneath junipers on fairly open ground or beneath pinyon-juniper stands in sandy soils. Plants have white flowers with purple tips and bloom in May. Mining and road construction are possible threats to the habitat of this species. (Colorado Native Plant Society, 1989).

Dolores Skeleton Plant (*Lygodesmia doloresensis*): Found only in Dolores River Canyon. Domestic livestock grazing has adversely affected the species and it is now only found by shrubs or clumps of prickly pear cactus, or on small sites inaccessible to livestock. About a foot tall, it produces numerous rose to lavender flowers (Colorado Native Plant Society, 1989).

Grand Mesa Penstemon (*Penstemon mensarum*): The Grand Mesa penstemon has been found only in Mesa and Delta Counties on the Grand Mesa and surrounding areas. It is found in the Gambel oak and aspen plant associations at elevations from 7,200 to 9,500 feet. Can also be found on open meadows on low creek terraces. Plants are 40-50 cm. tall. Leaves are a dull green. Flower is generally blue, (Harrington 1964). Found in a number of locations on the Grand Mesa and adjacent areas. Intensive surveys for this plant should be conducted when any oil and gas proposal is submitted.

Adobe beardtongue (*Penstemon retrorsus*): Known only from north facing slopes on adobe hills derived from Mancos shale in Montrose and Delta Counties. It displays bluish-purple flowers. Plants may be hidden among junipers, yuccas, saltbush, and sagebrush. Greatest threats to the plant are recreational use of ATVs and rangeland vegetation modifications (Colorado Native Plant Society, 1989). Plant's habitat is probably below National Forest lands.

DeBeque phacelia (*Phacelia submutica*): Found along Colorado River Valley in dark grey clay soils too dense to support most vegetation, this small plant has cream-colored flowers tinged with yellow to purple. It blooms in May and is found well below the Forest boundary.

Uinta Basin Hookless Cactus (*Sclerocactus glaucus*): This species has already been declared as a Threatened Species. It is being covered here and not in the Biological Assessment because it was not listed by the USFWS as an T&E species within the oil and gas Analysis Area. This is a small ball

cactus about 2-3" in diameter and has pink to magenta flowers. It is found on gravelly soils of hills and mesas in the Colorado and Gunnison River Valleys, below the National Forest boundary.

Penland Alpine Fen Mustard (*Eutrema penlandii*): Found on the Forests but well outside the Analysis Area, it is found in the Upper Gunnison area near Tincup. This species was proposed on 10/15/90 as an Threatened Plant. It occurs above 12,000 feet.

Clay-loving Wild Buckwheat (*Eriogonum pelinophilum*): Found in sparsely vegetated shrublands and barren adobe clay soils of the Mancos shale, this species has been declared Endangered by the USFWS, but is discussed here rather than the Biological Assessment for T&E because the USFWS has already determined that the plant is found outside the analysis area, below the Forest boundary.

Ute Ladies'-tresses Orchid (*Spiranthes diluvialis*): Listed as a Threatened species by USFWS. Discussed in Biological Assessment.

Proposed Sensitive Species

While the Region does not have an approved "official" Sensitive Species list, these species have nevertheless been proposed by either the Region or the Forest and are on a Draft Regional Sensitive Species List. Several of these species that could be affected by oil and gas development activities and are briefly discussed below:

Birds

Ferruginous Hawk (*Buteo regalis*): The ferruginous hawk inhabits grassland prairies, plains, and broken hills. Within the analysis area, this habitat is found along the lower Forest boundaries around the base of Grand Mesa and on both sides of the Uncompahgre Plateau. No nests have been identified on the Forest at this time. Ferruginous hawks return to their breeding grounds in late March or early April. Nesting begins in late April, when 2-6 eggs are laid. Young normally fledge from the nest in late April. This hawk can have 1-6 nests within each nesting territory. Nests may be reused by the same pair for many years. Nests can occur in tall trees or on the ground, usually on an elevated rock or dirt outcrop. Mammals, birds and reptiles constitute the major prey species. Breeding pairs are extremely sensitive to human activity near their nests and will easily abandon their nests if disturbed before eggs hatch. Loss of native grassland and shrubland habitat has resulted in the decline of this species. These birds migrate to more southerly latitudes during the winter. Ferruginous hawk nesting and fledging habitat is occupied during the time period from February 1 to August 15. The sensitivity of the ferruginous hawk to human associated disturbance activities requires a one-mile buffer zone to avoid nest abandonment (BLM, 1991).

Boreal Owl (*Aegolius funereus*): The boreal owl is closely associated with high elevation spruce-fir and lodgepole pine forests due to their dependence on these forest types for foraging year-round, as it does not migrate during the winter. Nesting habitat structure consists of forests with a relatively high density of large trees, open understory, and multi-layered canopy. These owls nest in cavities made by woodpeckers or in natural holes in snags. They feed chiefly on small forest mammals such as the red-backed vole. These owls have been documented on the Grand Mesa. They may also occur on the Uncompahgre Plateau and in the West Elk Mountains. Nesting activity begins with calling in February and young (2-4) are hatched in April, May, or June. Boreal owls occur in low densities ranging from .08-1.5 pairs/250 acres. Boreal owls do not migrate but are somewhat nomadic when searching for prey (Spahr, et al. 1991). They exhibit very low rates of population growth and appear to be vulnerable to the loss of spruce-fir habitat and the loss of snags, which provide cavities large enough to allow nesting. The owl is sensitive to human disturbance.

Flammulated Owl (*Otis flammeolus*): The flammulated owl is found in some habitats within the analysis area, in mixed forests from ponderosa pine and oak to aspen, spruce, and fir up to 10,000

feet in elevation. Flammulated owls, particularly northern range owls, migrate south to Mexico or beyond. Males begin arriving on their breeding territories in early May. Nests are in natural tree cavities or in woodpecker excavated holes, where 2-3 eggs are laid. Young fledge in July and adults leave their summer ranges in October. Numerous flammulated owls have been observed or recorded on the Uncompahgre Plateau while conducting surveys for spotted owls. This owl is entirely insectivorous in its food habits. The flammulated owl prefers mature ponderosa pine and Douglas fir forests with open canopies. Territories range in size from 20-59 acres depending on habitat type. Densities of flammulated owls can range from 1-5 owls per 250 acres. This owl avoids stands that have been cut over, suggesting that the cutting of mature ponderosa pine stands is detrimental to flammulated owl populations.

Merlin (*Falco columbarius*): The merlin is believed to be an uncommon summer resident on the Forest. Nests are often located in cavities in large trees usually in or near forest openings. This hawk feeds on small birds, mammals, and even insects.

Northern Harrier (*Circus cyaneus*): The northern harrier typically inhabits sloughs, wet meadows, and marshy areas with herbaceous or low woody vegetation. It nests in tall grassy areas within these habitats. Small mammals comprise most of the diet of this hawk. These Forests provide a number of areas meeting the habitat requirements suitable for breeding populations of northern harriers (also known as marsh hawks). No nests have been documented on the Forests at the present time.

Osprey (*Pandion haliaetus*): Osprey sightings have become more numerous in recent years in this area, particularly on Grand Mesa. However, no nests have been located within the analysis area. This large raptor feeds primarily on fish from either streams or lakes. This species can be sensitive to human activity at its nest site. Nests are constructed on top of snags or poles. Nest sites are generally near water but can be several miles away from their feeding sources. Less than twenty nests occur Statewide, but the population may be increasing slowly.

Young (2-4) are generally fledged in July or August. Osprey nesting and fledging habitat is occupied from April 1 to August 31. The sensitivity of osprey to human associated disturbance activities requires a half-mile buffer zone to avoid nest abandonment (BLM, 1991).

Western Burrowing Owl (*Anthene cunicularia*): This small owl of prairies and meadows may be a summer resident on the Forest within the analysis area. This owl is commonly associated with abandoned or active prairie dog colonies. At the present time no nests have been discovered on the Forest. This owl is very sensitive to disturbance near its nesting hole in the ground and has been the target of illegal shooting because of its visibility in open country. It feeds on small mammals, birds, and insects.

Fox Sparrow (*Passerella iliaca*): The fox sparrow can be found in dense thickets and in deciduous brush such as willow areas. The population abundance and distribution of this species on the Forest is relatively unknown, except that it does occur in some areas within the analysis area. One individual was captured at the Coon Creek Monitoring Avian Productivity and Survivorship (MAPS) station on the Grand Mesa in the summer of 1992, so it is a summer breeder on the Forest.

Black Swift (*Cypseloides niger*): The black swift is known to be a breeder in localized areas of North America. It is considered to be rare or uncommon throughout its entire range. One of these areas is on the Uncompahgre National Forest around the Ouray area. This bird requires ledges and crevices on high cliffs for nesting, often near or behind waterfalls.

Golden-crowned Kinglet (*Regulus satrapa*): The golden-crowned kinglet is found in coniferous forests in this area. The distribution and abundance of this species is relatively uncertain in this area, although two individuals were trapped and banded on Grand Mesa on the Coon Creek MAPS trapping station during the breeding season in 1992.

Purple Martin (*Progne subis*): The distribution and abundance of this species is also relatively unknown, although it is known to occur on the Forest in at least limited numbers. Overall it is considered to be common, locally. One nest has been located in a cavity in an aspen tree in the Muddy Park area on the Collbran Ranger District.

Pigmy Nuthatch (*Sitta pygmaea*): This species is believed to be present in limited numbers in coniferous forest types on the Forest, especially in the ponderosa pine forests. It's overall abundance is unknown at this time. It nests in small cavities, preferably in dead trees and feeds on small insects on or beneath tree bark.

Lewis' Woodpecker (*Melanerpes lewis*): The Lewis' woodpecker has been declining in overall numbers for reasons yet unknown. It requires dead trees and tall stumps for nesting. The Lewis' woodpecker is a semi-colonial species that represents the mature mountain shrub vegetative association, particularly where ponderosa pine and Gambel oak stands are present. Open park-like stands of trees with brushy understories are the preferred habitat for the species. The species is also a primary cavity nester, preferring trees that are at least 15" in diameter. Insects form the principle food items in spring and summer. Fruits and berries are also eaten in the summer, and Gambel oak acorns are utilized during the winter. The species migrates altitudinally within the analysis area as a result in changes in it's food supply.

Three-toed Woodpecker (*Picooides tridactylus*): This woodpecker can be locally common in some areas; however, its status within this analysis area is relatively unknown. It prefers dead standing trees, particularly where fire has destroyed large stands of dead trees. It forages on these dead trees for wood boring insects. Breeding occurs in May and June. Nests are in tree cavities in both live and dead trees. Generally the population density of this species is very low and is dependent on dead standing trees, particularly those with the bark still on them. Population declines have been linked to snag habitat loss from harvesting and the control of forest fires, which stifles the creation of new habitat.

American Bittern (*Botaurus lentiginosus*): The American bittern requires wetlands where tall emergent vegetation such as cattails, bulrushes, and reeds are present. These habitats are generally found in this area at lower elevational areas. However, some of these habitats are found within the area covered by this analysis. Protection of wetlands will continue to provide habitat for this and other wetland inhabitants.

Greater Sandhill Crane (*Grus canadensis*): The greater sandhill crane inhabits open habitats near shallow marshes, lakes, ponds, and streams. Occasionally it inhabits relatively small marshes and patches of prairie surrounded by forests, which is the case in this area. Larger mountain parks in the Upper Gunnison basin provide nesting habitat for this species. Most sandhill cranes in the area are migrants that stop over in the lower elevation ponds, lakes, and reservoirs. Whooping cranes are occasionally observed within these flocks of birds, in this area.

Long-billed Curlew (*Numenius americanus*): At this time it is not known whether this species' habitat extends onto the Forest. It requires grassland habitats ranging from moist meadowland to upland prairies. Its population is in a downward trend because of a loss of habitat due to grazing practices.

Mammals

Ringtail Cat (*Bassariscus astutus*): The ringtail cat can inhabit areas in western Colorado up to 9,000 feet in elevation. The preferred habitat of this species includes perennial stream bottoms with abundant trees, flanked by rimrock cliffs. This seldom seen mammal may vary from uncommon to common in certain localities. Rock crevices, tree cavities or abandoned buildings are used for denning. This animal breeds in the spring, producing one litter of 1-5 young per year. Omnivorous in feeding habits and nocturnal in nature, it has been documented along the North Fork of the Gunnison as far up

as Paonia Reservoir (Delta Co.) and from Taylor Park Reservoir (Gunnison Co). Records also exist from Montrose County.

Pine Marten (*Martes americana*): The pine marten represents the late successional stage of old growth spruce-fir forests, particularly the down woody component of these forests. The marten is generally nocturnal and is active throughout the year. It is most abundant in mature to old growth spruce, fir, and lodgepole pine forests. It will also utilize aspen forests that are intermixed with spruce and fir. Young (1-4) are born in April in natal dens found in logs, stumps, and large snags. The red-backed vole (*Clethrionomys rutilus*) and the meadow vole (*Microtus pennsylvanicus*) are staple food prey. Red squirrels and other small mammals are also important food items. Population densities of marten in good habitat vary by geographic location. In Glacier National Park, in Montana, mean home range size was estimated to be 1.0 square miles for resident males and 0.27 square miles for resident females (Hawley and Newby, 1957, Burnett, 1981). Larger home range sizes have been reported in other areas: in Minnesota, six square miles for males and 1.7 square miles for females was recorded (Mech and Rogers, 1977). Marten are easily trapped and are susceptible to over harvesting by trappers. One of the greatest threats to viable populations of pine marten is the construction of roads into their habitat.

Townsend's Big-eared Bat (*Plecotus townsendii*): This bat is colonial in nursery groups and when in hibernation, otherwise it may be solitary. These bats are late fliers and can remain undetected in an area unless they are trapped (Lechleitner, 1969). It roosts in caves, abandoned mines, rocky cliffs or buildings. Females have one young per year, usually in June. Little is known of the population distribution of this bat in the area; However, records show that a specimen was taken in the Gothic area.

Abert's Squirrel (*Sciurus aberti*): The Abert's squirrel is found on the south end of the Uncompahgre Plateau and south of Norwood in the Naturita and Lone Cone areas. The Abert's squirrel is unique in that it is almost totally dependent on the ponderosa pine - its food and cover requirements are met solely by this species of pine tree. Stands that average between 11 and 13 inches diameter at breast height and have a basal area of between 150 and 200 square feet/acre are preferred nesting sites (Patton, 1977). A few Abert's squirrels can also be found on the north end of the Plateau. Ideal habitat for this squirrel may be an older stand with all ponderosa pine age classes represented. They prefer to build their nests 30-50 feet above the ground in mature ponderosa pine trees. Home range size in one study area was approximately 5 acres in winter to 24 acres in summer (Pederson, 1976). Abert's squirrels have and use more than one nest in their home range. Young (3-4) are born in May or early June. Stick nests, tree cavities, and witches brooms are used for young rearing. The primary food of the Abert's squirrel include seeds, buds, terminal twigs, cones, and inner bark of ponderosa pine. A ground cover of 80% or more in litter is desirable.

Pigmy Shrew (*Microsorex hoyi*): The pigmy shrew may be found in western Colorado in disjunct or relic populations in boreal forest type habits. Populations may be separated from the main distribution of the species by hundreds of miles (Lechleitner, 1969). It breeds in the spring and summer and can have several litters of 5-7 young. Pigmy shrews can be found in wet or dry wooded areas adjacent to moist meadow clearings. This is a rare mammal and is the smallest mammal in the world. The exact population status of this species is unknown at this time.

Dwarf Shrew (*Sorex nanus*): The dwarf shrew may be found in scattered locations in western Colorado. It is quite rare and can be found in drier habitats than the pigmy shrew. The exact population status of this species is not known on the Forests at this time. Life history of this mammal is not well known. Specimens from this part of Colorado are absent (Armstrong, 1972).

Reptiles and Amphibians

Northern Leopard Frog (*Rana pipiens*): The northern leopard frog typically inhabits the banks and shallow portions of marshes, ponds, lakes, reservoirs, beaver ponds, streams, and other bodies of permanent water, especially those areas having rooted aquatic vegetation. This species can also be found in wet meadows. These frogs become active in March and remain active until October, or into November at lower elevations. It breeds in shallow, non-flowing portions of permanent pools. A typical breeding pool contains vegetation, mats of algae, and fairly clean water (Hammerson, 1982). This once abundant frog species in Colorado is becoming increasingly scarce throughout much of its range for unknown reasons.

Tiger Salamander (*Ambystoma tigrinum*): This species occurs in most habitats that contain non-flowing water suitable for breeding up to 12,000 feet in elevation, in this area. Preferred sites include those ponds that are mud bottomed and at least 18" in depth, with a shallow shoreline. In spring, the tiger salamander leaves its winter dormancy burrows to migrate to the breeding ponds. This occurs from April to July depending on elevation (Hammerson, 1982).

Smooth Green Snake (*Opheodrys vernalis*): The smooth green snake inhabits lush areas of herbaceous vegetation, especially near streams or ponds. However, it can inhabit mountainous areas far from water. This snake is active from May to September in mountainous areas. When in a state of inactivity it stays underground for the most part. Terrestrial insects are a primary food source. Breeding and reproductive activity is largely unknown for Colorado (Hammerson, 1982).

Other Species of Special Interest or Concern

Plants

Degener beardtongue (*Penstemon degeneri*): This penstemon is one of the least known penstemons in Colorado. The plant has been identified from Grand Mesa and only a few other sites in the State of Colorado. It is most likely to be found in the pinyon-juniper woodlands. The plant is a foot or more tall and has very few leafy stems. Flowers are a dark blue, less than an inch tall.

Paradox lupine (*Lupinus crassus*): Known only from western Montrose County on the west side of the Uncompahgre Plateau, it grows beneath junipers on fairly open ground, and within stands of mixed pinyon and juniper. It usually grows in sandy soils derived from the Dakota, Burro Canyon, and Chinle Formations. It can also be found on adobe hills. Mining and road construction are the greatest threats to the habitat of this species. (Colorado Native Plant Society, 1989).

Giant helleborine (*Epitactis gigantea*): This orchid is found in a few locations in western Colorado. Decomposed granite sandstone around springs, seeps and hanging gardens in canyon country are its preferred habitat. It is distinguished by rich brown marking on a silver dollar size flower.

Black Canyon Gilia (*Gilia penstemonoides*): Scattered over Gunnison, Montrose, and Ouray counties there are thirteen known populations. Trumpet shaped lavender to purple flowers on 4" long stems rise from a dense basal rosette of leaves. It flowers early June to late August.

Lanceleaf Spring Beauty (*Claytonia lanceolata varflaiva*): This flower is found in Western Colorado between 5,000 and 10,000 feet on moist ground. Flowers open only one day and last only that day. A plant with delicate pale pink blossoms, it blooms around snowbanks (Nelson 1970).

Species Surveys Completed or Proposed

It is highly probable that inventories will be required to document the presence or absence of any Candidate or Sensitive species. These inventories will be conducted prior to the issuance of any APD where the unknown potential exists that any of these species may occur in the area. Specific inventories may be required in lease areas prior to any development. Provisions in the oil and gas lease provide for requiring inventories so that activities can be relocated to avoid Candidate or Sensitive species of animals, fish, and plants. Locations of previously inventoried species in these categories are afforded protection through seasonal timing and *No Surface Occupancy* stipulations on the lease.

Some surveys and inventories are currently being performed or are planned for a number of species identified in this Evaluation. A brief summary of ongoing and planned surveys follows:

Southwestern Willow Flycatcher- Inventories are being conducted at two specific locations for neotropical birds. This species will be inventoried at these two sites.

Colorado River Cutthroat Trout- Inventories of this species will begin on the Grand Mesa Area in 1993. Some survey work has already been completed.

Goshawk- Previous goshawk surveys were completed in portions of the analysis area in the late 80's. Goshawk surveys were started in 1991 and were intensified in 1992. As a result, several new nesting sites were located within the analysis area. More intensive surveys are planned for 1993.

Columbian Sharp-tailed Grouse- Surveys are planned for this species on the Uncompahgre Plateau in 1993.

North American Wolverine- A few project specific surveys have been done for the wolverine in 1992. Additional survey work is needed in 1993.

North American Lynx- A few project specific surveys were conducted for this species in 1992. Additional survey work is needed in 1993.

Boreal Toad- Some coordinated survey work has been done on several areas in 1991 and 1992. Additional survey work will be performed in 1993. One population was found last year.

Grand Mesa Penstemon- Inventories have been done on portions of Grand Mesa and several locations have been mapped where this plant is found.

Boreal Owl- Some call surveys have been conducted for the boreal owl in past years. A research project was begun last year to systematically inventory this species on the Forests. Four hundred boxes, suitable for boreal owl nest occupancy were placed on Grand Mesa, the Uncompahgre Plateau, Lone Cone Area, and the Owl Creek Pass area. These boxes will be monitored to determine if a boreal owl population exists and what the population density may be.

Flammulated Owl- This species of owl was found in several locations on the Uncompahgre Plateau and adjacent areas on surveys being conducted in conjunction with Mexican Spotted Owl surveys done in 1990 and 1991.

Osprey- Limited surveys will be conducted on Grand Mesa in 1993 to determine if any breeding pairs occur on the Forest.

Other Plant and Animal Surveys and Inventories have been completed on a limited basis and usually in relation to a specific project. These surveys will continue to be performed throughout the analysis area whenever a project is proposed.

Affect on Candidate and Species of Concern in the Area

Wildlife Effects

Direct Effects

The potential effects of oil and gas development on wildlife in wildland environments can be both numerous and varied in their intensity. The severity of the effect is site-specific and depends on such factors as: (a) the sensitivity of the species affected; (b) the type of disruption; (c) the characteristics and importance of the affected habitat and; (d) the availability and condition of alternate habitat (Bromley 1985). Oil and gas activities will adversely impact some wildlife species or their habitat wherever they will occur. Carnivores and raptors may be affected more because of their sensitivity to disturbance. Response to disturbances will vary among species and even individuals depending on the type, duration, and severity of the disturbance. These effects may be most critical (a) during times when the animals are already stressed by natural conditions, (b) in habitats traditionally used by populations during critical periods of their life cycles, (c) for species whose social organization or behavior makes them susceptible to disturbance, and (d) for certain sex or age groups of animals (Bromley 1985). This effect will either be a permanent or temporary effect depending on the type of activity. A well pad on top of essential habitat is a permanent effect for the plant or animal species involved. A seismic blasting operation may be a temporary effect on a larger species because the activity may just result in a temporary displacement of the animal into an adjacent area until the disturbances have subsided. A seismic blast on a site occupied by a rare plant would be much more devastating. For the purpose of this analysis the effects of activities can be addressed for seismic activities, exploratory drilling, field development, and connected actions.

Seismic

The impact of a seismic activity on wildlife can be separated into two functions: 1) the impact of the activity and; 2) the resultant impact of access if roads are constructed or reconstructed/reopened to allow access for seismic conducting activities. In many situations seismic activity will conflict with wildlife utilization of key habitats (Stubbs 1979). The degree of impact will depend on the intensity of the activity, the number of concurrent activities, the number and extent of seismic lines, and the length of time that key habitats will be affected. Timing restrictions are generally applied to activities so that wildlife or fish will not be disturbed or displaced in their preferred or critical habitats during times of the year when disturbance is least tolerated. These restrictions, if adopted, would minimize or reduce the level of permanent or temporary disturbance on wildlife, or fish or their habitat. Additional restrictions should be adopted for seismic operations to minimize the overall effect of these activities on various wildlife species. These are:

1. Locate crew campsites out of key wildlife and riparian habitats.
2. Firearms should not be allowed in camps or on the job for crew personnel.
3. Helicopters should be kept to specific flight lines or lanes of travel.
4. Require that seismic lines be relocated to preserve special wildlife or fish habitats when they are encountered or identified prior to activity. Special habitats include but

are not limited to: mineral licks, fish spawning streams, waterholes, migration routes, bedding sites, nests and dens, etc.

5. Establish helicopter flight corridors along the seismic lines and between the landing zones and the lines. The width should generally not exceed one-half mile in width. Maintain a distance of one main drainage or three tributary drainages between concurrent seismic lines. In a study in Montana radio collared elk move away from helicopters and blasting activity and stayed at least one major ridge or drainage from the disturbance, mostly in heavy cover (Olson, 1983). It is assumed that the larger more mobile animals would do likewise.

Exploratory Drilling

Drilling for oil and gas creates much the same problems for wildlife as seismic in that the impact can be separated into two functions: 1) the activity itself and; 2) the subsequent increase in access (Stubbs, 1979).

Activity

Timing: Timing restrictions placed on drilling are similar in design to those placed on seismic activities. These reduce the harassment factor on wildlife during those times of the year that are critical to the wildlife species involved.

Construction/Well Pad Sites

1. The access road to any site should be aligned such that it does not cross key wildlife habitats or streams important to cutthroat trout, and should be located where sight distances will be minimal (a thick forested area rather than through an opening or sparsely vegetated area). To prevent long lines of sight along the roads themselves the road should be curved every 300 feet unless limited sight distances are already achieved by natural terrain features. Roads can increase harvest (legal and illegal), harassment, road mortality, and increased sediment in streams.
2. Campsites, garbage disposal, and control of recreational activities should be addressed similar to that discussed under seismic activities.
3. The well site should not be located on or near key wildlife habitats such as strutting grounds, mineral licks, springs, etc. Wherever possible, they should be located in heavily vegetated areas so that sound disturbance to surrounding areas is minimized.
4. Firearms, ATV's, motorcycles, and snowmobile use by personnel should be prohibited.

Access

Drilling activity results in an increase in the number of new roads that have to be constructed into an area. This can dramatically increase the number of both legal and illegal hunting that could occur. This can result in a overall reduction in wildlife numbers and other species that are otherwise trapped or hunted. These roads can also result in increased illegal butterfly or plant collecting. Furbearers are especially vulnerable to trapping in previously unroaded habitats. Access routes, even though closed, provide access by snowmobiles and foot to trapline sites which were previously inaccessible to trappers. The main objective then is to strictly control public access through road closures to all motorized vehicles during operations and the physical permanent closure of the roads after the operations are complete. The following access restrictions are recommended:

1. Access roads should be signed and closed with a locked gate at all times for the protection of the wildlife and fishery resources. If deemed necessary, the road should be manned on a 24 hour basis during certain time periods, such as during the hunting seasons.
2. Where possible, companies should be required to use each others, or existing already constructed open roads to reduce the degradation of wildlife habitat.
3. Physically close or recontour the road back to original slope. Keep closed to all motorized traffic.

Field Development

Normal well spacing in western Colorado is three wells every section or square mile. This kind of intensive development can result in serious wildlife conflicts and the substantial reduction of wildlife and their habitat since each well must have road access to it.

1. Wherever possible, existing roads should be used to access well sites. Companies should be required to "double up" using the same access route for more than one well site. While in use, roads should be open only to the oil or gas company unless the route was already open to the public before the activity occurred. Roads should be closed and reclaimed when seismic, wildcat wells, or full field development activity is completed.
2. Pipeline right-of-ways should accommodate more than one line to reduce the amount of wildlife habitat disturbance. Reclaim disturbed routes with palatable forage species unless they are along existing roadways.
3. Development of a transportation plan should be completed so that public access can be limited and not improved in previously unroaded habitat important to wildlife, fish, and plants. Centralized points of access should be established to minimize open routes.
4. Intensive wildlife habitat development schemes and mitigation measures should be implemented to increase carrying capacities for wildlife to offset losses incurred during the operations. This will attempt to replace habitat lost through road construction and well site development.

Potential Effects on Selected Species

The effects anticipated can be related to the size of the home range of the species, whether the species is migratory or non-migratory, or if the species has a very narrow habitat type dependency.

The potential effects on songbirds and waterfowl species should be very minimal and local in nature because there should be very little or no activity in riparian habitats where the largest numbers of these species congregate. Roads and well sites will reduce the available habitat for a number of species of Forest songbirds.

The Colorado River cutthroat trout should not be adversely affected because activities must be kept out of riparian areas and stream corridors. General increases in sedimentation from road or well pad construction will degrade the quality of streams in some areas. Streams containing this fish should be protected.

The pine marten has a relatively small home range and is dependent upon mature to old growth spruce/fir and lodgepole pine stands. Oil and gas activity in itself will have less of an effect on the pine marten than the cause and effect connected action of potential timber harvest along the roads

constructed for oil and gas activities. Timber harvest along these roads will fragment the old growth stands making habitat much less capable of supporting healthy pine marten populations. Timber harvest greatly reduces the habitat of the red-backed vole which is one of the chief prey items of the marten. Adding to this situation is the fact that roads, even when closed to vehicles, provide easy winter access to preferred pine marten habitat by trappers either on foot, skis, or on snowmachines. Habitat loss, coupled with direct mortality due to trapping generally results in greatly diminished or exterminated pine marten populations over time in that particular area. Similar declines can be expected in other furbearing mammals such as the wolverine and lynx. These species require unroaded forested habitats and are adversely affected by any incursions into their habitat. As discussed in detail in other sections of this Evaluation, these species' habitat will be degraded with any road construction or subsequent timber harvest activities. Measures must be taken to protect them.

The Goshawk represents a group of species that utilize mature to old growth aspen and mixed aspen/conifer forest types. The goshawk has a large home range and migrates south during the winter months. The goshawk is a large raptor that nests in old stands of timber and is very sensitive to disturbance at or near it's nest site. They often have several alternate nests in the area of their active nest. Disturbance from any human related activity can cause abandonment of the nesting process especially in the early stages of egg laying and incubation. Known goshawk nesting sites should be avoided when selecting road and drill pad locations. For goshawks, manage road densities at the lowest level possible to minimize disturbance to the nest area (Reynolds 1992). The most detrimental effect on the goshawk and its habitat could come from the cause and effect connected action of timber harvest along roads constructed for the oil and gas activities. Clearcutting of aspen stands converts goshawk habitat into habitat well suited to the red-tailed hawk which is not experiencing population declines. Other raptor species will require habitat protection as well.

Forest owls such as the Boreal and Flammulated are very sensitive to disturbance by man and his activities. These species and their habitat must be protected both from habitat degradation and from noise and other disturbances. It is also critical to protect large dead snags with cavities, upon which these species are totally dependent for their nesting.

The Abert's squirrel has a very narrow range of habitat use in that it requires mature ponderosa pine forests exclusively for its livelihood. Individuals have very small home ranges and would be adversely affected by new road construction or drill pad construction in mature or old growth stands of ponderosa pine. This would result in a loss of already very limited habitat. Roads through prime habitat will result in direct mortality of animals crossing these roads. The cause and effect connected action of possible timber harvest in previously inaccessible mature ponderosa pine stands would be very detrimental to the future existence of the Abert's squirrel which is already declining in numbers.

The Three-toed and Lewis' woodpeckers would be directly impacted to a minor extent by road or pad construction. However, potential timber harvest as a connected action would have a more far-reaching effect on woodpecker populations (primary cavity nesters) and a large group of other birds and small mammals that nest or den in the cavity excavations of the woodpecker family. These cavity excavators rely on large mature or old growth ponderosa pine, Douglas fir, aspen, lodgepole pine, Engelman spruce and subalpine fir trees for their nesting habitat.

The Columbian sharp-tailed grouse breeding grounds (leks) and winter habitat are most likely to be adversely affected by exploration or development. Braun (1987) stated that "with the discovery of oil and gas resources, especially in the 1930's and 1940's, impacts of energy development on wildlife resources in western North America increased". Studies in North Park, Colorado (Colorado Division of Wildlife, unpublished data) suggest that sage grouse populations, as measured by counting males on leks, decreased dramatically during initial stages of oil field development. The decrease is related to loss of habitat caused by site preparation, road development and associated human disturbance. Leks are areas where courtship, breeding, nesting, and brood rearing take place. Leks are traditional and absolutely necessary to the local grouse populations. These areas and wintering grounds are essential

habitat components necessary to maintain quality sharp-tailed grouse habitat. Leks and 1/2 mile areas around them should be protected.

Important bat habitat such as caves or abandoned mines should be considered in the development of oil and gas developments. These habitats should be avoided.

Butterfly habitat is generally very local and would be highly susceptible to habitat degradation, therefore these areas should be avoided.

Species such as amphibians, reptiles and small mammals occupy very localized habitats. These habitats, as with the larger wildlife species' habitats must be protected from development.

Rare plant communities can be degraded or destroyed unless these essential habitats are protected from roads and well sites. Sites can be avoided because these areas will be inventoried prior to activity. Multiple year surveys may be needed for some plants because their presence may not be evident every year, as they may bloom sporadically, depending upon climatic and other factors.

Disturbance from oil and gas exploration and development activities could result in nest or den abandonment, actual destruction of nesting and denning sites and habitat and the elimination of one or more of a species key habitat components which is necessary towards the survival of the species. These key habitat components requiring protection include such things as roosting sites, nesting grounds, breeding areas, important feeding sites, prey species, old growth forests, prey areas, etc. Seismic activities or drilling operations during a species courtship display periods, nest or den construction periods, egg laying/incubation or young bearing time periods could cause a species to abandon any further attempts to produce young. Some birds exhibit behavioral responses which are greatly influenced by humans and human related activity. For example the response of large raptors to human activity may vary considerably from species to species and from individual to individual. For many species, like the goshawk, nest abandonment is most likely to occur prior to or during the egg laying process rather than after young have been hatched and are being fed routinely. Disturbance to birds and mammals at their nesting or denning sites can cause excessive cooling of eggs or chilling of young birds and mammals because parent birds and mammals remain away from the young due to the presence of people. Premature fledging or movement away from nesting and denning sites can cause death to birds falling from nests or can result in the young being preyed upon by other birds or mammals.

Raptors such as hawks, falcons and owls are especially sensitive to human related activity or disturbance. Human activity associated with oil and gas exploration or development should be restricted one month prior to nest selection to one month after hatching for large raptor species. Impacts to the young of many mammal species may not be as common because mammals tend to hide nests out of sight of humans or underground. While the nests of birds, especially cliff dwelling and tree nesting species are often very visible. The impacts to many amphibians and reptiles is largely unknown at this time, although, many of these species make small dens underground which may be afforded better protection. The assessment of impacts on small forest birds and mammals, waterfowl and shorebirds are less known. Small forest birds and mammals have relatively small home ranges and would not be adversely affected unless roads or drill pad construction areas were constructed directly on or adjacent to their individual home ranges. Cause and effect connected actions could be far more detrimental to these species than the oil and gas activities themselves.

The Forest has a number of species that the U.S. Fish and Wildlife Service calls Federal Candidate wildlife, fish, and plant species. The boreal toad could be adversely affected by any road or drill pad construction if it is above 9,000 feet and in or near any wet bogs or ponds. North American wolverine, lynx, and pine marten inhabit the Forest and their habitat would be dramatically degraded with the construction of any new roads in previously unroaded habitat. These are backcountry "roadless" type species that are very sensitive to the presence of man. Any new road construction proposals need address these three species. These three species and their habitats will be additionally affected by cause and

effect connected actions such as possible logging of forested stands from roads constructed for oil and gas activities. Increased trapping of these three furbearing species could also occur as a result of easier access to their habitat even, if roads are closed to vehicle travel.

Cumulative Impacts

Important to consider is that the cumulative effects and impacts of oil and gas leasing and connected actions and effects, as well as other projects planned for the Grand Mesa, Uncompahgre and Gunnison National Forests may be significantly greater than the total effect of oil and gas activities considered alone. The cumulative effect of oil and gas leasing and its connected actions and adjacent or succeeding actions such as timber sales, recreational developments, subdivision and land development on wildlife, is largely unknown at this time. The opening up of unroaded habitat that was previously not available for timber harvest will adversely affect wildlife more than the oil and gas activity itself. Additionally, these roads would allow trapping or poaching in wildlife habitats which were inaccessible to prior to leasing. One activity considered alone may cause a temporary displacement of an animal species, but when several activities are occurring simultaneously in adjacent drainages, permanent displacement or outright elimination of the population could occur because of a lack of essential habitat.

At the present time these species' habitat is being disturbed in some areas because of the various activities occurring on the Forest. These activities include timber harvest, increased developed and dispersed recreation sites, subdivision and development, road construction, livestock grazing and numerous other activities. These activities will complicate the evaluation of future cumulative effects analysis done for future oil and gas project proposals. Because of the inability to identify where or when specific oil and gas activities are going to occur, it is impossible to accurately evaluate cumulative effects of future activities at this time. Each specific project proposal's Biological Evaluation will have to assess cumulative effects of the proposed project in light of the completed or ongoing activities in the zone of influence of the proposed activity. The evaluation of cumulative impacts will be a critical factor in determining the effects of oil and gas activities on the Candidate or Sensitive species in the study area under analysis. Consequently all future Biological Evaluations will include a section on Cumulative Effects.

An example of this type of discussion pertinent to this evaluation follows:

If Roadless Areas are entered with oil and gas development activities there will be a very negative effect on the variety and density of wildlife species which use these areas as security habitat or as the only habitat where they can survive. Some of the species which are dependent upon these areas for all or most of their habitat requirements include the lynx, wolverine, pine marten, goshawk, three-toed woodpecker, Lewis' woodpecker, and other species. Roads will result in reduced security cover and increased access by hunters, making all wildlife species more vulnerable to hunters or poachers. Many furbearers such as the lynx, wolverine, and pine marten will become more vulnerable to local extirpation and extinction as is evidenced by the eradication of these and other species in the Rocky Mountains as more and more development occurs. Roads will provide access routes to trappers who can easily "trap out" small relic localized populations of lynx, wolverine, and pine marten. Roads and associated timber harvest would cause forest fragmentation resulting in the disappearance of a number of wildlife species that require large home ranges of natural communities.

The combined effect of all these activities will be much more impactful on wildlife, fish, and plant species than just the planned activity of oil and gas development. Protection of Roadless Areas in their natural state are preferred so that the health and maintenance of wildlife populations can be achieved.

Mitigation Guidelines at Time of Application for Permit to Drill (APD)

Surveys to document occurrences and potential affects on all listed and proposed species of plants and animals is required at the APD analysis stage and prior to on the ground activities. Water depletion issues and possible impacts to fish will be addressed, assessed and resolved at the APD stage for all oil and gas activities that may have the potential to affect these species. In addition, these mitigation guidelines and any others developed at a later date shall apply:

A. Helicopters

1. Helicopters should stay far enough away from cliffs and river corridors so as to prevent disturbance or possible mortality to raptors, waterfowl, or shorebirds.
2. Most wildlife species are active during the dawn and dusk hours. Travel in helicopters should be restricted during this time period.
3. Helicopters should be kept to specific, pre-determined lanes of travel or corridors.

B. Roads

1. Roads should be constructed to the minimum standard necessary and placed away from sensitive wildlife, fish, or plant habitats.
2. Road construction should be severely restricted or prohibited in riparian areas.
3. Oil and gas activity roads should be closed to all other vehicle traffic, except authorized administrative use. Locked gates will be necessary and enforcement, including manning and patrolling, may be necessary.
4. Roads should be permanently closed and rehabilitated once their use for oil and gas has terminated. Physical barriers should be used to close the roads. Close to all motorized vehicles yearlong. In sensitive wildlife areas roads may need to be recontoured to original slope so that the area does not receive summer or winter use.
5. Following permanent closure, all roads should be seeded to clover, grasses, and shrubs identified as valuable to wildlife and native to the area if at all possible.
6. Regulate oil and gas activity traffic to control the numbers and timing of vehicles using the roads, especially during sensitive wildlife periods.
7. Straight stretches of roads should be avoided by placing curves at least every 1,000 feet or less, except where line of sight is restricted by natural means.
8. Whenever possible, roads should be placed in timbered areas where visibility into other areas will be limited. This screening will also reduce road traffic noise.
9. Maximum utilization should be given to existing access routes so that new road construction will be held to the absolute minimum.
10. Roads should be properly drained in order to prevent sediment from entering streams.

11. Roads should be constructed so that if trucks carrying potential pollutants go off the road, they will not spill into streams.

12. Roads will not be located near streams where sedimentation can destroy Colorado River cutthroat trout spawning sites or near important wildlife habitats such as Columbian sharptail grouse leks, denning areas, feeding and nesting sites, etc.

13. Roads cannot be placed near any Federal Candidate or sensitive plant species that would provide easier access for illegal plant collecting.

C. Oil and Gas Associated Activities

1. Seasonal and temporal restrictions of activities should be made during periods of high wildlife use.

2. Oil and gas activities should be restricted so that disturbance is not occurring simultaneously in adjacent drainages.

3. Oil and gas activities should be restricted so that the number of seismic lines, roads, utilities, etc. can be minimized.

4. All oil and gas activities should have timing restrictions to minimize or eliminate disturbances to wildlife (see Appendix 1 for time periods when restrictions may be necessary).

5. Blasting, drilling, helicopters, human activity, etc. must be restricted or prohibited around sensitive wildlife, fisheries and/or plant areas.

D. Water Quality

1. For point-source discharges the Forest will require that water quality standards as defined in Section 401 of the Clean Water Act be met to ensure protection of downstream aquatic resources.

2. Developments will be located outside of riparian and wetland areas unless alternative routes have been reviewed and rejected as being more environmentally damaging. Pits shall not be constructed in alpine, wetland/riparian, or floodplain areas. In addition, pits shall not be constructed in a manner that results in materials seeping or being transported overground to these areas.

3. Compliance with Executive Orders 11988, Floodplain Management, and 11990 Protection of Wetlands will be required and evaluated, using U.S. Water Resources Council Floodplain Management Guidelines 43 CFR 6030 for any proposals that could affect these resources. Locate new facilities outside of the 100 year floodplains (Executive Order 11988).

4. Whenever possible, avoid the addition of muds of known or suspected hazardous additives to protect ground and surface water resources.

5. Casing integrity tests should be required to reduce the potential for migration of fluids between water-bearing zones as required by the BLM.

6. Install surface casing to below the deepest underground source of drinking water to seal the well from tributary groundwater bearing formations.

7. All operations shall be conducted in such a manner as to prevent damage, interference, or disruption of water flows associated with all springs, wells, lakes, streams and rivers. Unforeseen damage, interference, or disruption will be mitigated appropriately.

E. Oil and Gas Developments

1. Powerlines should be designed in such a manner that birds of prey cannot be electrocuted.
2. Pipelines should follow existing roads so that additional loss of habitat will not occur. Pipelines must be placed so that they do not inhibit the movement of wildlife. Slash will be disposed of properly.
3. Drill sites should not be located near riparian zones, streams or wildlife watering areas.
4. Avoid locating drill sites, test holes, etc. near special wildlife habitats such as mineral licks, travel corridors, burns, etc.(BLM 1991).
5. Drill sites and pads should be located within forested areas, wherever possible, to lessen noise levels and reduce disturbances.
6. Sump ponds, settling ponds, or toxic sumps should be fenced, covered, and placed where danger to fish and wildlife is minimized and where breakage, should it occur, could be easily contained.
7. Pipelines and major pipeline rights-of-way should accommodate more than one line to reduce habitat destruction (Stubbs, 1979)

F. Wildlife/Human Interactions

1. No firearms or pets should be allowed by project personnel during the life of the project. Hunting will not be permitted by project personnel.
2. Travel to and from work sites during high wildlife use periods will be restricted.

Decision

The recommendation for oil and gas leasing, as identified in the Final Oil and Gas Leasing Environmental Impact Statement will have no impact on any Federal Candidate or Species of Special Interest (Sensitive Species). This no impact determination is based on the assurance that project specific Biological Evaluations will be completed before any land disturbance activity can commence and the inclusions of other stipulations, coordination requirements, and guidelines which can control key habitat disturbances, restrict human access, and coordinate activity patterns will be included.

Subsequent oil and gas activity proposals resulting from this recommended leasing action will require a site specific Biological Evaluation for each activity or APD that may occur. Any one of these future evaluations could conclude one of the following:

No impact.

May impact individuals but not likely to cause a trend to Federal listing or a loss of viability.

Likely to result in a trend to federal listing or loss of viability.

These site specific Biological Evaluations will discuss all those species discussed here and any other animal, fish or plant species or their habitat that may be added to the Federal Candidate or Sensitive Species lists issued by the U.S. Fish and Wildlife Service and Forest Service respectively, between the present time and when an activity is proposed. Any future determinations would be made where the presence of these species or their habitat occur in an area where the activities are proposed. Variables such as timing, location, magnitude, restrictions, and mitigation will all be factors in the determination of impacts.

The probability that a specific activity would impact any one of these species increases as you progress through the phases toward production because of the greater length of the potential disturbance periods involved in the later stages of oil and gas development.

At this point in time, there is insufficient information on where specific activities are going to occur to make a determination of impact on any one particular project resulting from leasing. Project specific Biological Evaluations will be required and conducted in order to identify where adverse impacts could occur and to identify applicable coordination measures to assure their protection. The incorporation of the Mitigation Measures and Stipulations in all of the leases assures that these species will not be adversely impacted. See Appendix 2 for specific elements that should be addressed in all future site specific Biological Evaluations.

Coordination and Additional Data Requirements

Four basic types of information will be required at the time an activity is proposed, to adequately evaluate the effects of oil and gas projects that are being proposed in the area.

1. A determination if any Federal Candidate or Species of Concern (Sensitive) or its habitat occurs in the area.
2. Identification of the key habitat components in sufficient detail on the ground so coordination measures can be implemented. This type of data will be gathered in the following manner:
 - a. General data on importance of specific habitats for the species involved, gleaned from current research findings applicable to the area.
 - b. Specific locations of important habitat components will, for the most part, be identified at the project specific assessment. The scope of these assessments will consider the dates identified in the stipulations used to protect wildlife and fisheries habitat reflect average conditions. Site specific assessments could identify variances in these distances or dates because of differences in topography, vegetative screening, or reproductive behavior.
3. Refinement of information on effects of oil and gas activities on T&E Species, and specific coordination measures needed to control the identified effects. This type of information will be gathered from current research findings applicable to the area.
4. Specific information on what type and level of oil and gas activities are going to occur and where these activities are proposed. This information can only be obtained from the specific applications for exploration or development permits. This information is essential, and the assessment of effects cannot be undertaken without it.

Conferencing and Consultation with Fish and Wildlife Service

- 6/4/92- The Grand Mesa, Uncompahgre, and Gunnison National Forest requested a species list from the U. S. Fish and Wildlife Service.
- 7/1/92- The Forest received letter from Fish and Wildlife Service describing species found within the analysis area.
- 8/10/92- Informal consultation between Tom Holland (FS) and Terry Ireland (FWS) on their review of the Draft.
- 12/15/92- Informal consultation between Tom Holland (FS) and Terry Ireland (FWS).
- 1/22/93- Informal consultation with Keith Rose, Assistant Colorado State Supervisor.

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APPENDIX 1: Time periods important to Candidate and Species of Concern that will require timing restrictions or coordination:

| | <u>Habitats Found</u> | <u>Critical Time Periods</u> |
|----------------------------|-----------------------|------------------------------|
| SW Willow Flycatcher | Riparian Shrubs | May 1 to July 15 |
| Colo. River Cutthroat | Clear Streams | May 1 to August 31 |
| Goshawk | Mixed Forests | March 1 to July 31 |
| Harlequin Duck | Clear Streams | Late April to July |
| Columbia Sharptail Grouse | Small Open Parks | March 1 to June 15 |
| Wolverine | Forest/Alpine | Feb.1 to June30 |
| Lynx | Forests | March 15 to July 15 |
| Spotted Bat | Caves | May 15 to July 15 |
| Regal Fritillary Butterfly | Wet Meadows | June 15 to Sept. 15 |
| Great Basin Silverspot | Boggy Streamsides | Aug. 1 to Sept 30 |
| Boreal Toad | High Elevation Ponds | May 15 to Aug.15 |
| Ferruginous Hawk | Open Prairie | March 15 to June 15 |
| Boreal Owl | High Elev. Forests | Feb.1 to June 30 |
| Flammulated Owl | Ponderosa Forests | May 1 to July 15 |
| Northern Harrier | Marshy Areas | May 1 to July 15 |
| Osprey | Large Lakes | April 1 to July 30 |
| Lewis' Woodpecker | Ponderosa Parkland | May 1 to July 15 |
| Three-toed Woodpecker | Snag Stands | May 1 to July 15 |
| Ringtail Cat | Rimrock Cliffs | May 1 to July 30 |
| Pine Marten | Conifer Forests | April 1 to June 30 |
| Abert's Squirrel | Ponderosa Pine | April 1 to June 30 |
| Plants (all) | All Habitats | Yearlong |

APPENDIX 2: Resource Considerations for Site Specific Project Biological Assessments.

Site specific biological assessments to determine the potential effects upon Threatened, Endangered, and Proposed Species should include an analysis of at least the following:

1. Direct impact from road, drill pad, well site, construction etc. on key habitats utilized. (Appendix 1)
2. Disturbances which could influence the use of key habitats (Appendix 1); e.g. blasting, helicopter operation, heavy equipment operation, vehicle traffic or human presence.
3. Water depletions during the exploration and development of wells and any other activities related to oil and gas development activities, i.e., road construction and use.
4. Increased human disturbance and the probability of human/wildlife conflicts.
5. Direct mortality from oil and gas activities; e.g., toxic sumps, powerlines, illegal shooting etc.
6. Disruption of wildlife travel corridors and migration.
7. Disturbances which could affect reproductive success or productivity of any of the species discussed in this Biological Evaluation. (See Appendix 1).
8. Disturbances which could preclude the use of suitable, currently unoccupied habitat.
9. Analysis of cumulative effects.
10. Analysis of habitat modification.
11. The lessee will be responsible to see that thorough searches are made for Candidate or Species of Concern within any area where activities might occur.
12. The lessee may be responsible to see that all Candidate and other species surveys are conducted prior to any activity.



UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

FISH AND WILDLIFE ENHANCEMENT
 Western Colorado Sub-Office
 529 25½ Road, Suite B-113
 Grand Junction, CO 81505-6199

PHONE: (303) 243-2778

FAX: (303) 245-6933



JUL - 1 '92

IN REPLY REFER TO:

FWE/CO:FS:GMUG
 MS 65412 GJ

June 29, 1992

Mr. Robert L. Storch
 Forest Supervisor
 Grand Mesa, Uncompahgre, and Gunnison National Forests
 2250 Highway 50
 Delta, Colorado 81416

| | |
|---------------------|--|
| SUPERVISOR | |
| EXECUTIVE ASSISTANT | |
| PAO | |
| ADMIN | |
| FWFE/TIMBER/FIRE | |
| LMP/NEPA/SWM | |
| REC/CULT RES/LANDS | |
| ENGINEERING | |
| RANGERS | |
| <i>Green</i> | |
| PROMISE CARD | |

Dear Mr. Storch:

This responds to your June 4, 1992, letter regarding the preparation of an Environmental Impact Statement for oil and gas leasing on portions of the Grand Mesa, Uncompahgre, and Gunnison National Forests. You have requested a list of federally listed species that may occur in the analysis area.

The following federally listed species may occur within the analysis area.

FEDERALLY LISTED SPECIES

- | | |
|----------------------------------|----------------------------------|
| Peregrine falcon | <u>Falco peregrinus</u> |
| Bald eagle | <u>Haliaeetus leucocephalus</u> |
| Mexican spotted owl ¹ | <u>Strix occidentalis lucida</u> |
| Black-footed ferret | <u>Mustela nigripes</u> |
| Colorado squawfish | <u>Ptychocheilus lucius</u> |
| Humpback chub | <u>Gila cypha</u> |
| Bonytail chub | <u>Gila elegans</u> |
| Razorback sucker | <u>Xyrauchen texanus</u> |

Peregrine falcon

A confirmed peregrine falcon eyerie is located in the vicinity of Joe Davis Hill. Potential peregrine falcon eyeries are designated in the vicinity of Crested Butte, South Saddle Mountain, and along the entire Gunnison Curecanti National Recreation Area. Your evaluation should, therefore, determine the current status of peregrine falcon at these sites to assess potential impacts. Current status of peregrine falcons at confirmed and potential nest cliffs can be obtained by contacting Jerry Craig with the Colorado Division of Wildlife (303/484-2836).

¹ Proposed as threatened 11/4/91 (56 FR 56344)

Bald eagle

We have no records of bald eagle nests at any of the Forest Service sites. However, bald eagles are common winter visitors to Colorado. Bald eagles are known to fly up to 18 miles from night roosts to feeding areas and it is likely that even greater distances are traveled searching for food. The species may therefore occur in the project area. Your biological evaluation should determine whether wintering bald eagles occur at any of the Forest's streams or reservoirs. If they do occur, the Forest Service should evaluate potential impacts.

Mexican spotted owl

Mexican spotted owls may occur in those areas identified in San Miguel County. Two consecutive years of searches for owls should precede any leasing in these areas.

Black-footed ferret

The black-footed ferret is dependent on prairie dogs and their burrows for food and shelter, respectively. It is our position that any impact to prairie dogs may impact the ferret unless a ferret search is completed to conclude their absence. Your evaluation should determine whether prairie dogs occur on the Grand Mesa, Uncompahgre, or Gunnison National Forests. If prairie dogs do occur, the Forest Service should conclude that ferrets may also occur and assess potential impacts associated with oil and gas leasing. Please contact this office prior to initiating any black-footed ferret searches.

Federally listed fish

We consider the depletion of water from the upper Colorado River an adverse impact to habitat for all the above federally listed fish species. Consequently, any activity authorized by the Forest Service that results in a net depletion of water from the upper Colorado River basin should trigger a "may affect" finding by the Forest and formal consultation with this office under authority of the Endangered Species Act.

The Forest Service should review their proposed Federal action and determine if the action would affect any listed species. If the determination is "may affect" for listed species, the Forest Service must request in writing formal consultation from our office. At that time, your agency should provide this office a biological assessment and/or any other relevant information used in making the impact determinations.

Federal Candidate Species

We believe your evaluation should also consider the following species which are candidates for official listing as threatened or endangered species [(Federal Register, Vol. 55, No. 35, February 21, 1990, and Federal Register, Vol 56, No. 225, November 21, 1991 (copy enclosed)]. While these species presently have no legal protection under the Endangered Species Act, it is

within the spirit of the Act to consider project impacts to potentially sensitive candidate species. Additionally, we wish to make you aware of the presence of Federal candidates should any be proposed or listed prior to the time that all Federal actions related to the project are completed.

The list was compiled from Colorado Division of Wildlife latilong surveys and other general literature. We have no specific records for the Forest Service properties identified in your letter.

FEDERAL CANDIDATE SPECIES

Ferruginous hawk
Loggerhead shrike
Northern goshawk
Baird's sparrow
Western snowy plover

Black tern
White-faced ibis
Flannelmouth sucker
Roundtail chub
Colorado River cutthroat trout

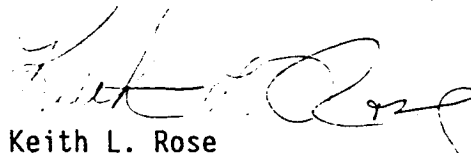
Penstemon mensarum

Buteo regalis
Lanius ludovicianus
Accipiter gentilis
Ammodramus bairdii
Charadrius alexandrinus
nivosus
Chilodrias niger
Plegadis chihi
Catostomus latipinnis
Gila robusta
Oncorhynchus (=Salmo) clarki
pleuriticus
Grand Mesa penstemon

There is no designated critical habitat within the Forest Service properties you identify. Our agency is presently classifying critical habitat for the federally listed fish species. This designation should be proposed in the Federal Register within the next year.

We appreciate your attention to federally listed and candidate species. Please contact Bob Leachman if there are any question.

Sincerely,



Keith L. Rose
Assistant Colorado State Supervisor

cc: FWS/FWE, Golden
FWS/FWE, Salt Lake City
CDOW, Grand Junction
CDOW, Montrose

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