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U.S. Department of the Interior

Bureau of Land Management
Wyoming State Office



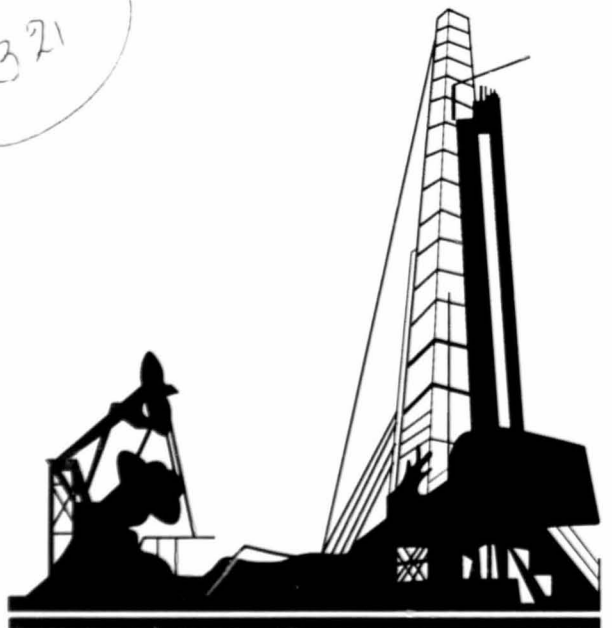
Rock Springs District/Green River Resource Area May 1996

**Fontenelle Natural Gas
Infill Drilling Projects**

**Sweetwater and
Lincoln Counties, Wyoming**

**Final
Environmental Impact Statement**

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

96-037102



United States Department of the Interior

BUREAU OF LAND MANAGEMENT

Wyoming State Office
P.O. Box 1828
Cheyenne, Wyoming 82003-1828

In Reply Refer To:

1793
(930DHorswey)
PHONE NO: 307-775-6290
FAX NO: 307-775-6082

May 1, 1996

Dear Reviewer:

This final Environmental Impact statement (EIS) on the proposed *Fontenelle Natural Gas Infill Drilling Projects* is furnished for your review and comment. As a supplement to the draft EIS, which was published on April 13, 1995, this volume contains a revised *Executive Summary and Summary of Impacts by Alternative*; corrected and new material in an *Addendum and Errata* section; an expanded *Consultation and Coordination* section, including comment letters received on the draft EIS and BLM's responses to the comments; and added *Appendices*.

Because this is an abbreviated final, this document and the draft EIS (with Air Quality and Wildlife Technical Reports) comprise the entire document for filing purposes and for the decision making process. Please refer to the draft for more detailed analysis and descriptions of the proposed action and alternatives.

Written comments will be considered in the decision if they are received within 45 days of the Environmental Protection Agency's (EPA) Federal Register publication of the Notice of Availability of the Fontenelle Natural Gas Infill Drilling Projects final EIS. The anticipated date of the publication is May 10, 1996. Copies of the final EIS and the Air Quality and Wildlife Technical Reports may be obtained upon request from the Bureau of Land Management - Rock Springs District Office.

This final EIS is not the decision document. The decision on the proposed natural gas infill development and associated rights-of-way will be based upon the analysis in the draft and final EISs, public concerns and comments, and other multiple-use resource objectives or programs that apply to the project. A Record of Decision (ROD), detailing the decision of the BLM, and its rationale for the decision, will be prepared and distributed through the Wyoming State Office as soon as the decision is reached following the end of the 45 day review period. Presently, the ROD is anticipated to be available for release in mid July 1996.

Please send comments on the content of this final EIS to:

Bill McMahan, Project Coordinator
Bureau of Land Management
280 Highway 191 North
Rock Springs, Wyoming 82901

The BLM thanks the individuals, Federal, State and local Governments, and organizations who participated in the environmental analysis process by providing comments and suggestions on the draft EIS. Your involvement has greatly enhanced the integrity of this final EIS.

Sincerely,

Alan R. Pierson
State Director

Department of the Interior

Final Environmental Impact Statement

on

Fontenelle Natural Gas Infill Drilling Projects Sweetwater and Lincoln Counties, Wyoming

May 1996

This Environmental Impact Statement was prepared by *PIC Technologies, Inc.*, an environmental consulting firm, with the guidance, participation and independent evaluation of the Bureau of Land Management (BLM). The BLM, in accordance with Federal Regulation 40 CFR 1506.5(a) & (b), is in agreement with the findings of the analysis and approves and takes responsibility for the scope and content of this document.

Wyoming State Director

FONTENELLE NATURAL GAS INFILL DRILLING PROJECTS

Sweetwater and Lincoln Counties, Wyoming

ENVIRONMENTAL IMPACT STATEMENT

Draft

Final

Lead Agency:

U.S. Department of the Interior, Bureau of Land Management

Cooperating Agencies:

U.S. Department of the Interior, Bureau of Reclamation
U.S. Department of the Interior, Fish and Wildlife Service
U.S. Department of Agriculture, Forest Service

Counties That Could Be Directly Affected:

Sweetwater and Lincoln Counties, Wyoming

Abstract:

DALEN Resources Oil & Gas Co. (DALEN Operator) and Cabot Oil & Gas Corp., Presidio Oil Co., and several other companies (collectively the Lincoln Road Operators) propose to continue infill drilling their existing lease acreage (collectively approximately 179,760 acres) within the Fontenelle II and Lincoln Road development areas. The Fontenelle II and the Lincoln Road development areas are immediately adjacent to each other. Both proposed actions would be implemented in northeastern Lincoln and northwestern Sweetwater counties, Wyoming adjacent to and east of Fontenelle Reservoir and the Green River. The project areas are approximately 30 miles northeast of Kemmerer, Wyoming and 70 miles northwest of Rock Springs, Wyoming.

The companies' proposals would continue to infill drill their natural gas fields, where collectively 907 wells are presently active, by drilling up to 1,317 additional wells over the next 10 years. Because of the tight-gas formation, the wells would be drilled on 160- and 80-acre spacing (i.e., a well density of four and eight wells per 640 acres). The companies' plans and drilling schedules would be contingent upon both an increased demand for natural gas supplies in response to the Clean Air Act amendments of 1990 and an adequate price for the gas at the wellhead.

This EIS analyzes the impacts of the Proposed Actions, Resource Protection Alternatives, and the No Action Alternative. Based on the issues and concerns identified during the scoping process, the EIS focuses on the impacts to socioeconomic, wildlife, air quality, water quality, recreation, historic trails, and cumulative effects. Key issues include effects to communities and people in the project area; effects to antelope and antelope habitat, sage grouse and raptor breeding and nesting; potential reductions in air quality and visibility; potential reductions in the water

quality and recreation of Fontenelle Reservoir and the Green River; and Oregon, Mormon Pioneer, Pony Express, and California Historic Trails condition and viewshed.

Other Environmental Review or Consultation Requirements:

This EIS, in compliance with Section 7(c) of the Endangered Species Act (as amended), includes the Biological Assessment for the purpose of identifying any endangered or threatened species which are likely to be affected by the proposed action.

Lead Agency Contact:

For further information, contact Bill McMahan at the Rock Springs District Office, (307) 382-5350.

EIS Contact:

Bill McMahan, Project Coordinator
Bureau of Land Management
280 Highway 191 North
Rock Springs, Wyoming 82901

Date EIS Made Available to EPA and Public:

Draft:	April 14, 1995
Final:	May 10, 1996
Final EIS Comments Must Be Received By:	June 24, 1996

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Preface

The purpose of this final environmental impact statement (EIS) is to supplement the draft EIS which was published in April 1995. Reviewed together, the draft and final EISs incorporate the description of the affected environment and analyses of potential environmental consequences resulting from construction, operation, and abandonment of the Fontenelle Natural Gas Infill Drilling Projects and its alternatives. This final EIS should not be considered as a complete EIS, nor as a decision document. This FEIS is organized into four sections:

- o Section 1, *Executive Summary and Summary of Impacts By Alternative* - Information presented in this section that is different from material presented in the draft EIS is identified by shaded background.
- o Section 2, *Addendum and Errata* - Provides an addendum of additional discussion and studies which have been completed to address comments received during the comment period on the draft EIS. Addendum material includes discussion of directional drilling, staged development, air quality impacts, and a wildlife impact mitigation plan. It also includes an errata sheet showing changes in the text of the draft EIS which resulted from public comment. Three Figures are also included, new Figure 2-6, *Proposed Sensitive Areas Subject to Drilling Restriction*, new Figure 3-7A, *Generalized Surficial Geology of the Fontenelle Cumulative Impact Study Area*, and corrected Figure 3-13, *Antelope Seasonal Ranges Within the Cumulative Impact Study Area*.
- o Section 3, *Consultation and Coordination* - Summarizes the consultation and coordination that occurred during the preparation of the Fontenelle EIS and background information regarding the consultation and coordination process. It contains a copy of the comment letters received during the public comment period on the draft EIS and BLM's responses to those comments.
- o Section 4, *Appendices* - Several appendices not included with the draft EIS are provided in this final EIS. Appendix A contains the Executive Summary from the technical report, "Cumulative

Impact Analysis of Southwestern Wyoming Natural Gas Development Projects on Air Quality"; Appendix B is an expanded analysis of directional drilling and reproduces the report of the BLM Wyoming Reservoir Management Group; Appendix C provides an outline for a wildlife protection and impact mitigation plan which will guide the preparation and implementation of protection measures to reduce and/or avoid impacts on wildlife habitat (the reviewer is also referred to the Wildlife Technical Report, released under separate cover with the draft EIS, which provides a more detailed discussion of the wildlife habitat modeling used in the draft EIS; and Appendix D provides a road development plan which contains standards and guidelines for transportation planning.

In response to comments received concerning cumulative impacts to air quality from the reasonably foreseeable implementation of the Fontenelle, Moxa Arch, Stagecoach Draw, Jonah, Wamsutter II, and other projects, the BLM, through the expertise of the firm *TRC Environmental Consulting, Inc.*, has supplemented the air quality sections of the draft EIS with an air quality cumulative impact analysis addressing the construction and operation phases of oil and gas development. The Section 2 Addendum of this final EIS expands upon the analysis found in the draft EIS. The details of this analysis are available in a separate Technical Report entitled, "Cumulative Impact Analysis of Southwestern Wyoming Natural Gas Development Projects on Air Quality". A copy of the technical report can be obtained from the Bureau of Land Management, 280 Highway 191 North, Rock Springs, WY 82901. It is also available for review at BLM offices in Rock Springs, Pinedale, Kemmerer, and Cheyenne, Wyoming; and the Forest Service Offices in Pinedale, Big Piney, and Jackson, Wyoming. A preliminary technical review of this Technical Report was conducted by the U.S. Environmental Protection Agency, Wyoming Department of Environmental Quality-Air Quality Division, and U.S. Forest Service Bridger-Teton and Shoshone National Forests. Although still subject to further comment by these agencies, concurrence in the scope, content,

and analysis procedure contained in the Technical Report was given.

In response to comments received on directional drilling, BLM has supplemented the draft EIS with an assessment of the feasibility of directional drilling within the DALEN and Lincoln Road areas. Section 2 of the final EIS summarizes the analysis and impact conclusions. Data and information utilized in the analysis are contained in Appendix B of this final EIS. Also, in response to comments, BLM has supplemented the draft EIS with consideration of a staged development alternative; additional opportunities for mitigation to reduce residual impacts; and a wildlife protection and impact mitigation plan.

The draft and final EISs have been prepared according to the requirements of the National Environmental Policy Act of 1969 (NEPA) and the Council on Environmental Quality's regulations for implementing NEPA, effective July 30, 1979.

The analyses were based on a proposed schedule and highest potential level of development contained in the draft EIS. As the project is implemented, the impacts will be evaluated to determine if they fall within the parameters discussed in the draft and final EISs. Any major change in project design would require additional environmental analysis.

SECTION 1 - Executive Summary

Introduction

This EIS was prepared to assess the environmental consequences of proposed natural gas infill drilling projects in the Fontenelle area in Sweetwater and Lincoln counties, Wyoming, in accordance with the National Environmental Policy Act of 1969. Public scoping was conducted for the projects. All issues identified during scoping and by the Bureau of Land Management (BLM) Interdisciplinary Team are addressed.

The EIS addresses two projects. The first project includes activities proposed by DALEN Resources Oil & Gas Co. (DALEN) (recently acquired by Enserch Exploration Inc.). The DALEN project nomenclature is retained in the final EIS to maintain consistency with the draft EIS. The DALEN project includes the Fontenelle II Unit and adjacent leased acreage. The second project includes activities proposed by Cabot Oil & Gas Corporation, Presidio Oil Company, and several other oil and gas companies for Federal oil and gas leases in the Lincoln Road area (collectively known as the Lincoln Road Operators). The document also addresses existing and planned oil and gas activity in an expanded, 965 square mile area referred to in the draft EIS as the cumulative impact study area (CISA) and within an even larger 1,540 square mile area of reasonably foreseeable development referred to in the draft EIS as the cumulative impact assessment area (CIAA).

The DALEN and Lincoln Road project areas are approximately 30 miles northeast of Kemmerer, Wyoming and 70 miles northwest of Rock Springs, Wyoming. Access to the project areas is from U.S. Highways 189 and 191, State Highways 372 and 28, and numerous County, BLM, and operator-maintained roads.

Collectively, the companies' propose to continue infill drilling an existing 179,760-acre, 907-well active natural gas field by drilling up to 1,317 additional wells over the next 10 years. Because of the tight-gas formation, the wells would be drilled on 160- and 80-acre spacing. A portion of the project area is presently developed on a 160-acre spacing (four wells

per 640 acres). In selected areas, drilling on 80-acre spacing would increase the well density up to eight wells per 640 acres. The companies' plans and drilling schedules would be contingent upon both an increased demand for natural gas supplies in response to the Clean Air Act amendments of 1990 and an adequate price for the gas at the wellhead. Not all proposed wells would be successful and put into production. Historic records indicate that about 30 percent of the wells drilled have not been economic. An unknown number of existing wells would be plugged and abandoned over the next 10 years.

Alternatives Considered. This EIS analyzes the impacts of the Proposed Actions (up to 1,317 new wells), Resource Protection Alternatives (up to 1,228 new wells), and the No Action Alternative. Based on the issues and concerns identified during the scoping process, the EIS focuses on the impacts to socioeconomic, wildlife, air quality, water quality, recreation, historic trails, and cumulative effects. Key issues include effects to communities and people in the project area; effects to antelope and antelope habitat, sage grouse and raptor breeding and nesting; potential reductions in air quality and visibility; potential reductions in the water quality of and recreation on Fontenelle Reservoir and the Green River; and Oregon, Mormon Pioneer, Pony Express, and California Historic Trails condition and viewshed.

Summary of Direct and Indirect Impacts. The table at the end of this section provides a summary of direct and indirect impacts to key resources resulting from the DALEN and Lincoln Road Projects which are addressed in the draft and final EISs.

Summary of Cumulative Impacts. The following summarizes cumulative impacts resulting from the proposed projects when added to past, present, and reasonably foreseeable oil and gas development outside the DALEN and Lincoln Road Projects CISA. The Fontenelle CIAA involves all or parts of seven oil and gas fields located along the Green River on the west and U.S. Highway 191 on the east. The seven fields are: East Labarge, Bird Canyon Fontenelle II, Lincoln Road, and a small portion of Big Piney-LaBarge Platform (collectively these five

are referred to as the *Fontenelle* cumulative impact study area (CISA)), plus the Stagecoach Draw Unit, and the Jonah field. These seven fields represent the CIAA for all resources except socioeconomics, air quality, and surface water. The CIAA is expanded to include the Moxa Arch Expanded Natural Gas Development Project area for these three resources.

The resources adversely affected by the Fontenelle projects are largely separate from those affected by other projects in southwest Wyoming such as the Moxa Arch Expanded Natural Gas Development Project. For example, much of the Fontenelle Proposed Action would be constructed upstream of Fontenelle Reservoir which traps sediment added to the Green River. The Proposed Action would occur within different big game herd units, tap different oil and gas reservoirs and affect different visual resources and transportation corridors. The fact that the boundaries of the Fontenelle and Moxa Arch CIAAs touch does not indicate any relationship between the two sets of projects.

The seven fields could potentially result in up to 2,850 proposed and existing wells being drilled by the year 2005. Assuming all proposed wells were drilled and were in place at the same time, cumulative production-related disturbance would be about 8,278 acres or about 0.9 percent of the 1,540 square mile CIAA.

A summary of cumulative resource impacts is provided for the following key resources: mineral resources, socioeconomic, land use, historical trails, air quality, surface water, and wildlife. Cumulative impacts were addressed for all resources in the EIS; however, those not summarized here would be expected to be negligibly affected.

Mineral Resources - Recovery of mineral resources would have beneficial effects. Assuming 70 percent of the 2,850 existing and proposed wells are successful (1,995 wells), and that each well produces 1 billion cubic feet of gas (BCFG) over 10 years (average 275,000 CFG/day), an estimated 2 trillion cubic feet of natural gas (TCFG) could potentially be recovered in 10 years. This would maintain supplies to existing western and northwestern markets and improve supply availability to mid-eastern and eastern markets for home heating, industrial uses, auto

conversion to natural gas, etc. This would contribute to the enhancement of global air quality.

Socioeconomic Resources - Assuming a typical well produces 1 BCFG over 10 years and assuming a \$1.58 per MCF average gas price, the increased natural gas production would generate approximately \$19,750 per year in Federal royalties, half (\$9,875) of which is returned to the State; State Severance Tax of 6 percent would generate \$9,500 per well per year; and Sales and Use Tax on taxable equipment, supplies, services, and materials would generate about \$13,000; County Property Taxes on surface facilities assessed and taxed on 11 percent of their value would yield about \$420 per year per well; and Ad Valorem Tax could yield \$8,500 per year. In total, under the above assumptions, a single well could yield \$41,295 per year in tax and royalty returns to State and local governments.

Housing demand would be minimal. Assuming 11 rigs working, a maximum of 275 workers would be employed. Based upon past project experience, 80 to 90 percent of all workers would be locally based. Given the high percentage of the workforce that would be local hires, no change in the adequacy of public services and facilities is expected to result from the implementation of the Fontenelle, Stagecoach, Jonah, or Moxa Arch projects.

Land Use - There would be no change in land ownership, nor would there be any change in the principal or major uses defined by the Federal Land Policy and Management Act (FLPMA Sec. 103 (1)) (domestic livestock grazing, fish and wildlife development and utilization, mineral exploration and production, rights-of-way, outdoor recreation, and timber production). All these uses would continue to occur except timber production. Changes that would occur would be in conformance with the FLPMA mandate of management under the principles of "multiple use" which provide for management of the public lands and their various resource values, i.e., "... so that they are utilized in the combination that will best meet the present and future needs of the American people; making the most judicious use of the land for some or all of these resources ... the use of some land for less than all of the resources...." The developments would affect a very small portion (< 1 percent) of the total land surface. The relatively flat terrain in the area would make such changes negligible in both the short and long term.

Historical Resources - Important historic trails (including the Oregon, Mormon Pioneer, Pony Express, and California Trails) would be protected from direct impacts to contributing segments of the trails in the DALEN and Stagecoach Draw project areas. Except where road-pipeline corridors already cross contributing segments, no development would be located within the 0.25 mile buffer area on each side of contributing trail segments. Numerous wells would be located outside the buffer area but within view of the trails. These indirect cumulative impacts to the viewshed would be unavoidable and would occur over the life of the projects.

Air Quality - Extensive analyses were performed to determine potential direct, indirect and cumulative air quality impacts from the Proposed Action and related natural gas development projects (as summarized in Appendix A and detailed in the Technical Support Addendum entitled "Cumulative Impact Analysis of Southwestern Wyoming Natural Gas Development Projects on Air Quality").

Although some deterioration of air quality would occur, most impacts would not be significant. Short-term, local air quality degradation would occur due to site preparation and construction activities (involving particulate matter, sulfur dioxide, and hazardous air pollutants). Long-term, cumulative air quality degradation (due primarily to nitrogen dioxide emissions, and potential ozone formation) would occur primarily due to compressor engine, dehydrator, separator, and storage tank operation. Findings of the extensive analyses include:

- Construction and operation would meet all applicable National Ambient Air Quality Standards (NAAQS) and Wyoming Ambient Air Quality Standards (WAAQS).
- Potential emission levels would comply with applicable Prevention of Significant Deterioration (PSD) Class I and Class II Increments.
- Pollutant concentrations during operation would not "overlap" between well locations, even with the densest assumed well spacing. That is, the maximum groundlevel concentrations would occur sufficiently close to each well that adjacent wells would contribute insignificant amounts to the overall maximum concentration.

- Construction and operation impacts would be below applicable significance criteria for atmospheric deposition.

- Assuming a "worst-case" emissions scenario, operation could result in a perceptible visual range reduction on twenty-six days annually (eight days of the non-winter period, and eighteen days during winter). Under the "less conservative" emissions scenario, no days exhibit significant visual range reduction.

The "worst case" emission scenario represents an upper bound which would not be exceeded. Review of current production activities in the area suggests this level of emissions and impacts would not be reached. For example, the "worst case" emissions scenario assumes: 1) all of the potential sites become producing wells (e.g.; no "dry holes"), 2) all producing wells would be operational for 10 to 20 years, 3) all production activity occurs at its maximum assumed emission rate continuously, and 4) each well will have a dedicated compressor engine, which overestimates the actual number of compressor engines that will be installed.

Also, before development could occur, the Wyoming Department of Environmental Quality requires air quality permits which would examine expected emissions from specific project components (such as compressors) prior to their construction. Additional site specific air quality analysis will be performed, and additional emission control measures may be required, to ensure protection of air quality resources. Therefore, projected impacts should be viewed as a conservative upper bound estimate of potential air quality effects that are not likely to occur.

Surface Water Resources - The cumulative assessment area is within the Green River Basin. Perennial streams within the area include the Green River with the tributaries Big Sandy River, LaBarge Creek, and Fontenelle Creek. Implementation of the Fontenelle, Stagecoach, and Jonah projects would result in an estimated 8,278 acres of production-related surface disturbance or about 0.9 percent of the Fontenelle CIAA drainage area (Fontenelle DEIS at 4-10).

The Moxa Arch project, located on the west side of the Green River, would result in an estimated 28,917 acres of production-related surface disturbance or about 1.4 percent of the Moxa Arch Natural Gas project area (Moxa DEIS at 4-35).

The combined CIAAs encompass approximately 2,285 square miles (1.5 million acres). The cumulative acres of production-related surface disturbance would be 37,195 acres or 2.5 percent of the Fontenelle and Moxa Arch CIAAs. This could cause an increase in adverse, direct impacts over the short and long term in sediment entering surface water. However, cumulative impacts to watersheds, in general, would not be significant. Cumulative direct and indirect impacts associated with oil and gas development would be reduced to low levels by implementation of best management practices (BMPs) for erosion control in accordance with EPA and Wyoming DEQ Storm Water Discharge Standards, timely reclamation and implementation of improved grazing practices.

Wildlife Resources - It is apparent that, under the Fontenelle Proposed Actions and Resource Protection Alternatives, cumulative short- and long-term losses of vegetation within the areas of the projects, especially high density sagebrush, will have adverse effects on wildlife and habitats. Taken together, the Fontenelle, Stagecoach and Jonah projects are expected to have no cumulative, adverse effect on threatened and endangered species given impact avoidance and mitigation measures. Neither the Fontenelle projects nor the Stagecoach and Jonah projects are expected to increase cumulative impacts within riparian and wetland habitats. Cumulative effects on sage grouse nesting habitat would be highest within the area of the Fontenelle projects. Mule deer, moose, and elk crucial winter habitat would be minimally affected within the area of the Fontenelle projects adjacent to the Green River. No crucial habitat for these species is found within the Stagecoach or Jonah projects. The Fontenelle projects would affect only the Sublette antelope herd unit. A combination of existing and reasonably foreseeable development within the Fontenelle and Stagecoach project areas would cause the loss of about 2,150 acres of antelope crucial winter range within the Sublette antelope herd unit over the long-term due to oil and gas production activities.

Aquatic resources are not expected to be cumulatively adversely affected by the Fontenelle, Stagecoach, and Jonah projects with implementation of the identified resource protection and mitigation measures.

BLM-Preferred Alternative. The BLM-preferred alternative is the *Resource Protection Alternative*. BLM believes that under this alternative all reasonable and practicable means to avoid or minimize environmental harm from the proposed development would be implemented. This alternative is preferred because: 1) it incorporates the added emphasis given by the DALEN and the Lincoln Road Operators in their proposed actions to comply with all Federal, State, and other regulatory requirements during construction, drilling, completion, and production operations, and field production operations; 2) it incorporates the consideration given by DALEN and the Lincoln Road Operators to modify facility designs, construction techniques, operating practices, and abandonment and reclamation procedures to avoid or minimize environmental impacts; 3) it incorporates EPA and Wyoming Department of Environmental Quality best management practices (BMPs) for storm water discharge prevention which would minimize off-site sedimentation and erosion by protecting soils; 4) the Mitigation and Monitoring Measures listed in Chapters Four and Five of the draft EIS identify further opportunities to mitigate impacts where necessary and monitoring is prescribed that would be an on-going practice to ensure measures remain functional and reclamation is successful; and 5) this alternative calls for relocation of project facilities and/or directional drilling to avoid impacts to steep slopes, wetlands, historic trails, streams, sage grouse leks, raptor nests, other sensitive surface resource values, and the Seedskaadee National Wildlife Refuge. BLM believes that the analysis demonstrates that the *Resource Protection Alternative* would meet the requirements of Federal Regulation 43 CFR 3162.1(a), directing lessees and/or operators to conduct "...all operations in a manner which ensures the proper handling, measurement, disposition, and site security of leasehold production; which protects other natural resources and environmental quality; which protects life and property; and which results in maximum ultimate economic recovery of oil and gas with minimum waste and with minimum adverse effect on ultimate recovery of other mineral resources."

SUMMARY OF IMPACTS BY ALTERNATIVE

RESOURCE	DALEN'S PROPOSED ACTION		DALEN'S RESOURCE PROTECTION ALTERNATIVE		LINCOLN ROAD'S PROPOSED ACTION		LINCOLN ROAD'S RESOURCE PROTECTION ALTERNATIVE	
	Construction-Related Impacts ¹	Production-Related Impacts ²	Construction-Related Impacts ¹	Production-Related Impacts ²	Construction-Related Impacts ¹	Production-Related Impacts ²	Construction-Related Impacts ¹	Production-Related Impacts ²
Socio-economic	Localized shortages in accommodations may occur. Increased jobs and sales tax collected.	Increased tax revenues including: Federal and State royalties, State Severance Tax, Sales and Use Tax, and County Property and Ad Valorem Tax.	Localized shortages in accommodations may occur. Increased jobs and sales tax collected.	Increased tax revenues including: Federal and State royalties, State Severance Tax, Sales and Use Tax, and County Property and Ad Valorem Tax.	Localized shortages in accommodations may occur. Increased jobs and sales tax collected.	Increased tax revenues including: Federal and State royalties, State Severance Tax, Sales and Use Tax, and County Property and Ad Valorem Tax.	Localized shortages in accommodations may occur. Increased jobs and sales tax collected.	Increased tax revenues including: Federal and State royalties, State Severance Tax, Sales and Use Tax, and County Property and Ad Valorem Tax.
Transportation	Increased probability of accidents. Existing roads upgraded to BLM standards.	Increased probability of accidents. Existing roads upgraded to BLM standards.	Increased probability of accidents. Existing roads upgraded to BLM standards.	Increased probability of accidents. Existing roads upgraded to BLM standards.	Increased probability of accidents. Existing roads upgraded to BLM standards.	Increased probability of accidents. Existing roads upgraded to BLM standards.	Increased probability of accidents. Existing roads upgraded to BLM standards.	Increased probability of accidents. Existing roads upgraded to BLM standards.
Land Use	699 acres of shrub/brush rangeland would be affected by oil and gas activities.	256 acres of shrub/brush rangeland would be converted to oil and gas production.	684 acres of shrub/brush rangeland would be affected by oil and gas activities.	252 acres of shrub/brush rangeland would be converted to oil and gas production.	6,891 acres of shrub/brush rangeland would be affected by oil and gas activities.	1,643 acres of shrub/brush rangeland would be converted to oil and gas production.	6,470 acres of shrub/brush rangeland would be affected by oil and gas activities.	1,561 acres of shrub/brush rangeland would be converted to oil and gas production.
Recreation	Increased ORV use and increased potential for vandalism of recreation sites.	Increased ORV use and increased potential for vandalism of recreation sites.	Increased ORV use and increased potential for vandalism of recreation sites.	Increased ORV use and increased potential for vandalism of recreation sites.	Increased ORV use and increased potential for vandalism of recreation sites.	Increased ORV use and increased potential for vandalism of recreation sites.	Increased ORV use and increased potential for vandalism of recreation sites.	Increased ORV use and increased potential for vandalism of recreation sites.
Visual Resources	47 acres of disturbance would occur in Class II areas.	16 acres of disturbance would remain in Class II areas.	35 acres of disturbance would occur in Class II areas.	12 acres of disturbance would remain in Class II areas.	238 acres of disturbance would occur in Class II areas.	45 acres of disturbance would remain in Class II areas.	142 acres of disturbance would occur in Class II areas.	31 acres of disturbance would remain in Class II areas.

SUMMARY OF IMPACTS BY ALTERNATIVE

RESOURCE	DALEN'S PROPOSED ACTION		DALEN'S RESOURCE PROTECTION ALTERNATIVE		LINCOLN ROAD'S PROPOSED ACTION		LINCOLN ROAD'S RESOURCE PROTECTION ALTERNATIVE	
	Construction-Related Impacts ¹	Production-Related Impacts ²	Construction-Related Impacts ¹	Production-Related Impacts ²	Construction-Related Impacts ¹	Production-Related Impacts ²	Construction-Related Impacts ¹	Production-Related Impacts ²
Cultural Resources	Possibility of disturbing unrecognized or unanticipated cultural resources.	Possibility of disturbing unrecognized or unanticipated cultural resources.	Possibility of disturbing unrecognized or unanticipated cultural resources.	Possibility of disturbing unrecognized or unanticipated cultural resources.	Possibility of disturbing unrecognized or unanticipated cultural resources.	Possibility of disturbing unrecognized or unanticipated cultural resources.	Possibility of disturbing unrecognized or unanticipated cultural resources.	Possibility of disturbing unrecognized or unanticipated cultural resources.
Historic Trails	38 acres of disturbance in contributing Oregon Trail Cutoff segment buffer zones.	13 acres of disturbance in contributing Oregon Trail Cutoff segment buffer zones.	0 acres of disturbance in contributing Oregon Trail Cutoff segment buffer zones.	0 acres of disturbance in contributing Oregon Trail Cutoff segment buffer zones.	508 acres of disturbance in contributing Oregon Trail Cutoff segment buffer zones.	98 acres of disturbance in contributing Oregon Trail Cutoff segment buffer zones.	42 acres of disturbance in existing road and pipeline corridors within contributing segment buffer zones.	0 acres of disturbance in contributing Oregon Trail Cutoff segment buffer zones.
Air Quality	No violation of Federal or State standards. Slightly higher fugitive dust and sulfur dioxide levels.	No violation of Federal or State standards. Potential cumulative visibility impacts. Slightly higher carbon monoxide, nitrogen dioxide and ozone levels.	No violation of Federal or State standards. Slightly higher fugitive dust and sulfur dioxide levels.	No violation of Federal or State standards. Potential cumulative visibility impacts. Slightly higher carbon monoxide, nitrogen dioxide and ozone levels.	No violation of Federal or State standards. Slightly higher fugitive dust and sulfur dioxide levels.	No violation of Federal or State standards. Potential cumulative visibility impacts. Slightly higher carbon monoxide, nitrogen dioxide and ozone levels.	No violation of Federal or State standards. Slightly higher fugitive dust and sulfur dioxide levels.	No violation of Federal or State standards. Potential cumulative visibility impacts. Slightly higher carbon monoxide, nitrogen dioxide and ozone levels.
Noise	Short-term noise during drilling and construction activities.	None	Short-term noise during drilling and construction activities.	None	Short-term noise during drilling and construction activities.	None	Short-term noise during drilling and construction activities.	None
Geology	None	None	None	None	None	None	None	None

SUMMARY OF IMPACTS BY ALTERNATIVE

RESOURCE	DALEN'S PROPOSED ACTION		DALEN'S RESOURCE PROTECTION ALTERNATIVE		LINCOLN ROAD'S PROPOSED ACTION		LINCOLN ROAD'S RESOURCE PROTECTION ALTERNATIVE	
	Construction-Related Impacts ¹	Production-Related Impacts ²	Construction-Related Impacts ¹	Production-Related Impacts ²	Construction-Related Impacts ¹	Production-Related Impacts ²	Construction-Related Impacts ¹	Production-Related Impacts ²
Ground Water Resource	Avoided with implementation of proposed casing, cementing	Avoided with implementation of proposed casing, cementing	Avoided with implementation of proposed casing, cementing	Avoided with implementation of proposed casing, cementing	Avoided with implementation of proposed casing, cementing	Avoided with implementation of proposed casing, cementing	Avoided with implementation of proposed casing, cementing	Avoided with implementation of proposed casing, cementing
Surface Water Resource	Increased potential for sedimentation into the Green River and its tributaries	Increased potential for sedimentation into the Green River and its tributaries.	Increased potential for sedimentation into the Green River and its tributaries.	Increased potential for sedimentation into the Green River and its tributaries.	Increased potential for sedimentation into the Green River and its tributaries.	Increased potential for sedimentation into the Green River and its tributaries.	Increased potential for sedimentation into the Green River and its tributaries.	Increased potential for sedimentation into the Green River and its tributaries.
Floodplains	41 acres of disturbance would occur in floodplains	14 acres of disturbance would remain in floodplains	15 acres of disturbance would occur in floodplains	7 acres of disturbance would remain in floodplains.	127 acres of disturbance would occur in floodplains	31 acres of disturbance would remain in floodplains.	111 acres of disturbance would occur in floodplains	28 acres of disturbance would remain in floodplains.
Soils	Loss of topsoil in areas where reclamation potential is poor.	Loss of topsoil in areas where reclamation potential is poor	Loss of topsoil in areas where reclamation potential is poor	Loss of topsoil in areas where reclamation potential is poor.	Loss of topsoil in areas where reclamation potential is poor	Loss of topsoil in areas where reclamation potential is poor.	Loss of topsoil in areas where reclamation potential is poor.	Loss of topsoil in areas where reclamation potential is poor.
Vegetation	803 acres of vegetation would be disturbed	295 acres of vegetation would remain disturbed.	770 acres of vegetation would be disturbed	285 acres of vegetation would remain disturbed.	7,137 acres of vegetation would be disturbed.	1,693 acres of vegetation would remain disturbed	6,676 acres of vegetation would be disturbed	1,602 acres of vegetation would remain disturbed.
Grazing	62 AUMs/year would be lost due to surface disturbance	23 AUMs/year would remain lost due to surface disturbance	59 AUMs/year would be lost due to surface disturbance	22 AUMs/year would be lost due to surface disturbance	549 AUMs/year would be lost due to surface disturbance	130 AUMs/year would remain lost due to surface disturbance	514 AUMs/year would be lost due to surface disturbance	123 AUMs/year would remain lost due to surface disturbance

SUMMARY OF IMPACTS BY ALTERNATIVE

RESOURCE	DALEN'S PROPOSED ACTION		DALEN'S RESOURCE PROTECTION ALTERNATIVE		LINCOLN ROAD'S PROPOSED ACTION		LINCOLN ROAD'S RESOURCE PROTECTION ALTERNATIVE	
	Construction-Related Impacts ¹	Production-Related Impacts ²	Construction-Related Impacts ¹	Production-Related Impacts ²	Construction-Related Impacts ¹	Production-Related Impacts ²	Construction-Related Impacts ¹	Production-Related Impacts ²
Wetlands and Riparian Resources	24 acres of wetland will be disturbed.	8 acres of wetland will remain disturbed.	0 acres of wetland will be disturbed.	0 acres of wetland will remain disturbed.	6 acres of wetland will be disturbed.	2 acres of wetland will remain disturbed.	0 acres of wetland will be disturbed.	0 acres of wetland will remain disturbed.
Threatened Endangered Species	All impacts on threatened and endangered species would be avoided.	All impacts on threatened and endangered species would be avoided.	All impacts on threatened and endangered species would be avoided.	All impacts on threatened and endangered species would be avoided.	All impacts on threatened and endangered species would be avoided.	All impacts on threatened and endangered species would be avoided.	All impacts on threatened and endangered species would be avoided.	All impacts on threatened and endangered species would be avoided.
Wildlife Resources								
Antelope Crucial Winter-Yearlong Range	97 acres of disturbance.	46 acres of disturbance.	108 acres of disturbance.	46 acres of disturbance.	1,226 acres of disturbance.	274 acres of disturbance.	1,130 acres of disturbance.	262 acres of disturbance.
Mule Deer Crucial Winter Range	184 acres of disturbance.	68 acres of disturbance.	162 acres of disturbance.	60 acres of disturbance.	0 acres of disturbance.	0 acres of disturbance.	0 acres of disturbance.	0 acres of disturbance.
Mule Deer Crucial Winter-Yearlong Range	3 acres of disturbance.	2 acres of disturbance.	4 acres of disturbance.	2 acres of disturbance.	0 acres of disturbance.	0 acres of disturbance.	0 acres of disturbance.	0 acres of disturbance.
Moose Crucial Range	None	None	None	None	None	None	None	None

SUMMARY OF IMPACTS BY ALTERNATIVE

RESOURCE	DALEN'S PROPOSED ACTION		DALEN'S RESOURCE PROTECTION ALTERNATIVE		LINCOLN ROAD'S PROPOSED ACTION		LINCOLN ROAD'S RESOURCE PROTECTION ALTERNATIVE	
	Construction-Related Impacts¹	Production-Related Impacts²	Construction-Related Impacts¹	Production-Related Impacts²	Construction-Related Impacts¹	Production-Related Impacts²	Construction-Related Impacts¹	Production-Related Impacts²
Elk Crucial Winter Range	None	None	None	None	None	None	None	None
Aquatic Resources	Increased potential for sedimentation into the Green River.	Increased potential for sedimentation into the Green River.	Increased potential for sedimentation into the Green river.	Increased potential for sedimentation into the Green River.	Increased potential for sedimentation into the Green River.	Increased potential for sedimentation into the Green River.	Increased potential for sedimentation into the Green river.	Increased potential for sedimentation into the Green River.
Health and Safety	Increased possibility of a fuel spill.	Increased possibility of a fuel spill.	Increased possibility of a fuel spill.	Increased possibility of a fuel spill.	Increased possibility of a fuel spill.	Increased possibility of a fuel spill.	Increased possibility of a fuel spill.	Increased possibility of a fuel spill.

¹ Impacts that would persist during construction and pending completion of reclamation.

² Impacts that would persist during production activities for the life of the field or 20-30+ years.

SECTION 2 - Addendum and Errata

1.1 Addendum

The following sections have been prepared to expand upon analysis found in the DEIS. For minor changes to the text of the DEIS see the errata section (Section 1.2 of this chapter).

1.1.1 Addendum: Air Quality

Affected Environment.

This addendum should be read in the context of Section 3.10 of the DEIS and should be incorporated as Section 3.10.1 of the DEIS.

3.10.1 Air Quality

Current and complete monitoring data for ambient air quality are not available for the CISA. However, based on data collected in similar locations, air quality levels are assumed to be in attainment for all National Ambient Air Quality Standards (NAAQS) and State of Wyoming Ambient Air Quality Standards (WAAQS). These data and standards are summarized in Table 3-16.

TABLE 3-16. BACKGROUND AIR QUALITY CONCENTRATIONS AND APPLICABLE STANDARDS

POLLUTANT	AVERAGING TIME ^a	CONCENTRATION ($\mu\text{g}/\text{m}^3$)	WAAQS ($\mu\text{g}/\text{m}^3$)	NAAQS ($\mu\text{g}/\text{m}^3$)
CO	1-Hour	3,500	40,000	40,000
	8-Hour	1,500	10,000	10,000
NO ₂	Annual	10 ^b	100	100
Ozone ^c	1-Hour	129	160	235
SO ₂	3-Hour	132	1300	1300
	24-Hour	43	260	365
	Annual	9	60	80
TSP	24-Hour	45	150	n/a
PM ₁₀	24-Hour	45	150	150
	Annual	13	50	50

Note: ^aShort-term periods reflect maximum measured concentrations.

^bMaximum measured nitrogen dioxide annual average value was $2 \mu\text{g}/\text{m}^3$; however, a maximum value of $10 \mu\text{g}/\text{m}^3$ was assumed based on extensive modeling reported in the Air Quality Technical Report.

^cOzone data from Bohm, et al, (1995); mean of 95th percentile maximum 1-hour concentrations.

The estimation of background concentrations is necessary in order to compare potential air quality impacts from the proposed actions with applicable air quality standards. Thus, impacts, for comparison against an applicable standard, are the sum of the modeled impacts from the proposed sources, plus background concentration. It is important that the model predictions, background concentration and applicable air quality standard are for the same averaging time period.

Background pollutant concentration data were provided by the Wyoming Department of Environmental Quality, Air Quality Division (WDEQ/AQD). Background concentrations of carbon monoxide (CO) are taken from representative data collected by WDEQ/AQD and commercial operators, and summarized in the Riley Ridge EIS (BLM, 1983). Nitrogen dioxide (NO₂) and sulfur dioxide (SO₂) gaseous data were gathered at the La Barge Study Area at the Northwest Pipeline Craven Creek site (Dailey, 1995). Ozone data were taken from Bohm, et al, (1995); they represent the mean of 95th percentile maximum 1-hour concentrations.

The particulate data were collected at the Seedskaelee Wildlife Refuge (TSP), and it was conservatively assumed that TSP and PM₁₀ concentrations are identical. In addition, because the Seedskaelee Refuge measurements were probably not influenced by man made (anthropogenic) emission sources it was assumed that the maximum 24-hour particulate values result from wind blown dust.

To supplement measured NO₂ data, and to verify modeled NO₂ contributions would not violate applicable ambient air quality standards, many NO_x emission sources in southwest Wyoming were modeled. Measured annual average NO₂ data (Craven Creek) showed background levels of nearly $2 \mu\text{g}/\text{m}^3$; the modeled background concentration was approximately $10 \mu\text{g}/\text{m}^3$. The modeled predictions are based on potential emissions of all sources operating at maximum capacity simultaneously over an entire year ("worst-case," but improbable). By contrast, background measurements result from actual conditions. In conclusion, these two independent estimates of background NO₂ levels complement each other. For purposes of the cumulative analysis, a

"worst-case" background concentration of NO_x of $10 \mu\text{g}/\text{m}^3$ was assumed.

No Prevention of Significant Deterioration (PSD) sources exist in the CISA. Several existing, planned and proposed emission sources were also included as "background" sources in the cumulative air quality impact analyses. These sources included:

- Existing (included in Background): South Baxter, UPRC Brady, Patrick Draw, Dripping Rock, Hay Reservoir, Nichi Gulch, Big Piney La Barge, Hiawatha, N. Evanston, S. Evanston, and Whitney Canyon.
- EIS Prepared but Field not Developed: Jonah Field, Stagecoach, Greater Wamsutter II (GWA II), Mulligan Draw, Creston/Blue Gap, and BTA/Bravo.
- Sources Permitted but not emitting: FMC, General Chemical, Sweetwater Methanol, SF Phosphates, Texaco-Table Rock, Texasgulf-Soda Ash, UPRC-Patrick Draw, Wold Trona, Western Gas Resources-Eagles Nest and -Granger and Williams Field Service-Echo Springs, -Frewen Lake, -Moxa North, -Moxa South, and -Opal NGL Plant.

Two projects were not included as "background" sources in the cumulative impact analysis: Continental Divide and South Baggs. Both of these projects are still undergoing preliminary NEPA analysis and therefore are not "reasonably foreseeable"; including these speculative sources could constitute a "pre-decision" by the Bureau regarding the likelihood of their development.

Environmental Consequences.

This addendum should be read in the context of Section 4.10 of the DEIS and should be incorporated as Sections 4.10.1 through 4.10.5 of the DEIS.

4.10.1 Introduction

Air pollutants are regulated under Federal and State air quality and emission standards and permit requirements established under the Federal Clean Air Act and administered by WDEQ/AQD. An expanded

air quality impact analysis report was completed in response to public comment on the DEIS. A summary of the report has been provided in Appendix A. A copy of the entire report may be obtained from the BLM, Rock Springs District Office.

The expanded report did not result in significant changes in the findings of the DEIS. No violations of applicable Federal or Wyoming air quality regulations are expected to occur as a result of direct, indirect or cumulative inflill drilling project emissions (including construction and operation). Potential emission levels would meet Prevention of Significant Deterioration (PSD) Class I and Class II increment limits. Pollutant concentrations would not significantly "overlap" between well locations, even with the densest assumed well spacing. All impacts would be below applicable significance criteria for atmospheric deposition.

Given the inherent conservatism in the analysis it is unlikely (but not impossible) operation emissions would cause significant regional haze impacts in the PSD Class I Area. Assuming a "worst-case" emissions scenario, operation could result in a perceptible visual range reduction on twenty-six days annually (eight days of the non-winter period, and eighteen days during winter). Under the "less conservative" emissions scenario, no days exhibit significant visual range reduction.

In reviewing these predicted impacts it is important to understand the assumptions that have been made regarding resource development. In development of this analysis there is a great deal of uncertainty in the projection of specific plans (i.e. number of wells, equipment to be used and specific locations) for resource development for twenty years in the future. All of these factors affect air emissions as well as predicted air quality impacts. This analysis was based on the "worst case": 1) amount of development; 2) equipment necessary to produce the resource to its maximum capacity; 3) well spacing; and 4) assumed source locations.

This "worst case" emission scenario represents an upper bound which would not be exceeded. Review of current production activities in the area suggests that this level of air emissions and impacts would not be reached. Thus the impacts projected in this report

should be viewed as a conservative upper bound estimate of potential air quality effects that are not likely to occur. It is also important to note that before development could occur, the Wyoming Department of Environmental Quality (WDEQ) would require very specific air quality preconstruction permits which must examine project specific air quality effects.

As part of these permits, (depending on source size), WDEQ would require a cumulative air quality impacts analysis. Thus, as development occurs additional site specific air quality analysis must be performed to ensure protection of air quality resources.

4.10.2 Summary of Issues and Impacts Common to Both Projects

The purpose of the near field modeling was to identify the maximum predicted concentrations in the vicinity of the emission sources for comparison with applicable air quality standards and PSD Class II increments. This modeling was performed to quantify potential "worst-case" impacts from particulate emissions and SO₂ emissions during construction, and CO and NO₂ impacts during production.

The ISC3 model was used to simulate the transport and dispersion of TSP and PM₁₀ from traffic on the unimproved lease road, and from the resource road and well pad construction. Detailed emission rates were used along with the Craven Creek meteorological data, to determine the maximum 24-hour TSP and PM₁₀ concentrations and annual average PM₁₀ concentration. These emissions are temporary (occur over a 25-day period) during construction and would occur in isolation, without affecting neighboring well sites. The maximum potential concentrations at the public access receptors (including representative background values) would be nearly 15 µg/m³ (PM₁₀ annual), 69 µg/m³ (PM₁₀ 24-hour), and 111 µg/m³ (TSP 24-hour). Therefore, both predicted short- and long-term particulate matter concentrations comply with the applicable Ambient Air Quality Standards; defined as 50 µg/m³ (PM₁₀ annual), 150 µg/m³ (PM₁₀ 24-hour), and 150 µg/m³ (TSP 24-hour). Since these sources are temporary, PSD increments are not applicable. Total maximum 24-hour concentrations shown are likely to

overestimate actual expected concentrations because they assume the maximum modeled concentration would coincide with the maximum measured background concentration. However, these two events would occur under very different meteorological conditions, and would not be expected to coincide.

The maximum short-term (3- and 24-hour) and long-term (annual average) SO₂ emissions are those from the drilling engines used for the 25 day rig-up and drilling campaign. SO₂ concentrations were predicted (using the ISC3 model) for all applicable time periods. These emissions are temporary (occur over a 25-day period) during construction and would occur in isolation, without affecting neighboring well sites. The maximum modeled concentrations (including representative "worst case" background values) would be nearly 183 µg/m³ (3-hour), 60 µg/m³ (24-hour), and 11 µg/m³ (annual). Therefore, both predicted short- and long-term SO₂ concentrations comply with the applicable Wyoming Ambient Air Quality Standards; defined as 1300 µg/m³ (3-hour), 260 µg/m³ (24-hour), and 60 µg/m³ (annual); the National standards are less restrictive. Since these sources are temporary, PSD increments are not applicable.

The ISC3 model was used to simulate the transport and dispersion of CO from the compressor engines during production. The maximum predicted direct CO impacts are nearly 95 µg/m³ (1-hour) and 60 µg/m³ (8-hour), indicating that no concentrations exceed EPA "significant" levels (2,000 µg/m³ 1-hour, and 500 µg/m³ 8-hour). Therefore by definition there is no significant concentration overlap. When these values are added to the assumed background concentrations, they become nearly 3,595 µg/m³ (1-hour) and 1,560 µg/m³ (8-hour), complying with the applicable Ambient Air Quality Standards of 40,000 µg/m³ (1-hour) and 10,000 µg/m³ (8-hour).

The ISC3 model was used to simulate the transport and dispersion of NO_x during the highest production phase. This modeling was based on the "worst-case" conservative assumption that each well would have a compressor engine (5.1 tons per year NO_x emissions). Maximum modeled NO₂ concentrations were determined by multiplying maximum NO_x concentrations by 0.75, in accordance with standard EPA methodology (Federal Register 60:153, p.

40469, dated Aug 9, 1995). A group of four wells were modeled to determine the potential for interaction of emissions. Minimal NO₂ overlap occurred between wells, indicating that the maximum potential NO₂ impacts are those associated with each individual well site (i.e.: no cumulative impact will occur). The maximum predicted direct NO₂ impact was 5.7 µg/m³. When this values is added to the assumed representative background concentration (10 µg/m³), the resulting predicted maximum total impact is nearly 16 µg/m³, below the State and Federal NO₂ ambient air quality standard of 100 µg/m³. In addition, the maximum direct NO₂ value (5.7 µg/m³) is well below applicable PSD Class II increment of 25 µg/m³.

Ozone is formed as a result of photochemical reactions involving ambient concentrations of VOCs and NO_x. Because of the complicated photochemical reactions involved with the formation of ozone, a nomograph developed from the Reactive Plume Model (RPM) (Scheffe, 1988) was used to predict potential ozone impacts. This involves computing a potential VOC to NO_x emission ratio, and comparing this ratio, and potential VOC emissions to the nomograph. At the predicted ratio (4.8), the nomograph estimates maximum potential ozone concentrations of less than 0.01 parts per million (20 µg/m³). When added to a background ozone concentration of 129 µg/m³, the total predicted ozone impact is 149 µg/m³. This predicted concentration is less than the restrictive Wyoming Ambient Air Quality Standard of 160 µg/m³. This concentration is conservative since the nomograph was developed using meteorological conditions more conducive for forming ozone than would be found in southwestern Wyoming.

In addition, emissions rates of several Hazardous Air Pollutants (HAPs) from well production were evaluated, including formaldehyde (approximately 0.44 tons per year), n-Hexane (0.65 tons per year), and Benzene (1.44 tons per year), Toluene (4.05 tons per year), Ethyl Benzene (0.004 tons per year), and Xylene (5.78 tons per year) from the dehydrator, separator, storage tanks, and compressor engine. Screening values for short-term or acute exposure limits for the HAPs were determined by dividing the American Conference of Governmental Industrial Hygienists (ACGIH, 1993) Threshold Limit Values (TLV) by a factor of 42 (CMA, 1988). This is

conservative since only workers would be within 50 meters of a well site, and the TLV would be directly applicable without a safety factor to account for the sensitive portion of the population or changes in averaging time.

Potential HAP impacts were predicted using an 8-hour averaging time, then compared to the TLV derived screening values. The predicted maximum concentrations (formaldehyde 3 $\mu\text{g}/\text{m}^3$, n-hexane 101 $\mu\text{g}/\text{m}^3$, benzene 222 $\mu\text{g}/\text{m}^3$, ethyl benzene 0.6 $\mu\text{g}/\text{m}^3$, toluene 630 $\mu\text{g}/\text{m}^3$, and xylene 896 $\mu\text{g}/\text{m}^3$) are well below the screening exposure levels (formaldehyde 8.8 $\mu\text{g}/\text{m}^3$, n-hexane 4,191 $\mu\text{g}/\text{m}^3$, benzene 762 $\mu\text{g}/\text{m}^3$, ethyl benzene 10,333 $\mu\text{g}/\text{m}^3$, toluene 4,476 $\mu\text{g}/\text{m}^3$, and xylene 10,333 $\mu\text{g}/\text{m}^3$). These maximum predicted concentrations occur close to the well site (within 50 meters). As the distance from the well increases, the predicted concentrations decrease rapidly.

Long-term (70-year) exposures to suspected carcinogens (benzene and formaldehyde) emissions were made to estimate the incremental risk. These were calculated from EPA unit risk factors for carcinogenic constituents (EPA, 1989). The estimated incremental risk was adjusted to account for duration of residency exposure (approximately 9 years), time spent at home (73 percent), and years of production (20). In addition, no residence would be affected by more than 1 well, so there would be no cumulative incremental risk. The incremental carcinogenic risk was computed to be 1.6×10^{-7} for formaldehyde, and 6.3×10^{-7} for benzene; both below one in a million (1.0×10^{-6}).

Impacts of all project alternatives (except the No Action Alternative) would be the same.

4.10.3 No Action Alternative

Implementation of this alternative would eliminate the incremental air quality impacts associated with the Proposed Actions and RPAs. Impacts to air quality from field maintenance activities and on-going drilling activities would persist.

4.10.4 Mitigation and Monitoring Measures

In computing particulate emissions from well pad and resource road construction, it is assumed that water

and/or chemical dust suppressants would be applied in order to minimize TSP and PM_{10} fugitive dust emissions. The control efficiency of the watering and/or dust suppressant use is computed at 50 percent watering at an (assumed) application rate of 0.02 gallons per square yard.

Roads which would be constructed on soils susceptible to wind erosion should be gravelled to reduce the amount of fugitive dust generated by traffic. These roads should be identified in transportation plans submitted to the BLM.

Dust inhibitors should be periodically used on unpaved local, collector or arterial roads which present a fugitive dust problem. To reduce fugitive dust, oil and gas operators should establish and enforce speed limits for all unsurfaced roads in CISA. These roads should be identified in the transportation plan.

4.10.5 Cumulative Impacts

Cumulative impact assessment was also performed to predict potential air quality impacts in the Bridger Wilderness PSD Class I area to satisfy the following objectives:

- Calculate (through a screening analysis) whether the PSD Class I increment for NO_2 would be exceeded.
- Calculate potential nitrate and sulfate deposition (and related impacts) in sensitive lakes.
- To address potential changes in regional visibility.

Three different groups of sources were modeled:

- Emissions from the "Proposed Action" well field development.
- Other well fields (included in background):
 - Existing: South Baxter, UPRC Brady, Patrick Draw, Dripping Rock, Hay Reservoir, Nichi Gulch, Big Piney La Barge, Hiawatha, N. Evanston, S. Evanston, and Whitney Canyon.
 - EIS Prepared but Field not Developed: Jonah Field, Stagecoach, GWA II, Mulligan Draw, Creston/Blue Gap, and BTA/Bravo.
- Other sources in southwestern Wyoming that have undergone New Source Review (NSR) but

have not been constructed or are not yet in operation (including sources permitted but not constructed: FMC, General Chemical, Sweetwater Methanol, SF Phosphates, Texaco-Table Rock, Texasgulf-Soda Ash, UPRC-Patrick Draw, Wold Trona, Western Gas Resources-Eagles Nest and -Granger, and Williams Field Service-Echo Springs, -Frewen Lake, -Moxa North, -Moxa South, and -Opal NGL Plant.)

It is important to place these modeling results into a proper perspective in terms of the level of conservatism factored into this analysis. The projected impacts reflect "screening" level modeling (a modeling approach that is conservative by design). If the modeling results are less than applicable significance criteria there is no need to perform a more refined analysis. The following conservative assumptions have been incorporated into this analysis.

- All emission units are operating at potential emission rates simultaneously. Given the number of sources included in this analysis (approximately 10,000) the co-probability of such an emissions scenario occurring over an entire year or over a 24-hour time period is extremely small. While this assumption is typically used in such modeling analyses, the resulting impacts will be overstated. It should be noted as the number of sources increases the level of conservatism also increases.
- The ISC3 model utilizes instantaneous straight line plume transport. Thus the model does not account for the actual travel time and distance that a plume would undergo as it is transported from the point of release to the receptors in the Class I area. Because of this assumption the model significantly overestimates the number of times that a plume actually reaches a sensitive receptor (based on a "puff" model analysis, it is likely a plume will impact the PSD Class I Area only fifteen percent of the time). Also, because the model cannot predict the varying route of an actual plume, the travel distance is underestimated and the concentration is overstated. For near field impacts this limitation is not very important, however, for travel distances greater than 50 kilometers this assumption becomes very conservative.

- The complex terrain treatment in the ISC3 model also conservatively addresses plume transport for elevation increases of greater than 4000 feet (1,320 meters). Even though a trajectory could transport the plume toward the Class I area, it is doubtful that it would climb 4000 feet necessary to reach the sensitive receptors.

In addition, a "less conservative" emission scenario was developed as a point of comparison to the assumed "worst case" emissions scenario. Review of existing compressor use suggests that after resource development, total emissions would be much less than the assumed "worst case" scenario. It is likely the 320 MMSCFD of additional natural gas capacity under the Proposed Action proposed would require 28,800 horsepower of additional compression. Since compressors are typically added in 225 horsepower increments, this would result in 128 new compressors, as opposed to the 1,325 compressor engines assumed under the "worst case" emission scenario. The "less conservative" emission scenario is approximately eight times less than the "worst case" emission scenario.

The maximum predicted cumulative NO_2 concentration at the Bridger PSD Class I boundary is 0.21 to 0.08 $\mu\text{g}/\text{m}^3$, reflecting a range between the "worst-case" and "less conservative" emissions scenarios. Therefore, it is unlikely the proposed action would cause or contribute to exceedances of the NO_2 PSD Class I increment (2.5 $\mu\text{g}/\text{m}^3$). SO_2 emissions from construction activities do not consume PSD increment. It is important to note that this is not a complete PSD increment analysis, but rather an assessment indicating that increment would not be exceeded. At the time of a pre-construction air quality permit application WDEQ could require a much more detailed analysis.

The maximum predicted cumulative, average SO_2 and NO_2 concentrations were computed using the ISC3 model for specific lake locations within the Bridger/Teton Wilderness Area. The lakes that were chosen are those identified in "Temporal Patterns in the Chemistry of Wind River Lakes and Four NADP/NTN Sites in Wyoming," (Welker, 1994), and include Black Joe, Deep, Hobbs, Ross, and Saddlebag. These lakes are those for which the most recent, and most complete, data have been collected. They represent a mix of east- and west-side lakes, all

of which are above 9,842 feet (3,000 meters) elevation, and all of which have alkalinities less than 200 µeq/l. These lakes represent a cross-section of "...aquatic ecosystems in this area [that] have little protection from acidic deposition." (Welker, 1994).

The U.S. Forest Service has expressed concern regarding Klondike Lake because its ANC is "...very low: 20 microequivalents per liter" (Nelson, 1996). If this measurement of ANC at Klondike Lake is correct and current, arguably additional nitrogen deposition at Klondike Lake could cause exceedances of the U.S. Forest Service ANC threshold. However, it appears that the Klondike ANC measurement is a single 1984 measurement, and subsequent measurements of ANC have not been made at Klondike Lake. Based on a comparison of 1980's and recent data collected at Ross Lake (Baron, 1996), the accuracy and representativeness of the single 1984 Klondike Lake ANC value is suspect.

Saddlebag Lake was the most sensitive receptor based on existing lake chemistry, location, and potential SO₂ and NO₂ impacts. Atmospheric deposition at Saddlebag Lake was predicted to be 0.1553-0.0735 kg/ha-yr (nitrogen) and 0.2050 kg/ha-yr (sulfur), compared to threshold values (Fox, et al. 1989) of 3 kg/ha-yr (nitrogen) and 5 kg/ha-yr (sulfur). Potential pH change in Saddlebag Lake was predicted to be 0.012-0.009 delta pH, well within the threshold of 0.1 pH units. Potential change in Acid Naturalizing Capacity (ANC) at Saddlebag Lake ranged between 2.74 and 2.07 percent; the allowable threshold change is 10 percent for lakes with existing ANC greater than 25 microequivalents per liter.

Since the proposed emissions constitute many small sources, uniformly spread out over a very large area, discrete visible plumes are not likely, but the potential for cumulative visibility impacts (increased regional haze) near the PSD Class I area is a concern. Regional haze or visibility degradation is caused by fine particles and gases scattering and absorbing light. Changes to regional haze are measured in terms of perceptible visibility differences below ambient background conditions.

The Interagency Workgroup on Air Quality Modeling (IWAQM) has prepared a methodology for estimating changes to regional haze (IWAQM, 1993). This method involves modeling SO₂, NO₂, and particulate

emissions to estimate airborne fine particle concentrations at the PSD Class I area, then computing an increase in extinction coefficient over background conditions. This method is called a "deciview change" from a background condition. The magnitude of the deciview change is used as an indicator for increases to regional haze. A deciview change of 1.0, which represents a 10 percent change to ambient conditions, is considered potentially significant. Factors such as magnitude of deciview change, frequency, time of the year, meteorological conditions during times when deciview thresholds are above 1.0, as well as inherent conservatism in the modeling analyses are considered when determining if the impact is significant.

Since the Proposed Action sites are located approximately 100 miles west of the sources that are located on the eastern side of the continental divide, and visibility degradation is a condition caused by persistent meteorological conditions, the sources east of the continental divide were not included in this analysis. The ISC3 model was used to estimate the maximum 24-hour, and annual average pollutant impacts from well field emissions, at receptors along the PSD Class I Area boundary. For this "worst case" scenario, NO₂ is the only pollutant of concern since no sulfur emissions would occur during production. The background visibility was determined on a seasonal basis using standard visual range (SVR) data provided by the IMPROVE monitoring program. These values for standard visual range are assumed to be the 90th percentile best-case visibility for each of the four seasons (262 km - winter, 204 km - spring, 191 km - summer, and 224 km - fall).

Results of this analysis for the "worst-case" emissions scenario indicated that there are 26 days when the deciview calculations exceed 1.0. The cumulative frequency distribution of these data indicate 92 percent of the estimates have a predicted deciview of less than 1.0. These data were further examined for the time of occurrence; the 1.0 deciview threshold was exceeded on only 8 days during the non-winter period. Given the inherent conservatism in the analysis it is unlikely (but not impossible) that "worst-case" well field emissions would cause significant regional haze impacts in the PSD Class I Area.

This regional haze analysis was conducted using conservative assumptions regarding emissions, plume transport time, humidity, and the conversion of NO_x to ammonium nitrate. It was assumed that 75 percent of the NO_x convert to NO₂ and that 100 percent of the NO₂ converts to nitrate particles. In all likelihood, the amount of NO_x that converts to ammonium nitrate particles would be significantly less.

Considering the less conservative emissions case, where NO₂ emissions from the well fields would be roughly eight times less than the worst-case scenario, the visibility threshold would not be exceeded at any time.

1.1.2 Addendum: Directional Drilling

This addendum should be read in the context of Section 2.4 of the DEIS and should be added as Section 2.4.3 to the DEIS.

Directional drilling of several wells from a single, existing well pad has been suggested as a means of reducing surface disturbance and impacts to wildlife habitat in the DALEN and Lincoln Road project areas. Directional drilling was incorporated to a limited extent in the Resource Protection Alternative to avoid impacts to wetlands, the Green River and historic trails. In addition, the DEIS included the following discussion of directional drilling (p. 2-20):

Directional Drilling Considerations. The RPA [Resource Protection Alternative] incorporates directional drilling to reach target bottomhole locations where necessary to avoid sensitive surface resources such as wetlands, historic sites, etc., or to reduce unnecessary surface disturbance within crucial winter ranges, Class II viewsheds, etc. BLM will require the operator/lessee to consider directional drilling in areas of sensitive surface resources or to drill from an existing pad where four well pads already exist within a section. Although once quite costly and heavy with risk, directional drilling technology has advanced tremendously such that the additional costs of directional drilling are less than 40 percent; it can actually mean a savings to an operator when factoring in directional drilling from an existing pad where the costs associated with construction of an

access road, well pad, and production facilities are greatly reduced by using common facilities on multi-well pads. The specialized downhole tools and experienced personnel to supervise directional drilling operations have become more common in the Rocky Mountains. Numerous well locations with environmental or topographical problems within the Rock Springs District have been directionally drilled from surface pads to bottomhole locations as much as 2,630 feet away.

Comments received on the DEIS and additional analysis completed by the BLM Wyoming Reservoir Management Group suggested the need to revise this paragraph (also see [errata](#)).

Comment letters received on the DEIS suggested that a more detailed analysis of directional drilling was needed. Industry spokespersons took issue with several aspects of the paragraph cited above including the discussion of the costs of directional drilling, the savings to be gained from drilling multiple wells from a single well pad, the possibility of requiring directional drilling to reduce surface disturbance, and the amount of surface disturbance avoided. Citizen groups have called for greater use of techniques such as directional drilling to reduce surface disturbance and impacts to areas such as crucial winter range. This addendum is intended to address the concerns of both parties and should be seen as a follow-up to the discussion of alternatives found in the DEIS.

In response to public comment, the BLM State Office requested that the BLM Wyoming Reservoir Management Group prepare a report which would address the following four questions. A copy of the report, entitled *Directional Drilling Alternatives in the Fontenelle II - Lincoln Road EIS Area*, is found in Appendix B. [The Wyoming Reservoir Management Group is an in-house group of BLM experts in oil and gas drilling and reservoir management.]

1. Do geologic and physical reasons preclude directional drilling in the DALEN or Lincoln Road project areas?

BLM analysts found no geologic or physical reasons which would preclude the use of directional drilling in either project area. DALEN, Cabot, Texaco, and others have directionally drilled wells in the project

areas with mixed success. Cabot has drilled directionally to avoid impacts within a historic trail buffer; Texaco has drilled directionally to avoid impacts to Fontenelle Reservoir and DALEN has drilled directionally to avoid impacts to wetlands and the Green River. Nonetheless, directional drilling in the project areas has been uncommon and confined to unique situations, and, while there are no geologic or physical reasons which preclude its use, several factors limit its applicability, success and desirability as a blanket requirement in the project areas.

First, directional drilling of a second well from an existing well pad saves little, if any, surface disturbance. Once a well has been completed, the reserve pit is backfilled and production equipment such as a dehydration unit and meter is installed on the pad. All but the 0.7 acres required for this equipment is reclaimed. Approximately 2.5 acres is required for drilling. To drill a second well from an existing production location requires avoiding the existing wellhead, production equipment, backfilled reserve pit and placing the drill rig a safe distance from the producing wellhead. In practice this means that little if any of the 0.7 acres associated with a production location would overlap the pad needed to drill the directional well. The directional well would now be located far enough from the first well that a larger production pad would be needed to permit maintenance vehicles to access the new wellhead. Therefore, requiring directional drilling would have little effect on the amount of proposed surface disturbance associated with well drilling and production activities.

Second, directional holes take longer to drill and experience more technical difficulties. The companies found that, compared to conventional wells, directionally drilled wells in the project areas can take up to twice as long to drill and complete. Increased drilling time translates into increased drilling-related impacts such as noise and traffic. DALEN experienced problems with casing and logging the two directional wells drilled in the Fontenelle area in the past few years. While numerous companies have tried directional drilling in southwest Wyoming, such wells have mainly been used in unique situations with a high probability of achieving a high production well. Several companies who have drilled directional wells in the past few years in southwest Wyoming have submitted letters to

the BLM pointing out that while directional drilling has been used in rare situations it should not be viewed as a standard or widespread industry practice.

Third, the savings in surface disturbance from reduced road-pipeline construction would be minor. A 2.5-acre well pad would still have to be constructed adjacent to an existing, producing well. In cases where a road-pipeline infrastructure is already in place some road-pipeline construction could be avoided. In the DALEN project area, the average road mileage per proposed well is approximately 1,030 feet or 0.7 acre of long-term disturbance. Disturbance from pipeline construction has already been minimized by the proposed use of surface pipeline and joint road-pipeline corridors as discussed in the DEIS. Furthermore, the Resource Protection Alternatives and Proposed Actions have been designed to minimize new road construction by using existing roads where feasible and by the BLM requirement that road development be coordinated and comply with a transportation plan intended to avoid unnecessary road construction.

Fourth, directional wells cost more than conventional wells to drill and complete. Using actual cost data provided by the companies, the BLM Reservoir Management Group estimated that a directional well in the Fontenelle area would cost an additional \$75,000-80,000. In some cases such wells have cost an additional \$100,000 or more. Allowing for the higher risks involved in drilling and completing a directionally drilled well, the companies typically budget an additional \$100,000 for a directional well.

Fifth, the cost savings in road and pipeline mileage declines as the level of existing development increases and proposed wells are located closer to existing roads and pipelines. Road-pipeline and pad construction accounts for only about 5 percent of the overall cost of drilling, completing and producing a new gas well. The Reservoir Management Group estimated that a directional well from an existing pad could save about \$15,000 by avoiding new road-pipeline construction. A new drill pad still would have to be constructed for reasons explained above. A second set of production equipment (e.g., dehydration unit and meter) or larger, more expensive units must also be installed to service the second well. With the road and pipeline savings, additional directional well costs would be reduced to

\$60,000 to \$65,000. Thus overall, compared to a conventional well, it still costs an additional \$60,000-65,000 to drill a directional well.

In parts of the Lincoln Road project area, disturbance would depend upon the existing level of development. For example, some sections already have 4-5 wells in which case the savings in surface disturbance from use of an existing location would be similar to that found in the DALEN project area. As discussed in the Proposed Actions and Resource Protection Alternatives, disturbance would be reduced only by co-location of road and pipeline. More substantial reductions in surface disturbance could be achieved in areas where road and pipeline infrastructures would be built. These areas tend to be found on the far eastern and southeastern edge of the Lincoln Road project area. On average, construction-related disturbance for road and buried pipeline would average 4.1 acres per well in the Lincoln Road project area. Following reclamation, production-related disturbance for road and buried pipeline would average 0.9 acres per proposed well (see DEIS, Table 2-3 and 4-5).

2. *If drilling is limited to four well pads per section, would a directional drilling requirement make a well undrillable due to economics?*

BLM analysts concluded that this question can only be answered on a well-by-well basis for a specific time. Considering historic well production data and historic natural gas prices, most of the wells currently in production would have been uneconomic if directional drilling were required. Similarly, assuming that future wells follow a similar production pattern, and considering current and reasonably foreseeable natural gas prices, most of the proposed wells would also be uneconomic to drill as directional wells. From this standpoint, directional drilling is not a reasonable alternative.

The report prepared by the BLM Wyoming Reservoir Management Group examined the costs of drilling conventional and directional wells in terms of three different production rates and four natural gas price scenarios. The team determined well payout times for each of these scenarios. Details of this analysis can be found in Appendix B of the FEIS which includes a list of prices at the Opal, Wyoming sales

point from January, 1986 through October, 1995. Wellhead prices for natural gas paid to DALEN, Cabot or other producers are less than this price. The analysis by the Reservoir Management Group found that at the recent gas price of about \$1.00 per thousand cubic feet of gas (MCFG), directional wells would be uneconomic to drill unless the well would achieve an unusually high rate of production. Given recent gas prices, even most conventional wells would be uneconomical to drill. Based on current prices the Reservoir Management Group predicted that a directionally drilled well would not be economical until recoverable reserves were greater than 2.7 billion cubic feet of gas. In comparison, recoverable reserves for a DALEN well average about 1.1 billion cubic feet and average about 1.4 billion cubic feet for a well in the Lincoln Road area.

To consider directional drilling a reasonable alternative, one must be able to predict the production rate from a proposed well with a high level of confidence. In the project areas, there is a very high probability that a well will hit natural gas. But predictions about gas production from that well have a very high level of uncertainty. In other words, predicted production has seldom matched realized production. This high level of uncertainty makes it virtually impossible to determine beforehand whether a directional well would be economic and therefore a reasonable alternative. As noted in the DEIS (p. 4-11) historical records show that about 30 percent of the wells drilled in the cumulative impact study area have not been economic. Thus it is very unlikely that more than about 70 percent of the proposed conventional wells would be economic.

The BLM Reservoir Management Group found that at current gas prices of about \$1.05/MCFG (Opal price), "...a directionally drilled well could not be drilled economically until recoverable reserves were greater than 2,750 MMCFG" or production from a single well equalled 2.75 billion cubic feet of gas over the life of the well, approximately 20 years (Appendix B). The Reservoir Management Group found "If gas prices were to rise to \$2.00/MCFG, recoverable reserves would still need to be greater than 1,275 MMCFG" (i.e., production equal to 1.27 billion cubic feet of gas over the life of the well). This price has not been reached at Opal in the past 10 years and is unlikely to be sustained in the reasonably foreseeable future.

Even at \$2.00/MCF, directional drilling would be uneconomical for many wells in the DALEN project area as estimated recoverable reserves average about 1.1 billion cubic feet per well. In the Lincoln Road area directional drilling could be economic for more wells--assuming this \$2.00/MCF price level would be sustained at the wellhead over several years. But current drilling, labor, environmental and other costs would have to remain constant over this period.

3. *If additional drilling pads cannot be permitted, would an unacceptable waste of hydrocarbons occur?*

Given that most directional drilling is uneconomic at current and reasonably foreseeable natural gas prices, if additional drilling pads for conventional wells were not permitted, some waste of hydrocarbons would be unavoidable. Natural gas reservoirs in the project areas are broken up into small producing compartments. Intercepting and producing these compartments requires a relatively close spacing of holes. For example, a well in the DALEN project area can drain about a 30-acre compartment; in the Lincoln Road area the drainage area averages about 63 acres. These drainage areas, or compartments, are relatively small because the companies are producing gas from "tight formations" which inhibit the flow of gas to the well bore. The drainage areas in these tight formations would be even smaller without the use of new technologies which fracture the rock and open up new pathways for gas to flow to the wellbore. Even with a pattern of one well per 80 acres, some compartments would remain undrained. In none of the 48 wells reviewed within the DALEN project area has drainage reached 160 acres; in the Lincoln Road project area, a sampling of 50 wells found only one well with a drainage area of 160 acres or greater (see Appendix B, Attachments B5 and B6). As a rough estimate, 4 wells can only drain about 120 acres or 19 percent of a section's gas reserves in the DALEN project area and about 250 acres or 39 percent of a section's gas reserves in the Lincoln Road project area.

4. *If additional drilling pads cannot be permitted, would an unacceptable loss of federal royalty occur?*

Given that most directional drilling is uneconomic at current and reasonably foreseeable natural gas prices,

if additional drilling pads for conventional wells were not permitted, the Reservoir Management Group found that in almost all cases a loss of royalty would occur. Estimates of royalties are tied to estimates of future production. The DEIS attempted to determine royalty revenue for a typical well in the project areas over the next 10 years (p. 4-12). Assuming an average wellhead price of \$1.58/MCF and average production of one billion cubic feet of gas over the next 10 years, Federal royalty revenue would total \$197,500 per well, half (\$98,750) of which would be returned to the State.

Other revenues would be lost as well. State severance tax revenue on a well producing one billion cubic feet of gas over 10 years would total \$95,000; County ad valorem taxes would total about \$85,000 per well; and property tax would yield about \$4,200 per well. Assuming that 50 percent of the cost of a completed well goes for the purchase of taxable equipment supplies, services and materials, an estimated \$13,000 in sales and use taxes (per well) would be foregone. In sum, on a per-well-basis, an estimated \$295,950 in revenues to the state and local governments, plus \$98,750 to the federal government, would be foregone over a ten-year period.

5. *Conclusions.*

Replacing one conventional well with a directional well drilled from an existing well pad would avoid surface disturbance caused by new road-pipeline construction. DALEN and the Lincoln Road Operators have proposed drilling up to 1,317 infill wells over the next ten years. Assuming the 70 percent historic rate of successful production, about 922 new wells would result in long-term, production-related disturbance. It is impossible to predict how many of these wells would be drilled in situations where well spacing has already reached 4 wells per section, or where an existing road and well pad could be used. For purposes of argument, assuming 25 percent (230) of 922 successful, producing wells were directionally drilled adjacent to an existing well pad, an estimated 207 acres (230 x 0.9 acres) of long-term, road-related disturbance would be avoided. The additional cost of drilling these (230) wells would be \$13.8 to \$15.0 million based on current drilling costs.

Construction-related disturbance for road and surface pipelines would average 1.2 acres per well within the DALEN project area and 4.1 acres per well within the Lincoln Road project area. The higher per-well disturbance for the Lincoln Road project is due to the fact that pipeline companies in the Lincoln Road project area bury the gathering pipelines and because the pipeline infrastructure within portions of the project area (e.g., eastern and southeastern edge) is not as well developed as it is within the DALEN project area (see DEIS, Tables 2-3 and 4-5).

Following reclamation of areas not needed for production-maintenance activities, production-related disturbance for road and pipeline would average 0.7 acres per proposed well in the DALEN project area and 0.9 acres per well within the Lincoln Road project area (see DEIS, Tables 2-3 and 4-5).

Based on the affected environment, resource values and impacts discussed in the DEIS, it would appear unreasonable to require a company to expend \$60,000-65,000 or more to directionally drill a well to avoid 1.2 to 4.1 acres of construction-related disturbance or 0.7 to 0.9 acres of long-term, production-related disturbance within the DALEN and Lincoln Road project areas.

Based on the results of the analysis conducted by the BLM Wyoming Reservoir Management Group for the Fontenelle projects area and for the reasons cited above, it is apparent that a *blanket* requirement of directional drilling from an existing pad where four well pads already exist within a section is not a reasonable alternative. Forced directional drilling would mean that a number of wells would not be drilled and thus a resource wasted (~200 wells @ 500 MCFG/D = 100 MMCFG/D wasted). It would be more prudent and economical to invest a fraction of the cost (e.g., 10%) to drill a directional well into other measures that would reduce resource impacts. These measures, as discussed in more detail under section 1.1.4, could include placing pipelines adjacent to access roads but outside the borrow ditch and reducing the zone of vegetation disturbance during pipeline installations; reclaiming old seismic trails or other two-track trails and other roads not necessary for oil and gas field operations or other uses; commingling production facilities to reduce the size of well pads remaining during production; installing remote-sensing equipment to monitor wells to reduce

the number of trips to each well from daily to about twice per week; etc.

Therefore, an alternative that includes directional drilling as a blanket requirement is not examined further in this document. However, directional drilling would still be a required consideration on a case-by-case basis in the sensitive surface resource value areas shown in Figure 2-6.

1.1.3 **Addendum: Staged Development Alternative**

This addendum should be read in the context of Section 2.4 of the DEIS and should be added as Section 2.4.4 to the DEIS.

This alternative was not suggested during scoping; however, in response to public comment received on the DEIS, this alternative was considered but not examined as a separate alternative for the following reasons.

The purpose of staged development is to spread out impacts over a longer time period to avoid more serious, concentrated impacts. The Proposed Actions and Resource Protection Alternatives already incorporate key elements of a staged development as discussed below.

Under the DALEN Proposed Action and Resource Protection Alternative, a maximum of 45 wells could be drilled in any one year--or about 20 percent of the total number of wells. However, to encourage longer range planning, the DEIS allows well drilling to be spread out over a 10-year period. Similarly, in the Lincoln Road project area, the companies would be limited to a maximum of 150 wells in any one year but the total number of allowed wells could be spread out over a 10-year period. In some areas drilling would have to be concentrated in a shorter time frame to accommodate seasonal restrictions on drilling activities in crucial winter range and sage grouse buffer areas. This would increase the number of rigs that must be operated at any one time. A maximum of four drill rigs would be operated at any one time within the DALEN project area and up to seven drill rigs would operate in the Lincoln Road project area at any one time.

The 10-year time horizon was adopted for several reasons:

- to respond to concerns expressed by citizen groups that the BLM had conducted piecemeal analysis of projects through the use of supplemental NEPA documents;
- to address all reasonably foreseeable oil and gas development in the project areas;
- to provide a more stable climate within which well drilling in the Fontenelle area could continue at a relatively stable pace, resulting in more stable employment and revenue streams and reduced peak impacts;
- to allow companies the flexibility not to drill wells in some years (e.g., when economic conditions are unfavorable) without putting them under pressure to compress their drilling program within a short, rigid time frame—such as occurred prior to the expiration of Federal tax credits; and,
- to avoid the need to conduct repeated, duplicate NEPA processes or to repeatedly supplement and revise NEPA documents with each new stage of a project.

Compared to a surface coal mining operation, for example, it is much more difficult to fix definite stages for the development of an oil and gas field. Several reasons account for this. Geologically, oil and gas development in the cumulative impact study area is much less predictable and the geographical extent of the resource is more difficult to define. Oil and gas drilling is strongly influenced by year-to-year fluctuations in energy prices. Generally, producers are not guaranteed a long-term price for their production. There are numerous alternative oil and gas development opportunities which are constantly being weighed against continued development in the Fontenelle area. Improving technologies could extend the life of an existing well or field or offer additional opportunities for infill drilling within an existing field.

Some have suggested that BLM should stage development in a manner that would allow, e.g., in hot spots or high production areas within a section, four wells could be drilled and when they cease producing, reclaim; the sites and then drill the other four wells. This is not realistic because reservoir characteristics are such that this form of staged

development cannot occur without significant loss of the natural gas resource.

The concept and benefits of "staged development" have already been incorporated into the Proposed Actions and Resource Protection Alternatives. For these reasons a separate "staged development" alternative is not analyzed further in this document.

1.1.4 Addendum: Additional Opportunities for Mitigation to Reduce Residual Impacts

This addendum should be read in the context of the Resource Protection Alternative and the Mitigation Measures discussed in chapter four of the DEIS.

In response to public comments and additional discussion among the BLM State Director and Rock Springs District Offices the following additional opportunities to mitigate residual impacts were identified. As an EIS is not a decision document, these measures are described as recommendations, hence the use of the word "should" rather than "must".

Air Quality - NO_x Mitigation. As part of the cumulative air quality impact analyses, an evaluation of NO_x mitigation (emission reduction alternatives) was conducted. This evaluation focused on opportunities for reducing NO_x emissions for natural gas fired internal combustion compressor engines. It is important to note this is not intended to rank or identify which technology is most applicable for the proposed compressors. The appropriate level of control would be determined as part of the air quality reconstruction permitting process required by the Wyoming Department of Environmental Quality (WDEQ). In developing the emission inventory it was assumed that each compressor engine would reflect 75 percent control with an emission of 2 g/hp-hr (uncontrolled emissions are 9-25 g/hp-hr).

Additional control measures could include:

- Nonselective Catalytic Reduction. This control technology is applicable to relatively new engines, and requires the installation of catalysts in the engine exhaust. The catalyst removes between 80 to 90 percent of the uncontrolled NO_x emissions, for an operating emission rate of

1-5 g/hp-hr. Costs are approximately \$110-180/ton removed.

- Prestratified Charge. This control technology has been applied to 4-cycle carbureted natural gas engines under 1500 hp, but is limited to selected engines that can accommodate turbocharging and power derate. The controls are between 80 to 90 percent efficient, for an operating emission rate of 5-8 g/hp-hr. Costs are unavailable.
- Lean Combustion. This technology involves the increase of the air-to-fuel ratio to lower the peak combustion temperature, thus reducing the formation of NO_x (new engines and retrofit applications). The controls are between 80 to 90 percent efficient, for an operating emission rate of 1.5-4 g/hp-hr. Costs are \$490-690 \$110-180/ton removed.
- Exhaust Gas Recirculation. This control technology employs the recirculation of exhaust gas into the engine cylinder which reduces the formation of NO_x by reducing the combustion temperature. It is applicable for new engines and retrofit kits. The controls are between 50 to 85 percent efficient, for an operating emission rate of 5-8 g/hp-hr. Costs are \$250-600/ton removed.
- Selective Catalytic Reduction. This is a post combustion control technology which is only applicable to exhaust streams with significant oxygen content (a lean burn engine). The controls are between 80 to 90 percent efficient, for an operating emission rate of 1-2.5 g/hp-hr. Costs are \$750-9600/ton removed.

Coordination of Road-Pipeline Construction. The eastern portion of the Lincoln Road Project area (Ts. 23-25 N., R. 109 W.) is proposed for development on a 4 well per section spacing pattern. However, a gathering system infrastructure has not been put in place in much of this area. Design of the gathering system should be coordinated with the area's transportation plan to ensure that existing roads are used as joint road-pipeline corridors wherever feasible.

Road and Trail Reclamation/Closure to Improve Wildlife Habitat. Road reclamation and closure that could occur as part of road construction activities within the project areas have been suggested in the DEIS (p. 4-88, 4-90, 4-94). In addition, numerous two-tracks and unneeded primitive roads also criss-cross the eastern portion of the cumulative impact study area where little or no oil and gas development has occurred (Ts. 22-26 N., Rs. 108-109 W., for example). These two-tracks and primitive roads have been maintained by casual use and are not critical for oil and gas development or other resource uses. Moreover, these two-tracks often occur in areas identified in the wildlife technical report as having a high probability (p > 0.80) of being good quality big game range or sage grouse habitat. To protect and improve potential high quality habitat, unneeded two-tracks and primitive roads in these areas should be closed to vehicle use and reclaimed. Off-road vehicle closures should also be put in force in these areas. In cooperation with the Wyoming Game & Fish Department, the oil and gas operators, livestock operators, and other interested parties, BLM should develop a map that identifies priority areas for closures of unneeded primitive roads and two-tracks. Examples of high priority closures would include two-track roads that cross near sage grouse leks or are within canyons used for raptor nesting. Implementation of a road closure could take one or more of several forms: reclamation, locked gates, signs, and/or barriers such as rocks and ditches.

Reclamation should be used in cases where two-tracks are unnecessary or redundant. Reclamation of these roads should consist of ripping and seeding. Teeth/shanks on the ripper should be spaced so that the tire tracks are ripped but the vegetated area in the center of a two-track road is not ripped. The seed mixture and application rate described in Table 4-26 of the DEIS should be used. No other reclamation measures (e.g., mulch, fertilizer) should be required. Assuming that restoration is conducted when other construction or reclamation activities are occurring (to minimize mobilization costs), it is estimated that a two-track road could be ripped and seeded for about \$200-250 per mile. Ripping and seeding should be done in the fall. A simple barrier should be installed where the reclaimed two-track intersects a road. The barrier could take several simple forms, including a deepened road ditch, rock piles, or a three-strand section of barbed wire fencing. A sign

should be installed indicating that the area is closed to vehicle traffic and is undergoing reclamation. BLM experience has been that a sign works as effectively as barriers at a much lower cost.

As part of the transportation plan required by the BLM, each mile of new road construction could be offset by the operator reclaiming a mile of unneeded two-track--preferably in the previously identified high priority habitat areas. The companies should not be responsible for ensuring reclamation success on these abandoned two-tracks. If one year later, for example, the BLM decides that a second ripping-seeding is necessary on one mile of previously ripped and seeded road, the companies should receive credit for a second mile of reclamation work. It should be remembered that the companies would still be responsible for the complete, successful reclamation of all roads into wells that they plug and abandon.

In some cases, a two-track may be needed only occasionally or the BLM may want to retain the option to allow road use in the future. In this case the area in the vicinity of the entry could be fenced, the road gated, and then signed as closed to public use. Although such a gate would not deter a determined off-road vehicle user, it would deter most casual users. As noted above, BLM experience has been that a sign, explaining that the old two-track road has been reclaimed to replace wildlife habitat and stabilize soil, works as effectively as barriers and at a much lower cost.

If carried to its maximum development over the next 10 years, the DALEN project would require the construction of approximately 41 miles of road; the Lincoln Road projects would require about 262 miles. If this mitigation measure were to be implemented, the companies would reclaim and/or close up to 303 miles of two-track road that may be unnecessary in higher quality wildlife habitat areas in return for development of roads in areas found in existing oil and gas fields (generally lower quality habitat). It is estimated that there are currently 1,454 miles of road in the cumulative impact study area (see DEIS, Table 3-5)--but this does not include many unmapped primitive roads and two-tracks. By incorporating this mitigation measure, it is possible that the projects could result in a net improvement in the availability of higher quality wildlife habitat.

Reduce Extent of Surface Disturbance. BLM and the operators should evaluate well pads, access roads, and pipeline corridors on a site-by-site basis to identify opportunities to minimize construction-related and long-term, production-related disturbance. Well pad size could be reduced to less than the 2.5 acres assumed in the DEIS depending upon site specific conditions and well pad design. Similarly, pipeline construction rights-of-way could be reduced below that assumed in the DEIS. Pipelines could be placed on the outside of road backstops, where feasible, to reduce the total width of pipeline construction disturbance. By using the access road as the working surface for pipeline installation, the width of disturbed area is reduced. In many cases, the reclamation of roadside borrow areas and backstops could be improved to ensure maximum reduction in long-term, production-related surface disturbance. Existing roads or two-tracks should be used where available to route and construct access roads to new locations, provided the existing road or two-track is appropriate for siting a road. The size of drill and well pads could be reduced to the minimum necessary to safely conduct operations. BLM and the operators should evaluate opportunities to reclaim all areas not needed for production or maintenance operations. Instead of burying gathering pipelines, more frequent consideration could be given to the use of surface pipelines where feasible. All construction-related traffic should be confined to staked rights-of-way and project locations.

Maximize Reclamation and Restoration of Wildlife Habitat. Apply interim reclamation practices following completion of construction activities. Where drilling fluids can be reused, dewater reserve pits to speed reclamation of the drill pad and areas not needed for production operations. Use locally tested reclamation practices. Consult with reclamation contractors and oil and gas operators for reclamation practices (e.g., seed mixtures) successfully applied in the Fontenelle area. BLM should hold an annual one day conference with representatives of oil and gas companies and their contractors operating in the Rock Springs District to review reclamation practices and identify innovative, successful reclamation practices that have been applied in the Fontenelle area. Disturbed areas may require fencing after seeding if grazing by livestock, wildlife, or wild horses preclude successful reestablishment of vegetation.

Offset unavoidable forage loss to improve the quality of existing habitat. To the extent practical, implement timely reclamation and/or use vegetation treatments (e.g., controlled burning, cutting decadent sagebrush to increase vegetative productivity) to improve wildlife habitat quality and partially offset losses due to surface disturbing activities. Evaluate and identify opportunities for replacing wildlife forage lost by ripping and seeding roads, two-tracks and trails not needed for field operations, livestock operations, or other resource users.

1.1.5 Addendum: Wildlife Protection and Impact Mitigation Plan

The scope of this plan would be fourfold:

- 1) to compile all wildlife protection and mitigation measures ultimately described in the Record of Decision prepared for the Fontenelle Infill Drilling Projects;
- 2) to describe additional opportunities for mitigation which have been identified by the core team;
- 3) to define specific locations or situations for the implementation of these wildlife protection and impact mitigation measures; and
- 4) to establish schedules or milestones for the implementation of these measures.

Specific measures to avoid or minimize impacts to wildlife were described in the Proposed Action and Resource Protection Alternatives discussed in the DEIS. Measures to mitigate residual impacts were

described in chapter four of the DEIS. This plan would define specific schedules and locations or situations for the implementation of these measures. The plan itself would be periodically updated to reflect changes in the level of development and inflill drilling. This is important as the actual level of drilling may vary substantially with market conditions and could be substantially less than that addressed in the EIS. Similarly, impacts from some percentage of new wells could be offset by abandonment and reclamation of existing well pads and associated roads. The plan and its implementation would be reviewed by a core team of representatives from the companies, BLM, Wyoming Game and Fish Department, and the U.S. Fish and Wildlife Service. The team would provide advice and recommendations to the BLM on the planning goals and strategies for attaining the goals. However, the Green River Area Manager retains the ultimate decision making authority for the implementation of the plan on BLM administered lands and resources. A detailed outline to be used in preparing this plan is found in Appendix C of this FEIS.

1.2 Errata

This section describes changes to the DEIS prepared in response to public comments. In some cases responses to public comment have been repeated here and incorporated into the FEIS. Where a BLM response to a public comment referred the reader to "errata", this change has been indicated below. Additional changes have been made in the DEIS by the BLM to correct minor errors in the text.

Page	Errata
Chapter One	
1-4	Figure 1-2, Note: Add: "Dalen Resources Oil & Gas Co. (DALEN) was recently acquired by Enserch Exploration Inc. (Enserch) after completion of the DEIS.
1-6	Delete: "...BLM is initiating a programmatic EIS...future." Substitute: "BLM has initiated an evaluation of present BLM management practices, cumulative impacts and opportunities to reduce and mitigate impacts to resources that occur as a result of resource development in southwest Wyoming."
1-6	<p>In Section 1.2, Purpose and Need, delete: "Private exploration...foreign energy supplies." Substitute: "Private exploration and development of federal oil and gas leases is an integral part of the BLM oil and gas leasing program under authority of the Mineral Leasing Act of 1920 and the Federal Land Policy and Management Act of 1976. Natural gas is rapidly becoming the country's "energy of-choice" because it is clean burning and less polluting. Federal oil and gas leases have been issued to the companies. Federal regulations (43 CFR 3162.1(a) - <i>Requirements for Operating Rights Owners and Operators</i>) require the holder of a Federal oil and gas lease to develop that lease in a manner "... which ensures the proper handling, measurement, disposition, and site security of leasehold production; which protects other natural resources and environmental quality; which protects life and property; and which results in maximum ultimate economic recovery of oil and gas with minimum waste and with minimum adverse effect on ultimate recovery of other mineral resources." Furthermore, BLM Onshore Order No. 1 (issued under 43 CFR 3164) requires that lessees and operators conduct their exploration, development, production and construction operations in a manner which "results in diligent development and efficient resource recovery" while affording "adequate safeguards for the environment." BLM retains the authority to control development on BLM-administered lands. However, BLM must not take actions which would place the leaseholder in a situation which would cause them to be in violation of Federal regulations.</p> <p>Lease stipulations, along with the standard terms of a lease, define the limits of the lessee's rights and the Government's reserved authority. Within this reserved authority, the BLM may impose additional mitigation measures to ensure that proposed operations minimize adverse impacts to other resources, uses, and users. However, these additional measures must be consistent with the granted lease rights. The contractual controls existing in the lease provide substantial latitude within which the BLM may require modification to the siting, design, and interim and final reclamation measures. They do not, however, allow the BLM to require modifications to proposed operations that would prevent economic extraction of otherwise commercial deposits of oil and gas. Such mitigation would be justifiable if there are resources, values, uses, and/or users present that cannot coexist with oil and gas operations, cannot be adequately managed and/or accommodated on other lands for the duration of oil and gas operations, and provide a greater benefit to the public than that of oil and gas operations. In such cases, stipulations or conditions of approval are justifiable and would be used.</p>

Page	Errata
1-6 continued	<p>Environmental protection measures required to prevent unnecessary and undue degradation under the Federal Land Policy and Management Act (FLPMA) are within the terms of the lease, as all leases are subject to applicable laws and regulations. Because all oil and gas activities are subject to FLPMA, mitigation required to protect public lands from unnecessary and undue degradation is consistent with the lease rights granted. Unnecessary and undue degradation implies that there is also necessary and due degradation. For example, if there is only one route of access possible for development of an existing oil and gas lease, and that route presents the likelihood of some degradation of public lands or resources, such degradation may be considered necessary for the management of the oil and gas resource.</p> <p>In accordance with FLPMA (Sec. 103 (l)), management of the public lands within the Fontenelle projects area would occur so that the principal and major uses of grazing, fish and wildlife habitat development and utilization, mineral exploration and development, transportation, outdoor recreation (petrified wood collecting), and rights-of-way would not be excluded, but would continue to co-exist. FLPMA (Sec. 103(e)), in its definition of multiple-use, provides for "making the most judicious use of the land for some or all of these resources"; and "the use of some land for less than all of the resources".</p>
1-11	<p>Insert in Table 1-1:</p> <p>Under "Nature of Permit/Approval" - Bureau of Reclamation, insert: "The Bureau of Reclamation will also have final responsibility for the issuance of easements and rights-of-way on Bureau of Reclamation lands (see Appendix H, DEIS)."</p> <p>Under "Issuing Agency/Permit Name", insert: "Wyoming Department of Environmental Quality-Air Quality". Under "Nature of Permit/Approval" insert: "Compressor sites, flaring, and other natural gas production and processing facilities."</p>
1-12	Delete sentence: "The Bureau manages Fontenelle Reservoir and surrounding lands (212 square miles)." Substitute: "The role of a cooperating agency is described in detail in 40 CFR 1501.6. The Bureau of Reclamation has identified standard stipulations for surface use, oil and gas well sites and access roads on lands it administers (Appendix H). These stipulations are incorporated into the Proposed Actions and Resource Protection Alternatives."
1-13	In Section 1.6.3, first sentence, insert after "Green River Resource Area": "and the Bureau of Reclamation..."
1-14	Delete last sentence of Section 1.6.5.3. Substitute: "Commercial disposal wells must be permitted with the WDEQ".

Page	Errata
Chapter Two	
2-1	<p>In Section 2.2, Workforce and Transportation Requirements for the Proposed Actions and Resource Protection Alternatives. Insert the following two paragraphs after the 2nd paragraph under Section 2.2: "A <i>Road Development Plan for the Lincoln Road Area</i> has been prepared by the Lincoln Road Operators (prepared by the engineering consulting firm of D.R. Griffin and Associates, Inc.) in consultation with BLM. As it states under "Purpose", the Plan "... is intended by the Lincoln Road Operators as a commitment to a quality assurance/quality control program for the location, design, construction and maintenance of roads required for expansion of their operations on public lands within the Lincoln Road Area." The Plan details "... the procedures by which transportation planning, road design, construction and road maintenance will be conducted by Lincoln Road Operators to meet their operational needs and Bureau of Land Management requirements for roading standards, safety, and resource protection."</p> <p>"Lincoln Road Operators will utilize an extensive network of existing roads in the Lincoln Road Area, much of which is shared with other road users. The incremental infill development of the Lincoln Road area will follow the guidelines provided in the <i>Road Development Plan for the Lincoln Road Area</i>. Transportation planning would consist of the annual review of plans for development between the operator and BLM. The review would entail assessment of existing roads and how the planned incremental well development roads would tie-in to the existing network to ensure safety and protection of natural resource values. As individual APDs are then prepared for submission to BLM, and following on-site inspection, they will address site-specific considerations relative to safety and environmental protection pertaining to access road location, design, construction and maintenance in accordance with the <i>Road Development Plan for the Lincoln Road Area</i>. Thus BLM intends that access road plans submitted as part of an APD be consistent with a field transportation plan, i.e., the <i>Road Development Plan for the Lincoln Road Area</i> (Appendix D of this FEIS)."</p>
2-3	Table 2-1, Operational Heavy-Truck Traffic, Total should read "82 trips/month" not 882 trips/month.
2-3	In Section 2.3, at the end of the first paragraph insert: "In accordance with BLM On-Shore Oil and Gas Order No. 1 the Proposed Action includes the intention by the companies to conduct their exploration, development, production and construction operations in a manner which (1) conforms with all applicable Federal laws and regulations and with State and local laws and regulations to the extent that such State and local laws are applicable to operations on Federal leases; and (2) conform with the terms, stipulations, and conditions of approval of Federal leases, permits, right-of-way grants and easements."
2-3	In Section 2.3.1, Well Pad Construction, at the end of the first paragraph insert: "Wells drilled on Bureau of Reclamation lands would be subject to stipulations described in Appendix H."
2-9	In Well Operation and Maintenance Section, at the end of the second paragraph, add: "No production pits are proposed. No discharges to the ground from condensate tanks and no discharges of produced water to the ground are proposed."
2-13	In Section 2.3.3.1, at the end of the third paragraph, at the end of the last sentence, add: "...activities such as the operation of heavy equipment on well pads and within pipeline rights-of-way."

Page	Errata
2-14	At end of section "Hydrostatic Testing" add: "To protect species using such habitat, water from hydrostatic testing would not be discharged into prairie dog burrows."
2-20	Delete paragraph "Directional Drilling Considerations." See addendum and expanded discussion of directional drilling in the FEIS (Section 1.1.2). Add Figure 2-6 (see figure at end of Errata Section).
Chapter Three	
3-1	In Section 3.1.2, Regional Setting section, delete sentence: "For most purposes the BLM manages all BOR lands within the CISA." Substitute: "The BLM is responsible for overseeing the site-specific implementation of BOR stipulations (see Appendix H) which apply to oil and gas development on BOR lands."
3-3	<p>Under Section 3.2.1, following paragraph 5, insert the following paragraphs:</p> <p>"The BLM documents violation of environmental laws and regulations under two categories - undesirable events and incidence of non-compliance. During the period of increased drilling activity, environmental violations that were documented are as follows:</p> <p>Undesirable Events - Six undesirable events occurred within the Fontenelle Projects area between January 1992 and September 1995. All six events were minor. Three involved leaks in tanks which were contained within the existing berm surrounding the tanks; one involved a reserve pit overflow which was contained behind a dike; and two involved valve or vent failures resulting in spills on location which were cleaned up. No contamination of waters have occurred within the Fontenelle Projects area.</p> <p>Incidence of Non-Compliance - Two incidence of non-compliance were documented between January 1992 and September 1995. The incidence involved operator failure to fix a leaking condensate tank and to solidify a reserve pit within the specified time frame.</p> "
3-17	<p>In Section 3.7.2, after 2nd sentence add, "... campground (Brown, 1994). Some of the heaviest usage occurred on the 4th of July weekend and other "long" weekends."</p> <p>In Section 3.7.3, after 2nd sentence add, "... (RV) use. Rock collecting activity takes place, weather permitting, approximately 8 months out of the year."</p>
3-25	In Section 3.9.1, Cultural Resources section, at the end of the first sentence of the first paragraph insert: "...and the Bureau of Reclamation."
3-30	In Section 3.10.2, add to list of noise-sensitive areas "Blue Forest rock collecting recreation area".
3-31	In Section 3.12, Paleontological Resources, delete last paragraph and insert: If the BLM determines that paleontological resources may be of particular concern at a specific project location, a technical analysis of existing paleontological data to determine sensitivity would be required. A technical analysis consists of a literature and museum records search conducted by a qualified paleontologist and determines if a field survey is necessary. Figure 3-7A, which has been added, provides a preliminary classification ranking according to potential for noteworthy occurrences of fossils.

Page	Errata
3-45	Table 3-24, heading for 6th column should read "Average 5-year AUM Use."
3-57	Figure 3-13 in the DEIS was incorrect. A correct Figure was used in the wildlife modeling technical report which was discussed in the DEIS and issued concurrently as a supplemental technical report. The corrected Figure 3-13 has been reprinted at the end of this section.
Chapter Four	
4-9	In Section 4.2.3, second paragraph, insert the following statement after "...wetland/riparian, and threatened, endangered, and species of concern": "This is due to the fact that activities in the Fontenelle area are geographically isolated from these resources in the Jonah and Stagecoach fields. For example, noise from a drilling operation in the Fontenelle area is not additive with noise from a drilling operation in the Jonah Field."
4-9	In the Land Use section delete: "designated land uses". Replace with: "Nor would there be any change in the principal or major land uses, which include oil and gas production, livestock grazing, fish and wildlife habitat, and recreation."
4-11	In the Aquatic Resources section., delete: "This has forced ... accumulated sediment."
4-19	In Section 4.6.1, delete: "While the entire area may be used for hunting ... significance." Substitute: "Hunting and dispersed recreation activities can occur in both project areas; however, affected lands do not provide recreation opportunities of regional or national significance. The project areas are utilized by some antelope outfitters but no other tourism-related businesses; except for rock collecting in the Blue Forest area, neither are they typically considered a recreation destination by tourist, back country users or hunters."
4-22	In Section 4.6.4.1, to end of paragraph add, "The BLUE Forest petrified wood collecting area would be an avoidance area for surface disturbing activities, including seismograph lines, access roads, well pads, and buried pipelines. This area is included within the sensitive area shown on Figure 2-6 and would be subject to construction and drilling restrictions."
4-22	In Section 4.6.5, fourth bullet, correct "... camping (typically greater than 14 days)" on public lands ...", "not 10 days".
4-23	In Section 4.6.6., delete first sentence. Substitute: "Given the small number of immigrant workers involved (up to 55), no noticeable change in the use of recreation resources is expected to occur. Consequently, no overall increased deterioration of recreation resources is expected to occur, but it is possible that a slight increase in incidents of vandalism could occur. Some increased ORV use could result from improved recreation access. Environmental protection and mitigation measures discussed above would minimize such impacts. As a result, the projects would make a negligible contribution to existing impacts on locally, regionally or nationally significant recreation resources."
4-23	Delete last sentence at the end of Section 4.7.1 and add: "Typical Visitors to Class IV areas of the project areas would be familiar with existing local oil and gas development found in these areas and are unlikely to be sensitive to additional changes in visual qualities associated with infill drilling."
4-24	In Section 4.7.3.1, second paragraph, delete: "Construction - ... Class II area." Substitute: "Construction - and production-related disturbances would be unavoidable in a Class II area if development of existing oil and gas leases is to continue."

Page	Errata
4-28	In Section 4.8.2, where it states that "BLM requires completion of Class III cultural resources surveys on areas potentially disturbed by oil and gas activities." This is corrected to read, "The appropriate level of inventory for historic properties will be required prior to approval of any APD, right-of-way, etc."
4-28	In Section 4.8.2, right column, 3rd paragraph, line 8, insert after "...landowner's wishes.": However, if a BLM authorization has the potential to effect significant historic properties (e.g., archaeological or historical sites) on private lands, the BLM is required to take into account comments from the SHPO and ACHP on the effects of the proposed undertaking."
4-37	In Section 4.13.2, second paragraph, delete "BLM could require Class I....Class III field survey." Substitute the following: "BLM could require a paleontological sensitivity survey at any proposed project site within an area which BLM has determined holds a high potential for encountering paleontological resources of scientific value. The survey would be conducted by a qualified paleontologist and would consist of a literature review and search of museum records. The results of such a survey would be used to develop field survey requirements, if warranted, as well as identify impact avoidance and environmental protection measures. Avoidance of areas holding paleontological resources of scientific value is an acceptable measure. Due to the size of the project areas and the cumulative impact study area, and the possibility that much of the area may not be developed for years, such surveys, where warranted, could be conducted on a site-by-site basis."
4-45	In Section 4.15.5.1, General Construction section, at the end of the first paragraph, add: "Water withdrawal sites should be located outside of Seedskaade National Wildlife Refuge. New water withdrawal sites on BLM land should be approved by the authorized officer in consultation with the Wyoming State Engineers Office prior to use."
4-48	In third paragraph, change "would add and estimated" to "would add an estimated".
4-59	Under "Maintenance" after the sentence "Successful revegetation...forage." insert: "BLM will also use other measures to gauge successful reclamation including percent cover or plant frequency that has returned to a disturbed area."
4-66	Change all references to "allotment holder" to "grazing permittee" on entire page.
4-66	In Section 4.19.5, after the first sentence in the first paragraph, insert: "Reclamation and road closures would be reviewed by the land management agency prior to implementation and should be reflected in the operators' transportation plan." Section 4.19.5, the 2nd and 3rd sentences of the first paragraph have been changed to read: "Riparian areas on Federal land which are undergoing reclamation should be fenced if livestock congregate in these areas. The need for fencing should be determined by BLM."
4-73	At the end of the Black-footed Ferret section, add: "The U. S. Fish and Wildlife Service is currently reviewing its entire black-footed ferret recovery program in part because of the low discovery rate associated with current survey methods. Survey requirements would be adjusted in the future to conform with any changes in Service policy."

Page	Errata
4-75	In the Candidate Wildlife Species - Raptors section, second paragraph, delete sentence: "The experimental design...820 feet away." Substitute: "The research found that, although individual nesting pairs varied in their response to disturbance, birds would not flush from nests (90 percent of the time) if the disturbance was at least 820 feet away."
4-79	In Section 4.21.4.4, 5th bullet, after the first sentence, insert: "Potentially suitable habitat is defined as habitat that possesses specific, key environmental conditions favored by a species. Potentially suitable habitat should be used as a guideline to decide the need for, and geographic extent of, the survey. If no potentially suitable habitat is present, no survey would be required."
4-79	In Section 4.21.4.4, 5th bullet, change: "Likewise, no surface disturbing activities should occur within 0.5 mile of an occupied ferruginous hawk nest" to "Likewise, no surface disturbing activities should occur within one (1) mile of an occupied ferruginous hawk nest unless otherwise approved by the BLM authorized officer."
4-79	In Section 4.21.4.4, add bullet: "Oil and gas operators should inform their employees, contractors and subcontractors of sensitive wildlife areas that should be protected from disturbance, e.g., nesting raptors, riparian and wetland areas, and Seedskadee National Wildlife Refuge."
4-79	In Section 4.21.4.4 Mitigation and Monitoring Measures, 2nd bullet, right column, delete 3rd and 4th sentences "Likewise no surface...use by ferruginous hawks;" and insert as a new bullet: <ul style="list-style-type: none"> • Raptors should be afforded protection as follows: <ul style="list-style-type: none"> • Well locations, pipelines, and associated roads would be selected and designed to avoid disturbances to areas of high wildlife value (e.g., raptor nest sites, wetland areas). In conjunction with the wildlife mitigation plan, operators would include the design of a raptor mitigation program for the DALEN and Lincoln Road project areas in consultation with the BLM, FWS, and WGF. • Raptor nest surveys would be conducted within a 1-mile radius or linear distance of proposed surface uses or activities if such activities are proposed to be conducted between February 1 and July 31; • All surface disturbing activity (e.g., road, pipeline, well pad construction; drilling, completion, workover operations;) would be seasonally restricted from February 1 through July 31 within a one-half (1/2) mile radius or linear distance of all active raptor nests, except ferruginous hawk nests for which the seasonal buffer would be one (1) mile. (An active raptor nest is defined as a nest that has been occupied within the past 3 years.) The seasonal buffer distance and exclusion dates applicable may vary depending upon such factors as the activity status of the nest, species involved, prey availability, natural topographic barriers, and line-of-sight distance(s); • Permanent and high profile structures such as well pads, roads, buildings, storage tanks, overhead powerlines, etc., would not be allowed within 825 feet (0.25 km) of active raptor nests, with the exception of active eagle nests for which the distance would be 1,970 feet (0.60 km). The buffer distance may vary depending upon the species involved, prey availability, natural topographic barriers, and line-of-sight distances. Linear disturbances such as pipelines, seismic activity, etc., could be granted exceptions.

Page	Errata								
4-79	<p>In Section 4.21.4.4 add to last bullet: If deemed appropriate, Mountain Plover surveys would be made in accordance with FWS guidelines provided in their Fontenelle DEIS comment letter of June 29, 1995. The survey procedures would include the following:</p> <ul style="list-style-type: none"> • Visual observation of the area within 1/4 mile of the proposed action and 100 yards of proposed access routes would be made to detect the presence of plovers. All plovers located would be observed long enough to determine if a nest is present. • Surveys would be conducted no more than 14 days prior to the date actual ground disturbance activities begin. If two surveys are required, they would be made at least 14 days apart, with the last survey no more than 14 days prior to the start-up date. • The number of surveys required to clear a site for mountain plovers prior to beginning a planned activity is dependent upon the start-up date, as shown below: <table border="1"> <thead> <tr> <th>Date of planned Activity</th> <th>Number Surveys Required</th> </tr> </thead> <tbody> <tr> <td>March 15 through April 15</td> <td>1</td> </tr> <tr> <td>April 15 through July 15</td> <td>2</td> </tr> <tr> <td>July 15 through August 15</td> <td>1</td> </tr> </tbody> </table> <ul style="list-style-type: none"> • If an active nest is found in the survey area, the planned activity would be delayed at least 30 days. If a brood is observed, activities would be delayed at least seven days. 	Date of planned Activity	Number Surveys Required	March 15 through April 15	1	April 15 through July 15	2	July 15 through August 15	1
Date of planned Activity	Number Surveys Required								
March 15 through April 15	1								
April 15 through July 15	2								
July 15 through August 15	1								
4-80	<p>In Section 4.22.1, begin section with the following explanation regarding BLM's limitations: "Under the Mineral Leasing Act, the Code of Federal Regulations (43 CFR 3101.1-2) states the following regarding Surface Use Rights - "A lessee shall have the right to use as much of the leased lands as is necessary to explore for, drill for, mine, extract, remove and dispose of all the leased resource in a leasehold subject to: Stipulations attached to the lease; restrictions deriving from specific, nondiscretionary statutes; and such reasonable measures as may be required by the authorized officer to minimize adverse impacts to other resource values, land uses or users not addressed in the lease stipulations at the time operations are proposed [emphasis added]. To the extent consistent with lease rights granted, such reasonable 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. At a minimum, measures shall be deemed consistent with lease rights granted provided that they do not: require relocation of proposed operations by more than 200 meters; require that operations be sited off the leasehold; or prohibit new surface disturbing operations for a period in excess of 60 days in any lease year." [53 FR 17352, May 16, 1988]</p>								

Page	Errata
4-84	Add to 2nd paragraph, left column: "Although loss of migratory waterfowl from contaminated pits is not a known and documented problem in southwest Wyoming, it is a potential problem. BLM requires operators to take steps to assure that migratory birds do not enter a pit that could be harmful to it. The Wyoming Oil and Gas Conservation Commission (WOGCC) Rules and Regulations (August 1992) require that "Reserve pits shall be completely fenced and, if oil or other harmful substances are present, netted or otherwise secured at the time the pit substructure has been moved from the location in a manner that avoids the loss of wildlife, domestic animals, or migratory birds." Because of the same concerns, the WOGCC also requires this measure to produced water pits. Unless the operator can demonstrate that no harmful chemicals are contained in the fluids. Some loss of waterfowl in reserve pits may occur without this protection.
4-90	In Section 4.22.3.4, No. 6, change: "Consider constructing wildlife guzzlers" to "Consider improving water supplies for wildlife (e.g., by constructing fenced guzzlers)"
4-90	In Section 4.22.3.4, Add: "8. Reclamation should be implemented in cases where unnecessary two-tracks or other roads are identified. Specific reclamation measures should include ripping and seeding and the installation of traffic barriers. The BLM should develop a map that identifies priority areas for closures of unnecessary roads and two-tracks. Impacts of new road construction should be offset where feasible by implementation of road closures and reclamation of unneeded two-tracks. This should be discussed in the operators' transportation plans."
4-90	In Section 4.22.3.4, delete 2nd bullet, right column, and insert the following: "BLM should consider not placing roads and constructing well pads in sage grouse nesting habitats with high probabilities of suitability, primarily high density sagebrush within 2 miles of a known sage grouse lek. Surface uses and activities should not be allowed within 0.25 miles of an active lek during the sage grouse mating season (between February 1 and May 15) between the hours of 6:00 PM and 8:00 AM. If an occupied sage grouse nest would be adversely affected, surface uses and activities should be delayed in the affected area until nesting has been completed. Field evaluations of sage grouse leks should be conducted by a qualified biologist in sage grouse nesting habitat (usually up to 2 miles of a lek) between February 1 and July 31. Permanent and high profile structures such as buildings, storage tanks, overhead powerlines, etc., should not be allowed within 0.25 miles of a lek. Linear disturbances such as low-traffic roads, pipelines, seismic activity, etc., could be granted exceptions."
Chapter Five	
5-1	Third paragraph, 7th bullet, revise: "the operator's transportation plan" to read "the operator's transportation plan for the oil and gas fields".
Chapter Six	
6-1	An updated list of preparers is found in the FEIS at the end of this section.

Page	Errata
References	
Various	<p>The following references were used in preparation of the DEIS and should be added:</p> <p>BLM and U.S. Forest Service. 1989 (3rd ed.). Surface operating standards for oil and gas exploration and development.</p> <p>Environmental Protection Agency. 1976. Erosion and sediment control: Surface mining in the eastern U.S./Design. Washington, D.C.</p> <p>Gray, D. and A. Leiser. 1989. Biotechnical slope protection and erosion control. Robert E. Krieger Publishing Company. Malabar, Florida.</p> <p>Levinski, C. 1982. Best management practices for road activities, Volumes I (Location), and II (BMP Catalogue). Idaho Department of Health and Welfare Division of Environment.</p> <p>State of Nevada Conservation Commission and Department of Conservation and Natural Resources. n.d. Handbook of best management practices. Carson City, Nevada.</p> <p>State of Washington Department of Ecology. 1992. Stormwater management manual/Technical manual. Olympia, Washington.</p> <p>Tahoe Regional Planning Agency. 1988. Water Quality Management Plan: Volume II. Handbook of Best Management Practices. Elk Point, Nevada.</p>

List of Preparers -- Draft and Final EIS	
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Barbara Amidon	Vegetation, Special Status Plants
Don Schramm	Transportation, Engineering
Don Judice	Petroleum Engineering, Groundwater
Wayne Sutherland, Laurie Bryant	Geology, Paleontology
Jim Perkins	Range
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John Henderson	Wetland/Riparian, Special Status Fish
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PIC Technologies, Inc.	
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Pamela Dykes, B.A.	Document Preparation, Editing, Word Processing
Joe Thomas	Maps, Graphics
Phyllis Lucas	Maps, Graphics
Rosalie Urwin	Document Preparation

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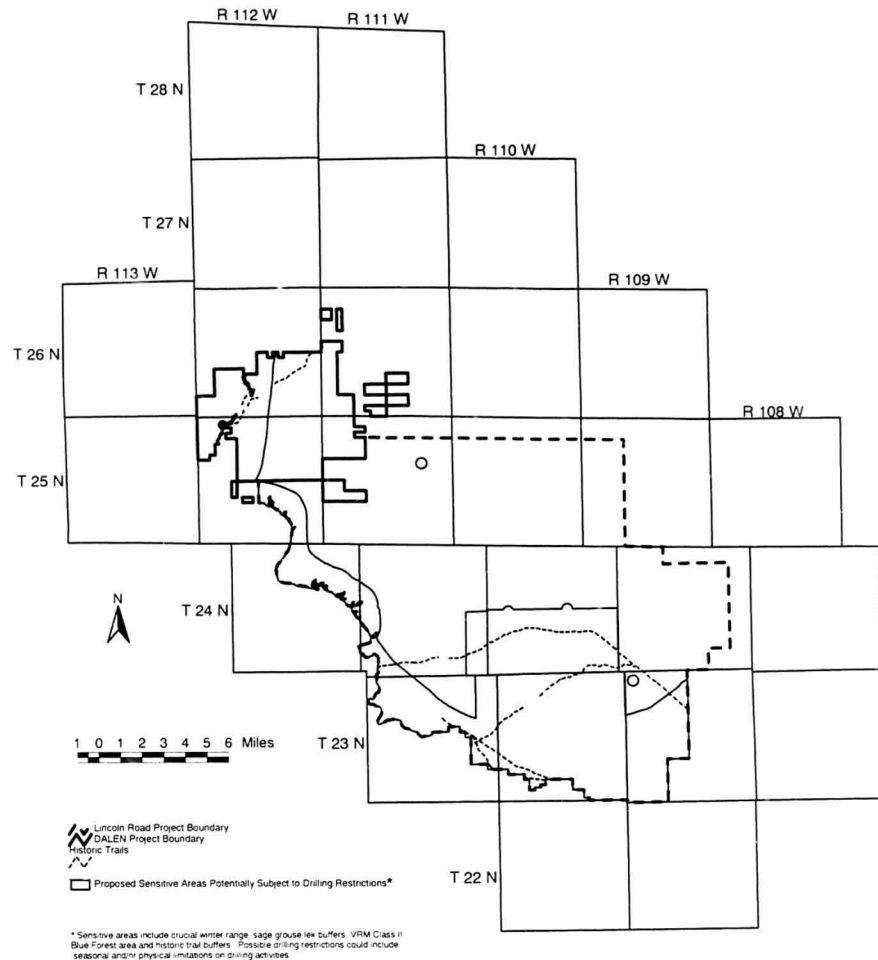


Figure 2-6

37

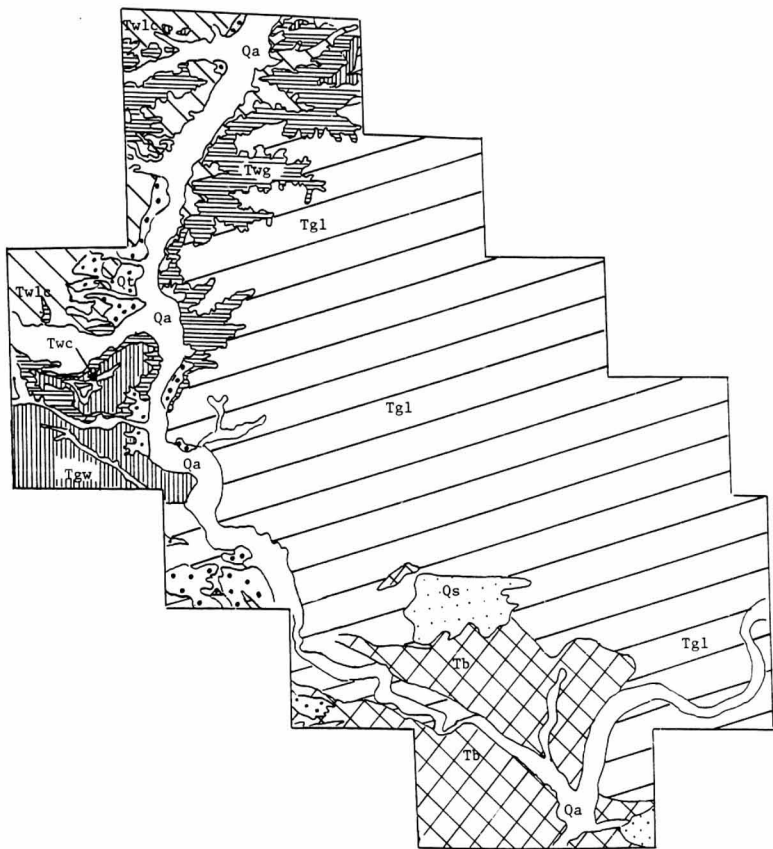


Figure 3-7A. Generalized surficial geology of the Fontenelle Cumulative Impact Study Area. Adapted from Love & Christiansen, 1985.

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Figure 3-7A. Legend.

	Qa	Alluvium (Quaternary)	Clay, silt, sand, & gravel. Condition 3 classification for paleontological resources.*
	Qs	Sand (Quaternary)	Active and/or dormant sand dunes. Condition 3 classification for paleontological resources.*
	Qt	Terrace Deposits (Quaternary)	Predominantly gravel deposits. Condition 3 classification for paleontological resources.*
	Tb	Bridkin Formation (Eocene)	Green-gray & drab tuffaceous sandstone and claystone. Often weathers into badlands topography. Condition 2 classification for paleontological resources.**
	Tgl	Laney Member, Green River Formation (Eocene)	Oil shale & marlstone. Condition 2 classification for paleontological resources.**
	Twc	Cathedral Bluffs Tongue, Wasatch Formation (Eocene)	Variiegated claystone, lenses of sandstone. Condition 2 classification for paleontological resources.**
	Tgw	Wilkin's Peak Member, Green River Formation (Eocene)	Green, brown, and/or gray tuffaceous sandstone, shale, & marlstone. Condition 2 classification for paleontological resources.**
	Twg	New Fork Tongue, Wasatch Formation (Eocene)	Dull-red & green mudstone, brown sandstone & thin limestone. Condition 2 classification for paleontological resources.**
	Twlc	La Barge & Chappo Members, Wasatch Formation (Eocene)	Red, gray & brown mudstone, conglomerate, & yellow sandstone. Condition 2 classification for paleontological resources.**

* Condition 3 = Areas that are extremely unlikely to produce fossils based on their surficial geology.

** Condition 2 = Areas with exposures of geological units that are likely to contain fossils.

Condition 1 = Areas that are known to contain fossil localities (no areas identified in Figure 3.7A).

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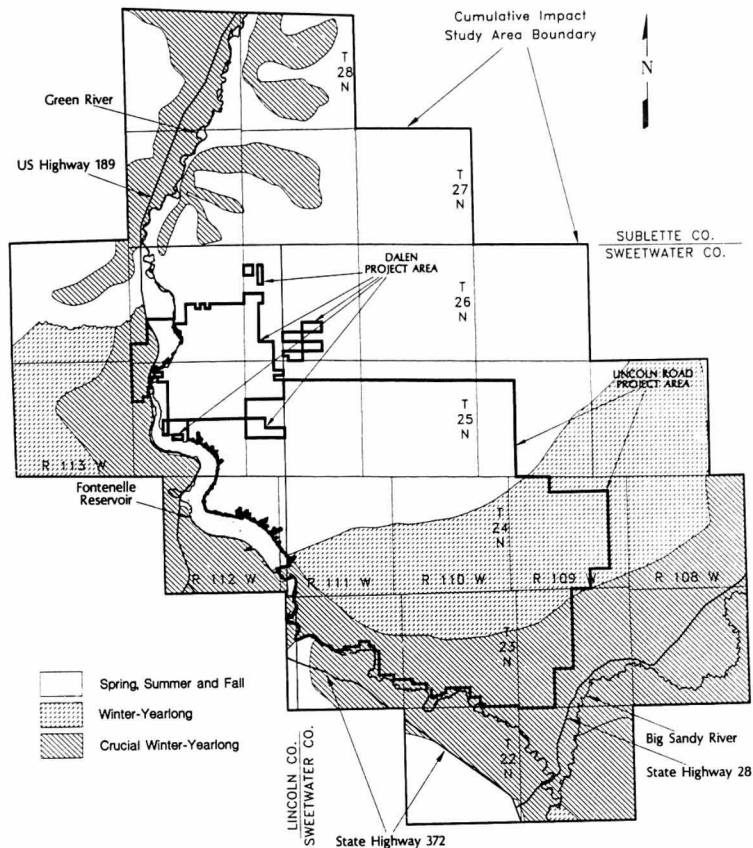


Figure 3-13
Antelope Seasonal Ranges Within the Cumulative Impact Study Area

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SECTION 3 - Consultation and Coordination

Scoping Process

On December 16, 1994, the BLM published in the Federal Register and mailed a scoping statement to the media, governmental agencies, environmental organizations, industry representatives, individuals, landowners and grazing permittees. The scoping statement explained the scope of DALEN and Lincoln Road Operator's Proposed Actions and requested comments concerning the level of analysis included in the DEIS. The public was given until January 16, 1995 to comment. All comments received were incorporated into the analysis of issues identified in the DEIS (page 1-9). Fifteen comment letters were received.

Draft EIS Consultation and Coordination

The BLM consulted with the Bureau of Reclamation, a Cooperating Agency, on issues, impacts, and mitigation measures on Bureau of Reclamation administered lands. The BLM requested a list of Federally endangered, threatened, and proposed species that could occur in the cumulative impact study area from the U.S. Fish and Wildlife Service. In addition, information on State species of concern was obtained from the Wyoming Natural Diversity Data Base and the Wyoming Game and Fish Department Wildlife Observation System.

Public Review of Draft EIS

Over 300 copies of the draft EIS were issued on April 13, 1995 for a 60-day public review. The date by which comments had to be received was June 6, 1995. The public was invited to provide written comments on the draft EIS and they were also encouraged to visit the local Bureau of Land Management (BLM) offices listed in the Dear Reviewer letter to talk with the managers about any concerns. BLM did not schedule a public hearing on the DEIS because of the lack of substantial environmental concern regarding the proposed projects. However, the public and reader were informed that a public hearing(s) on the DEIS would be scheduled if enough people indicated a desire to

testify by returning the tear-out sheet provided in the draft EIS. The tear-out sheet had to be received no later than May 8, 1995 to schedule a hearing. Information on the hearing(s) would be published in state and local newspapers and other media sources, and directly mailed to the recipients of the DEIS to give the public enough notice. No tear-out sheets were received by the BLM.

Draft EIS Comments

A total of 20 comment letters were received during the 50-day public comment period provided on the draft EIS. No request for a public hearing was received.

Responses to all public comments received on the draft EIS have been prepared. In many cases respondents submitted virtually identical comments. Rather than repeating a response, the reader may be referred to an earlier response. Reference to a previous response in no way reflects upon the value of the comment. Copies of all comment letters have been reprinted and responses to all comments are contained in the section entitled *Response to Public Comments on the Draft EIS* following the reprinted letters. Comments are numbered sequentially within a letter and correspond to the numbered response.

Public issues of most concern were the lack of analysis of the cumulative effects of mineral development on the non-mineral resources of southwestern Wyoming, including wildlife, and air quality; the need for a regional, cumulative EIS before any further development is authorized; land use changes causing industrialization of southwest Wyoming; and impacts to water quality.

Specific changes in the text of the draft EIS are found in Section 2 of the final EIS. Where a response to a comment indicates "see Errata", Section 2 of the final EIS should be consulted for the specific rewording or clarification of the text.

Note that DALEN Resources was recently acquired by Enserch Exploration. However, for purposes of consistency with the draft EIS, reference is still made to the DALEN project and DALEN project area.

Common Concerns

Respondents shared several common concerns about the proposed infill drilling projects. BLM has prepared responses to these common concerns as well as to specific concerns raised in individual letters.

General Comment A. The cumulative impacts from the Fontenelle infill drilling projects and numerous other proposed oil and gas activities in southwest Wyoming are not being adequately evaluated.

The Fontenelle EIS addresses the cumulative impacts of past, present, and reasonably foreseeable actions within the DALEN and Lincoln Road development areas and within a 965 square mile cumulative impact study area (CISA) and a 1,540 square mile cumulative impact assessment area (CIAA). The respondent may disagree with the spatial scale of the analysis; however, Federal regulations and the courts give the agency latitude to determine the appropriate spatial scale of analysis. The area considered in the EIS is far beyond that which has been found to be directly or indirectly adversely affected by project activities. The scope of analysis is consistent with BLM guidelines for cumulative impact analysis for NEPA documents (BLM 1994) and the spatial scale is one step below that found in the DEIS prepared for the draft Green River Resource Area Resource Management Plan. BLM believes it has chosen an appropriate spatial scale to analyze past, present and reasonably foreseeable development.

General Comment B. The EIS did not consider a reasonable range of alternatives to the Proposed Action and the No Action Alternative was improperly dismissed.

The EIS does examine the appropriate range of alternatives identified during scoping. BLM is only required to consider reasonable alternatives.

The No Action Alternative was not dismissed in the EIS. BLM defined the No Action Alternative (p. 2-17) and the impacts of implementing this alternative were analyzed for each potentially affected resource. See subsections labeled "No Action Alternative" in Sections 4.3 through 4.23 in the DEIS.

General Comment C. The EA does not adequately address impacts on protected wildlife species or other

wildlife resources.

Reviews of existing databases, on-site examination of affected lands and potential habitat conducted during on-sites for past wells, past environmental analyses and site surveys found no evidence that implementation of the Proposed Actions or project alternatives would reduce the number, reproduction or distribution of any federally listed species, or would adversely affect the status of any candidate species. The U.S. Fish and Wildlife Service has concurred in this conclusion as discussed in past NEPA documents prepared for projects in the Fontenelle area. The U.S. Fish & Wildlife Service has concurred in the finding of the DEIS that the whooping crane and peregrine falcon would not be affected. BLM expects that similar concurrence will be forthcoming on the other species listed by the U.S. Fish and Wildlife Service once additional information found in this FEIS is provided to the U.S. Fish & Wildlife Service. Where potentially affected as a result of project modification or new information, BLM, in cooperation with the U.S. Fish & Wildlife Service, the Wyoming Game & Fish Department and the companies, would conduct additional surveys and adopt protective measures as needed to ensure continued protection of federally-listed species. BLM is consulting with, and will rely on the expertise of, the U.S. Fish & Wildlife Service regarding the adequacy of protection of threatened and endangered species and the adequacy of the biological assessment.

General Comment D. The proposed development does not account for the region-wide impacts causing the area to be converted to a heavily industrialized landscape. A programmatic cumulative effects EIS should be prepared for southwest Wyoming.

As discussed in the DEIS, the Fontenelle area (specifically the cumulative impact study area) has been a center of oil and gas production for over 70 years. Proposed infill drilling would take advantage of existing roads to minimize new disturbance that would otherwise be introduced by the construction of new access roads. Similarly, the impacts of surface disturbance would be reduced by siting new well pads and facilities in the vicinity of existing road corridors. Existing roads are also used by a variety of non-industrial resource users (e.g., ranchers).

BLM policy (FLPMA) regarding multiple use management of the public lands differs from some respondents assumptions of what constitutes industrialization. The development projected to occur within southwest Wyoming would not convert the landscape to one viewed as heavily industrialized. In accordance with FLPMA (Sec. 103 (l)), the management of the public lands within the Fontenelle projects area would occur in a manner that ensures that the principal and major uses of grazing, fish and wildlife habitat development and utilization, mineral exploration and development, transportation, outdoor recreation (e.g., petrified wood collecting), and rights-of-way are not excluded, but rather would continue to co-exist with each other. FLPMA (Sec. 103(c)), in its definition of multiple-use, provides for "making the most judicious use of the land for some or all of these resources"; and "the use of some land for less than all of the resources".

The total area within southwest Wyoming presently developed for resource extraction (i.e., coal, uranium, trona, and oil and gas production) occupies about 12.3% of the public land surface. The proposed increase in development will not appreciably increase the level of area occupied by oil and gas development since most of the development will be infill development within existing fields. Also, the projections for oil and gas development are merely "maximum" or "worst case" development levels for environmental impact analysis purposes. The likelihood that the projected levels of development will be reached is truly remote.

BLM has conducted a review of the cumulative effects of oil and gas development as well as other resource uses in the Final EIS for the Green River Resource Management Plan for the BLM Green River Resource Area (March 1996). Public comment on cumulative impacts was solicited during that NEPA process.

BLM agrees that review of the regional, cumulative effects of mineral development in southwest Wyoming is warranted. On February 8, 1995 BLM announced that it had begun the *Southwest Wyoming Resource Evaluation*. The 16.5 million acre area (nearly 25,780 square miles) encompassed by the regional evaluation includes the DALEN and Lincoln Road project areas. However, the agency also believes that it is inappropriate to conduct, as part of

an EIS intended to address the impacts associated with a specific set of infill drilling projects, such an extensive and detailed review of regional impacts.

COMMENT LETTERS RECEIVED
ON THE DRAFT EIS

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WYOMING ADVOCATES FOR ANIMALS

316 East Parkview Street
Cheyenne WY 82001

May 9, 1995

Comment Letter #1

Bureau of Land Management
Rock Springs District Office
P.O. Box 1869
Rock Springs, WY 82902-1869

Re: Fontenelle Natural Gas Infill Drilling
Producers Create EIS - April 1995

Expanded Mesa Arch Area Natural Gas
Development Project - Draft EIS -
April 1995

STA Oil Producers Bravo Field Development
SA - May 1995

Sentiment:

The rationale plans set forth in the above three referenced projects do little more than, quite literally, tear up the countryside, while all the volume involved are massive in content and physical weight. There is little or real substance, an almost total lack of support by science (including a great deal of contradiction, and, more importantly to us, no real protections for wild horses and other native species. It matters little that hunting, for instance, is said to potentially suffer little disruption, that some matter is that in regard to comment to the contrary, there will be major disruptions and impacts against wild horses and other native species. These natural use fields are too concentrated in the areas for which they are planned, and will valuable as this type of resource, the best to other resources is far too great.

Careful.

Yours truly,

Jeannine P. Stallins
Jeannine P. Stallins
President



Comment Letter #3

THE STATE OF WYOMING

DEPARTMENT OF ENVIRONMENTAL QUALITY

Department of Environmental Quality

Headquarters Building • 122 West 29th Street • Cheyenne, Wyoming 82002
 Telephone: (307) 777-3000 • Fax: (307) 777-3000 • TDD: (307) 777-3000
 Telefax: (307) 777-3000 • TDD: (307) 777-3000 • TDD: (307) 777-3000
 June 5, 1995

Bill McMahon, Project Coordinator
U.S. Bureau of Land Management
P.O. Box 1869
Rock Springs, WY 82902-1869

RE: Mesa Arch and Fontenelle Draft Environmental Impact Statements

Dear Mr. McMahon:

The Department of Environmental Quality has reviewed the Draft Environmental Impact Statement for the Mesa Arch Area Natural Gas Development and Fontenelle Natural Gas Infill Drilling Projects and our comments are provided on the enclosed attachments. These comments have been informally provided to you previously through our District Engineer.

Thank you for the opportunity to comment on the Draft Environmental Impact Statements and we look forward to working with you to ensure the environmentally sound development of the proposed project areas. Should you have any questions, please do not hesitate to contact our office.

Sincerely,

Denise Heamer
Denise Heamer
Director

DHLing
Enclosures
cc: Charles Collins
Lee Grubbs

Comment Letter #2

Office of Planning and Development
Lincoln County, Wyoming

P.O. Box 468
Kemmerer, Wyoming 82101
(307) 877-9024

(309) 442-9861 (in Wyoming)
FAX: (307) 877-3161

DATE: May 12, 1995

TO: Bill McMahon, Project Coordinator

FROM: Randy Wilson, Director

RE: Lincoln County comments on the Draft EIS for the Fontenelle Natural Gas Infill Drilling Project-Sweetwater and Lincoln Counties, Wyoming

The Lincoln County Board of County Commissioners has the following comment with regard to the above mentioned Draft EIS:

The Lincoln County Board of County Commissioners supports drilling and production of energy resources. The Board recommends that the review process proceed without unnecessary delays such that the project may be developed in a timely manner.

Fontenelle Natural Gas Infill Drilling DEIS Comments

These comments are similar to those regarding the Mesa Arch Natural Gas DEIS in many of the same issues reported in the Fontenelle Lincoln Road DEIS. As a matter of fact, the Mesa Arch and gas development area is essentially contiguous to the Fontenelle Lincoln Road gas production area, and from an air quality perspective, the impacts of the two developments overlap. Discussions of the impacts by plants in the Fontenelle Lincoln Road area should be linked to the assessment of the Mesa Arch area and the cumulative impact of these developments should be considered together.

General Comments

This DEIS makes the assumption that the only significant air quality concerns are fugitive dust present during the drilling and well development stage of the project while assuming that long term production related emissions from the operations are negligible. I find that this assumption is incorrect.

The cumulative emissions from wellfield construction, natural gas dehydration, condensate liquids handling, and other gas liquids processing are significant. The impact of these emissions on the Fontenelle Lincoln Road/Mesa Arch area is currently unquantified.

Emissions sources in the oil and gas industry emit traditional criteria pollutants (SP, PM 10, SO₂, NO_x, CO and VOC) in significant amounts. There is no reference to any of these criteria pollutants in the Fontenelle Lincoln Road DEIS, except for particulate matter, and that error makes the impact analysis of the DEIS flawed.

N₂ is one of the major pollutants from oil and gas operations and recent air quality emission inventory inventories have placed the permitted emission totals in the area at over 27,000 TPD (of that, about 3,000 TPD is related to existing oil and gas operations in the vicinity with the balance being other area industry, primarily well oil processing).

There is not a conveniently compiled emission number for CO, one of the chief pollutants from oil and gas operations. However, there are currently no significant air quality concerns with ambient CO concentrations in Southwest Wyoming.

The emission of hydrocarbons and related Volatile Organic Compounds from oil and gas operations is also poorly quantified at this point in time, but there could be significant emissions of these compounds that are not on the State's emission inventory at this time. The Air Quality Division does not currently have minimum or general exceedance of standards from any of the criteria pollutants on the Fontenelle Lincoln Road/Mesa Arch area, but there is interest in evaluating the oil and gas emission totals impact from N₂ and VOC for other regions.

Currently, the State of Wyoming is involved with a coalition of business and public interest

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3-3 cont. groups an attempt to quantify visibility and related impairment in the Green River Basin of southern Wyoming. Oil and gas emissions of NO_x and VOC's figure prominently in the evaluation of this issue.

In addition, Title III of the 1990 Amendments to the U.S. Clean Air Act has listed 189 Hazardous Air Pollutants (HAP's) which must now be more carefully considered in air quality evaluations. Preliminary evaluation of the oil and gas industry emissions show that there are at least five compounds that are on this list of HAP's including Benzene, ethylbenzene, toluene, xylene and butane. There is currently very poor quantification of the emission rates for these HAP compounds and the Fossil-fuel Lincro Road DEIS fails to consider the emission of these pollutants in any fashion.

3-4 Finally, as noted above, the Mesa Arch oil and gas development area is essentially contiguous to the Fossil-fuel Lincro Road gas production area, and from an Air Quality perspective, the impacts of the new developments overlap. Discussion of the impacts of the new in the Fossil-fuel Lincro Road area should be linked to the assessment of the Mesa Arch area and the cumulative impact of these developments should be considered together.

In summary, the DEIS should be revised to include a complete evaluation of the air quality impact from both the drilling development phase of the operations... from the long term production phase of the operation. Included in the drilling development phase of the wellfield operations should be an analysis of other pollutants besides fugitive dust from road-paved wellhead construction. Also, total impacts of NO_x, CO, VOC's and HAP's should be considered along with the cumulative impact of other industrial emissions, including those from the Mesa Arch Oil & Gas Region.

Specific Comments

Table IV, SUMMARY OF IMPACTS TABLE

Under the Air Quality heading in the "Remarks" column of this table, the only emissions considered are fugitive dust. The Air Quality impacts in this table should be expanded to consider the impacts of other gaseous criteria pollutants, specifically NO_x, VOC's and HAP's.

Page 1-11, Table 1-1

This table lists Wyoming Department of Environmental Quality Authority Action. Missing from this table is Air Quality Division permitting approval for compression sites, flaring, and other natural gas production and processing facilities.

Page 2-17, Section 2-2

This "Resource Protection Alternatives" section fails to consider any air quality related resource alternatives. Alternatives such as use of Vapor Recovery Units (VRUs) are

3-7 cont. dechlorination equipment vents, use of "Low NO_x" burners on flare headers, use of "Low NO_x" compression alternatives, requirements for fugitive hydrocarbon monitoring and maintenance on gas intake liquid vents and lines, requirements for centralized gas liquids recovery and dechlorination, and other emission control options should be considered in this section.

Page 2-21, Section 2-5

3-8 Table 2-3 section on hazardous materials usage in the operation of natural gas wellfields lists a considerable number of Hazardous Air Pollutants that are listed among the 189 compounds considered HAP's by Title III of the 1990 Amendments to the U.S. Clean Air Act. It should be made clear that sources of air emissions of any of these HAP's would be evaluated to determine if they are "major" emitters to the TPU and if HAP's emissions > 25 TPU cumulative tons of all HAP's or subject to provisions of the Title.

Page 2-24, Section 3-10

3-9 This section on the Air Quality in the analysis area provides a baseline estimate for particulate only. The section should be expanded to include a baseline air quality estimate for all other pollutants emitted from the drilling development and the long term production phases of wellfield operation.

Page 4-32, Section 4-10

3-10 This section on impacts to Air Quality due to the proposed action deals mainly with fugitive dust from construction activities, briefly passing off diesel generator emissions as a short term component of the construction phase of wellfield operations. It can find no discussion of the generator sizes and other field equipment required for a standard drilling rig. Therefore, these emissions are not quantified. This assumption cannot be verified.

3-11 The cumulative emissions totals for all criteria and hazardous air pollutants from the construction phase of the operations should be estimated along with the emissions projected from long term production from the wellfields.

It has not been made clear that increased initial drilling will likely increase the natural gas production rates from the Fossil-fuel Lincro Road area, and that additional gas compression treatment facilities would therefore likely be required. There will almost certainly be a demand for additional compression, production and processing facilities that will be necessary due to the expanded drilling conceived under the Proposed Action. If this DEIS is not better than the BLM has estimated the amount of increased wellfield compression, wellfield production equipment including field emission sources such as heater treaters, line heaters and dehydrators (burners) or central gas processing facilities necessary to support the proposed level of wellfield development. Also, there is no estimate of hydrocarbon and HAP emissions due to dehydrator reboiler vents, process line leaks, liquid storage tank vents, and other such production related emission sources. In particular, there is no estimate of the contribution of fugitive emissions from wellhead venting.

The Air Quality Division has issued can be on the order of 100% of TPU for the Mesa Arch

3-2 cont. area. These types of facilities will all have potential air emissions and their impact should be factored into the analysis of this project.

3-3 cont. • Although the state, county and basin wide directional drilling technology has advanced significantly since that the additional costs of directional drilling are not being factored into the analysis.

3-4 From this statement were correct regarding the additional costs of directional drilling. Directional drilling wells would probably eliminate most remaining wells. We do have indicated in our comments that we have added most of our "bright spots". This means that directional drilling wells are being drilled more often than in the past. This means that directional drilling wells are being drilled more often than in the past. This means that directional drilling wells are being drilled more often than in the past.

3-5 Directional drilling wells are more prevalent in areas where the additional cost can be justified either by the increased production of the reservoir or by the production cost of additional surface facilities, usually in offshore or related basins.

3-6 Naturally, exploring this potential could be reduced and mitigated. However, we believe that the ultimate conclusion would be that the BLM could not substantially directional drilling. We recommended that you delete this portion of the paragraph.

3-7 • It can be fairly well argued that an operation where drilling is directed away from the well head and toward production facilities, thereby reducing the amount of surface facilities.

3-8 The implication that one can drill several wells from the same well pad as a single well pad is erroneous. If the same is done, more than one well from a single pad will be constructed. Well preparation including the site and constructing the drilling pit success for about 10% of the drilling costs to run as a proportion of the total cost of the well. Therefore, reducing a well that is 10% of the total to 20% is not particularly productive. It is better to drill a 10% well to get a 10% production and reduction of perhaps 20% and only reduce the total cost by 10%.

3-9 Savings on production equipment are not a significant factor as the test program. Each well would still require its own wellhead, meter and an artificial lift. In fact, as we would go further, the cost of production equipment per acre would increase. However, we do not believe that there is any way to reduce the cost of production equipment per acre. The cost of production equipment per acre would increase. However, we do not believe that there is any way to reduce the cost of production equipment per acre.

3-10 We see no justification for the statement that an operation can occur on a single wellhead, drilling a well. The features that other operations have as one part of the terms that drive the costs of drilling a conventional well. They are over as a factor in the cost of drilling a directional well. We recommended that you delete this portion of the statement.

3-11 • The specialized methods used and conventional processes to support directional drilling operations have been well documented in the BLM's documents. Technically, the statement is correct and well meaning. There is no reference to the level of directional drilling in the past. Thus, having one directional drilling contractor in the Rockies makes directional drilling operations more common. As we indicated above, there are multiple, separate directional drilling contractors of numerous in the Fossil-fuel Road area. More directional drilling contractors in the past would reduce the total cost of drilling a well, but we do not believe that this is a realistic expectation.

3-12 The Physical Drilling program... • DEIS will require the additional costs of additional directional drilling of surface facilities, treatment or additional surface facilities, such as heater treaters, line heaters and dehydrators (burners) or central gas processing facilities necessary to support the proposed level of wellfield development. Also, there is no estimate of hydrocarbon and HAP emissions due to dehydrator reboiler vents, process line leaks, liquid storage tank vents, and other such production related emission sources. In particular, there is no estimate of the contribution of fugitive emissions from wellhead venting.

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Re: WRM EA
Mesa Arch Oil and Gas Development
Project Coordinator
P.O. Box 1860
Rock Spire, Wyoming 82702-1860

Subject: Fossil-fuel Natural Gas Field
Drilling Projects DEIS
Dear Mr. McManus:

In accordance with our responsibility under the National Environmental Policy Act (NEPA) and Section 106 of the Clean Air Act, the Region VIII office of the Environmental Protection Agency has reviewed the subject documents.

4-5 The BLM is commended for selecting the Atmospheric Protection Alternative for this project. Even so, the EPA believes the BLM should do more to evaluate the proposed action.

The EPA has serious concerns that the cumulative impacts from the Mesa Arch oil and gas development in the Fossil-fuel Road area will be significantly increased. We have noted that the individual analyses have evaluated only incremental effects within the project boundary, which would have no significant impacts. Cumulative impacts will add new activity to the area and will have a significant impact on the area.

5-2 The EPA has serious concerns that the cumulative impacts from the Mesa Arch oil and gas development in the Fossil-fuel Road area will be significantly increased. We have noted that the individual analyses have evaluated only incremental effects within the project boundary, which would have no significant impacts. Cumulative impacts will add new activity to the area and will have a significant impact on the area.

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5-7 The EPA has serious concerns that the cumulative impacts from the Mesa Arch oil and gas development in the Fossil-fuel Road area will be significantly increased. We have noted that the individual analyses have evaluated only incremental effects within the project boundary, which would have no significant impacts. Cumulative impacts will add new activity to the area and will have a significant impact on the area.

5-8 The EPA has serious concerns that the cumulative impacts from the Mesa Arch oil and gas development in the Fossil-fuel Road area will be significantly increased. We have noted that the individual analyses have evaluated only incremental effects within the project boundary, which would have no significant impacts. Cumulative impacts will add new activity to the area and will have a significant impact on the area.

5-9 The EPA has serious concerns that the cumulative impacts from the Mesa Arch oil and gas development in the Fossil-fuel Road area will be significantly increased. We have noted that the individual analyses have evaluated only incremental effects within the project boundary, which would have no significant impacts. Cumulative impacts will add new activity to the area and will have a significant impact on the area.

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5-11 The EPA has serious concerns that the cumulative impacts from the Mesa Arch oil and gas development in the Fossil-fuel Road area will be significantly increased. We have noted that the individual analyses have evaluated only incremental effects within the project boundary, which would have no significant impacts. Cumulative impacts will add new activity to the area and will have a significant impact on the area.

5-12 The EPA has serious concerns that the cumulative impacts from the Mesa Arch oil and gas development in the Fossil-fuel Road area will be significantly increased. We have noted that the individual analyses have evaluated only incremental effects within the project boundary, which would have no significant impacts. Cumulative impacts will add new activity to the area and will have a significant impact on the area.

5-13 The EPA has serious concerns that the cumulative impacts from the Mesa Arch oil and gas development in the Fossil-fuel Road area will be significantly increased. We have noted that the individual analyses have evaluated only incremental effects within the project boundary, which would have no significant impacts. Cumulative impacts will add new activity to the area and will have a significant impact on the area.

5-14 The EPA has serious concerns that the cumulative impacts from the Mesa Arch oil and gas development in the Fossil-fuel Road area will be significantly increased. We have noted that the individual analyses have evaluated only incremental effects within the project boundary, which would have no significant impacts. Cumulative impacts will add new activity to the area and will have a significant impact on the area.

5-15 The EPA has serious concerns that the cumulative impacts from the Mesa Arch oil and gas development in the Fossil-fuel Road area will be significantly increased. We have noted that the individual analyses have evaluated only incremental effects within the project boundary, which would have no significant impacts. Cumulative impacts will add new activity to the area and will have a significant impact on the area.

faces the Draft Environmental Impact Statement (EIS) Environmental, Concrete, Practicable Information. We request that the above listed items be addressed in the FEIS.

EPA appreciates the opportunity to review the subject document and all the effort which went into its preparation. If you have any questions, please contact Carl Hestek of my staff at (303) 251-1857.

Sincerely,

J. William Geise, Jr.
Acting Chief

Environmental Assessment Branch
Water Management Division

Comment Letter on Fontanelle Draft EIS
June 4, 1995
Page 2

42 U.S.C. § 4332(C). In addition, NEPA requires agencies to study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources.

42 U.S.C. § 4332(D)(2). It is interesting to note that each agency decision maker identified weaknesses and limitations in all possible approaches to a particular proposal which would better address environmental concerns and the policy goals of NEPA.

Council on Environmental Quality (CEQ) regulations implementing NEPA and the courts have made clear that the identification of alternatives is "the heart" of the NEPA process. 40 C.F.R. 1500.4-1. In order to "thoroughly define" the alternatives, CEQ regulations require agencies to provide a clear basis for choice among options by the public and the public and the public and the public must explore and evaluate "all reasonable alternatives." 15 U.S.C. 1502.15(d).

CEQ regulations explicitly require agencies to explore a "no action" alternative. 40 C.F.R. § 1502.14(a); 40 C.F.R. § 1502.14(b). Failure to comply with a reasonable range of alternatives, including the "no action" alternative, is a clearly grounds for judicial reversal. See, e.g., *Bur Marshall, Alabama v. Model*, 452 F.2d 1223, 10th Cir. 1971; *San Antonio, Texas v. EPA*, 711 F.2d 933, 5th Cir. 1983; *Sierra Club v. EPA*, 724 F.2d 791, 9th Cir. 1982; *Coalition for Environmental Quality v. EPA*, 733 F.2d 970, 10th Cir. 1984; *Sierra Club v. EPA*, 714 F.2d 888, 10th Cir. 1983.

The draft EIS contains no analysis of the no action alternative. Including its failure to comply with the explicit requirements of NEPA and implementing regulations on its incorporation of the "no action" alternative. 40 C.F.R. 1500.4-1(f); 40 C.F.R. 1502.14(a); 40 C.F.R. 1502.14(b). Because the draft EIS omits the fundamental analysis of this case, the supplemental EIS must be prepared fully analyzing the "no action" alternative.

In *Sierra Club v. EPA*, the D.C. Court of Appeals addressed the issue of whether NEPA reviews must take place at the least level, because after an area had been leased the agency had that case, the Forest Service could not completely drilling, road building, and related activities which have negative environmental effects. The Court clearly was directed to the fact that NEPA reviews must take place before any activities can take place, not after. *Sierra Club v. EPA*.

Comment Letter on Fontanelle Draft EIS
June 4, 1995
Page 4

In addition, even if the agency must permit at least some surface disturbance, the draft EIS must include an analysis of the "no action" or "no surface disturbance" alternative. NEPA implementing regulations specifically require that environmental impacts be analyzed for the "no action" alternative and the "no surface disturbance" alternative. 40 C.F.R. 1500.4-1(f). NEPA guidance explains that the "no action" alternative is outside the legal jurisdiction of the lead agency, but still be analyzed if it is reasonable. *Sierra Club v. EPA*, 714 F.2d 888, 10th Cir. 1983. NEPA implementing regulations specifically require that agencies address the EIS alternative beyond their jurisdiction.

Because the draft EIS fails to analyze the no action alternative, a supplemental draft EIS must be prepared which

includes a discussion of such an alternative. Only when the no action alternative is adequately addressed will the public and stakeholders be able to fully understand the effects of the human environment if adopting either of the action alternatives.

The draft EIS fails to consider adequately cumulative impacts. CEQ regulations require agencies to analyze the "environmental impacts of proposed actions in an EIS. 40 C.F.R. § 1502.15(d). This includes the direct and indirect impacts of proposed actions, but also the cumulative impacts of "past, present, and reasonably foreseeable future actions." 40 C.F.R. 1502.15(d). NEPA implementing regulations specifically require that agencies analyze the cumulative impacts of "past, present, and reasonably foreseeable future actions." 40 C.F.R. 1500.4-1(f). NEPA guidance explains that the "no action" alternative is outside the legal jurisdiction of the lead agency, but still be analyzed if it is reasonable. *Sierra Club v. EPA*, 714 F.2d 888, 10th Cir. 1983. NEPA implementing regulations specifically require that agencies address the EIS alternative beyond their jurisdiction.

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Comment Letter on Fontanelle Draft EIS
June 4, 1995
Page 5

In order to comply with NEPA, its implementing regulations, and Federal caselaw, the BLM must issue a supplemental FEIS adequately analyzing the "no action" alternative and the cumulative effect of other petroleum projects including the proposed Mox-Arch project. Failure to do so may represent reversible error on the part of the agency.

If you have any questions or require more information, please do not hesitate to contact me at the number above.

Sincerely,

Edward C. Johnson
Director, Public Lands Program

Bill McMahon, Project Coordinator, BLM Wyoming, 107-162-4001
Dan Kelly, Wyoming Outdoor Council
Clash Bear, General Counsel, Council on Environmental Quality
Office of the Solicitor, Department of Interior
William Geise, Chief, Environmental Assessment Division, EPA Region VII

6-3 cont.

6-5

LAND AND WATER
June 4, 1995

Comment Letter #8

VIA FAX - FIRST CLASS MAIL

Mr. Alan S. Pierson
Wyoming State Office
115 Harten Avenue
Cheyenne, WY 82001
FAX: 307-779-4215

Re: Comments on Fontanelle Natural Gas Infill Drilling Projects Draft EIS

Dear Mr. Pierson:
Thank you for the opportunity to provide comments on the Fontanelle Natural Gas Infill Drilling Projects Draft Environmental Impact Statement (EIS).

For the reasons set out below, the Fontanelle draft EIS fails to comply with the standards established in the National Environmental Policy Act (NEPA) and the Council on Environmental Quality (CEQ) regulations implementing that law, and therefore the Bureau of Land Management (BLM) must withdraw the document and prepare a supplemental draft EIS.

The draft EIS fails to analyze adequately the No Action Alternative.

The provisions of NEPA and Analyze Adequately the No Action Alternative. CEQ regulations require agencies to consider all reasonable alternatives to the proposed action, including the "no action" alternative. 40 C.F.R. 1500.4-1(f); 40 C.F.R. 1502.14(a); 40 C.F.R. 1502.14(b). NEPA implementing regulations specifically require that agencies explore and evaluate "all reasonable alternatives." 40 C.F.R. 1500.4-1(f).

Include in every recommendation or report on proposals for major Federal actions which significantly affect the human environment, a detailed statement on the environmental impacts of the proposed action, and a statement on the alternatives to the proposed action.

Comment Letter on Fontanelle Draft EIS
June 4, 1995
Page 3

disturbance could occur. In fact, as the Fontanelle draft EIS states, quoting *Sierra Club*:

Notwithstanding the assurance that a later site-specific environmental analysis will be made in leasing these leases the Department has made an irreversible commitment to allow surface disturbing activities, including drilling and road building.

Draft EIS, 217, *Sierra Club v. EPA*, 714 F.2d 888, 10th Cir. 1983. NEPA implementing regulations specifically require that agencies analyze the cumulative impacts of "past, present, and reasonably foreseeable future actions." 40 C.F.R. 1502.15(d). NEPA guidance explains that the "no action" alternative is outside the legal jurisdiction of the lead agency, but still be analyzed if it is reasonable. *Sierra Club v. EPA*, 714 F.2d 888, 10th Cir. 1983.

Clearly, some development has taken place at Fontanelle as a result of the BLM's lease to the public. The draft EIS does not clear a great deal of development has taken place. See Draft EIS, 217-219. The failure of this proposal to permit "infill" drilling by definition means that a great deal of development has taken place already. Thus, the BLM has already discharged its commitment to permit "some" surface disturbing activities. The BLM also clearly retains the authority to "explicitly control" all development, and need not permit all surface disturbing activities proposed by the lease holder. Where, as here, a tremendous amount of drilling has taken place, the agency is under no obligation to permit further surface disturbing activities. The "no action" alternative defined in the draft EIS would clearly constitute a reasonable alternative which the agency must analyze.

The agency's failure to analyze the no action alternative also brings into question the objectivity of the analysis.

NEPA does not forbid the agency from identifying a "preferred alternative" during the NEPA process. 40 C.F.R. § 1502.14(b). However, even though such an alternative is identified, NEPA documents

must be objectively prepared and not slanted to support the choice of the agency's preferred alternative over the other alternatives and the public interest.

CEQ regulations require agencies to analyze the "environmental impacts of proposed actions in an EIS. 40 C.F.R. § 1502.15(d). This includes the direct and indirect impacts of proposed actions, but also the cumulative impacts of "past, present, and reasonably foreseeable future actions." 40 C.F.R. 1502.15(d). NEPA implementing regulations specifically require that agencies analyze the cumulative impacts of "past, present, and reasonably foreseeable future actions." 40 C.F.R. 1500.4-1(f).

6-2 cont.

6-3

6-3 cont.

Comment Letter on Fontanelle Draft EIS
June 4, 1995
Page 5

includes a discussion of such an alternative. Only when the no action alternative is adequately addressed will the public and stakeholders be able to fully understand the effects of the human environment if adopting either of the action alternatives.

The draft EIS fails to consider adequately cumulative impacts. CEQ regulations require agencies to analyze the "environmental impacts of proposed actions in an EIS. 40 C.F.R. § 1502.15(d). This includes the direct and indirect impacts of proposed actions, but also the cumulative impacts of "past, present, and reasonably foreseeable future actions." 40 C.F.R. 1502.15(d). NEPA implementing regulations specifically require that agencies analyze the cumulative impacts of "past, present, and reasonably foreseeable future actions." 40 C.F.R. 1500.4-1(f).

The Fontanelle draft EIS fails to analyze the cumulative impacts of proposed actions in an EIS. 40 C.F.R. § 1502.15(d). This includes the direct and indirect impacts of proposed actions, but also the cumulative impacts of "past, present, and reasonably foreseeable future actions." 40 C.F.R. 1502.15(d). NEPA implementing regulations specifically require that agencies analyze the cumulative impacts of "past, present, and reasonably foreseeable future actions." 40 C.F.R. 1500.4-1(f).

The Fontanelle draft EIS fails to analyze the cumulative impacts of proposed actions in an EIS. 40 C.F.R. § 1502.15(d). This includes the direct and indirect impacts of proposed actions, but also the cumulative impacts of "past, present, and reasonably foreseeable future actions." 40 C.F.R. 1502.15(d). NEPA implementing regulations specifically require that agencies analyze the cumulative impacts of "past, present, and reasonably foreseeable future actions." 40 C.F.R. 1500.4-1(f).

6-3 cont.

Comment Letter #7

Greater Yellowstone Coalition

Bill McMahon, BLM Project Coordinator
Fontanelle Natural Gas Infill Drilling Project
P.O. Box 1569
Rock Springs, WY 82901-1569

Re: Comments on Fontanelle Natural Gas Infill Drilling Projects Draft EIS

Dear Mr. McMahon:
Please accept the following comments regarding the proposed Fontanelle Natural Gas Infill Drilling Project Draft Environmental Impact Statement on behalf of the Greater Yellowstone Coalition. We appreciate your efforts to address these concerns.

We commented earlier that we agreed with your decision to combine the environmental analysis of BLMN Fontanelle Infill Drilling Projects with the Fontanelle Road Project. The joint project of the two projects along the BLMN Water and Fontanelle Road project was a decision to combine them in the Environmental Impact Statement (EIS) appropriate.

However, the procedural analysis of the joint project proposal contained in the subject of the initial impacts of the Fontanelle Infill Drilling Project and the Fontanelle Road Project was not completed before the individual environmental impact statements were made to proceed with each of the development projects. These decisions could have serious effects on wildlife populations and habitat that extend beyond project boundaries.

Major Federal actions requiring the preparation of environmental impact statements which require or shall have the effect of the proposed action, shall be analyzed in the EIS as defined by the statute. 40 C.F.R. 1500.4-1(f). The subject of the initial impacts of the Fontanelle Infill Drilling Project and the Fontanelle Road Project was not completed before the individual environmental impact statements were made to proceed with each of the development projects. These decisions could have serious effects on wildlife populations and habitat that extend beyond project boundaries.

Some projects of the joint project, environmental analysis and related to be considered in the EIS. The combined EIS is an environmental analysis of the joint project. The combined EIS is an environmental analysis of the joint project. The combined EIS is an environmental analysis of the joint project.

Washington, DC: 2000-11-11

6-4

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7-2

7-3

Does not impact the very resources attracting the public in the first place.

During the early boom of the 1970-80s numerous roads were constructed in southwest Wyoming that created a tremendous impact on wildlife. Wildlife officials and local riders recall the results of the increased road traffic as a substantial loss of birds of prey. Transient oil field employees sought refuge for target practice in their time-off. Such activities are difficult to monitor unless it is too late and the toll is taken in reduced populations.

While we appreciate your development of a transportation plan, we suggest that the employees be prohibited from carrying guns on these roads. It is important for the Fontaine's and Mena Arch projects due to close proximity of the roads. We would like to see a program for all employees who help prevent some of these problems.

With the transportation plan, we suggest that the program for reduced speed limits should be imposed. But specifics are missing and we suggest that the potential for the same conditions on these roads.

Road density standards are missing from the plan. Increased road density means increased needs for the wildlife. Game and Fish treatment and US Fish and Wildlife Service. Not too long ago collared trumpeter leaved and killed along the roadways. We would like to see who had driven down to the refuse to take them out. Fortunately, they were collected, but not without great expense to the agency and the wildlife. Road construction should not be done in the riparian area down the water. They are already sufficient access points along the Green River. We suggest that the oil and gas companies provide funds for enforcement needs. Roads must be reclaimed and closed when they are not needed and that a road density standard be written into the transportation plan.

Off road vehicles (ORV) have become a serious problem in southwest Wyoming. Increased oil and gas field employees seeking recreation opportunities will only exacerbate this problem. The Resource Management Plans have addressed ORVs by allowing only on-road use by ORVs except where indicated. But even an enforcement has been used. Rangers cannot be widely spread as to approach every vehicle. We suggest the companies provide funds for enforcement ORVs as well.

LITERAL RESOURCES

As we stated above, all archaeological and paleontological studies will be done prior to any surface disturbance activities in association with this project. The Green River basin is rich in prehistoric and human historic artifacts in order for us to gain a valuable knowledge of our past, we must know about our past.

Streams, rock terraces and commercial enterprises have developed

the land by leaving large quantities of fossil artifacts and petrified wood. The last of 24 paddles may have been petrified wood is excessive in light of the number of paddles that are being attracted to this area with the forthcoming development.

The following surveys and documents are therefore necessary for compliance with NEPA in the Fontaine's Basin:

- 1. Biological Survey of the National Historical Preservation Act.
- 2. Biological Opinion by USFWS of NM Historical Act.
- 3. Studies of surveys required for Clean Water Act Sec 404 wetlands permit.
- 4. Clean Air Act monitoring data.
- 5. Transportation and traffic way studies as required by Federal Land Policy and Management Act (FLPMA) and Mineral Leasing Act.
- 6. Reclamation plans.
- 7. All studies and surveys required for permits listed Table 1-1, Range monitoring plan.

COMPLETION

In conclusion, we sincerely urge you to expand the scope of the Fontaine's BSA to include the other projects. Both existing and proposed. It is impossible for either the agencies or the public to assess the impacts in such valuable resources in southwest Wyoming without a cumulative impact assessment BSA.

We appreciate the opportunity to submit these comments in this important cause and hope that you will contact us if you have questions or need further information.

Sincerely,

Wendell Taylor
Wendell Taylor
Greater Yellowstone Coalition

Don Arley
Don Arley
Wyoming Outdoor Council

Rob Kappel
Rob Kappel

Nick Engel
Nick Engel
Sierra Club

Cabot Oil & Gas Production Corporation

June 2, 1995

Comment Letter #9

W. William McMahon
Point Coordinator
Bureau of Land Management
Box 1969
Rock Springs, Wyoming 82901-1969

RE Fontaine's Natural Gas Well
Drafting Process Draft
Environmental Impact Statement

Dear Mr. McMahon:

U.S. Bureau of Land Management
Attn: Bill McMahon, Project Coordinator
P.O. Box 1969
Rock Springs, WY 82901-1969

As you are aware, road operation have implemented some road reduction measures in the past but in order to provide a sustainable resource use of values. To achieve this, a program that must include both on-road and off-road use and protection facilities are greatly needed to ensure proper use of the resources. We are currently reviewing the proposed action in the Draft EIS and we are currently reviewing the proposed action in the Draft EIS and we are currently reviewing the proposed action in the Draft EIS.

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Very truly yours,
Wendell Taylor
Wendell Taylor
Greater Yellowstone Coalition

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SIERRA CLUB LEGAL DEFENSE FUND, INC.

1400 Broadway, New York, NY 10018

June 4, 1995

Comment Letter #9

U.S. Bureau of Land Management
Attn: Bill McMahon, Project Coordinator
P.O. Box 1969
Rock Springs, WY 82901-1969

RE Fontaine's Natural Gas Well
Drafting Process Draft
Environmental Impact Statement

Dear Mr. McMahon:

We have reviewed the document in question in addition to the comments that follow. We incorporate here by reference comments submitted on the Draft Environmental Impact Statement on the Fontaine's Basin, Wyoming, by the National Wildlife Federation, the Greater Yellowstone Coalition, the Sierra Club, and the Wyoming Outdoor Council.

As mentioned in comments incorporated above, the Draft does not adequately address the environmental impacts of the proposed action. Nor does it adequately assess the relationship of the proposed action to other BLM authorized activities in southwest Wyoming, northeast Colorado, and northeast Utah collectively.

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Mr. Bill McMahon
June 4, 1995
Page 1

The environmental impacts of the proposed actions were identical. The Court observed that:

"While the operations are not functionally or economically identical, their impacts are not independent and separate common activities. At the time of preparing the EIS, the BLM had no idea that the Fontaine's Basin (the 124-mile stretch of a single river from a 'discovery' stream to a wellhead) was a significant environmental event."

The court's finding and development of energy resources in southwest Wyoming is identical to the situation in the Fontaine's Basin. The court's finding and development of energy resources in southwest Wyoming is identical to the situation in the Fontaine's Basin. The court's finding and development of energy resources in southwest Wyoming is identical to the situation in the Fontaine's Basin.

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Comment Letter #12

Department of Environmental Quality

Headquarters Building, 172 West 25th Street, Cheyenne, Wyoming 82002

June 2, 1995

Mr. Bill McManan, Project Coordinator, Bureau of Land Management, P.O. Box 1849, Rock Springs, Wyoming 82902-1849

Re: Fossilfuel Natural Gas Infill Drilling Project Draft Environmental Impact Statement

Dear Mr. McManan: Jack Strassman of the Water Quality Division (WQD) reviewed the above referenced Environmental Impact Statement (EIS) and provided comments which are presented below. Thank you for the opportunity to comment.

Generally the EIS provides a good approach for protection of water quality.

See 10.4.3 Wyoming Department of Environmental Quality, Page 114

The wording in the parentheses in the second and third lines of the first paragraph of this comment is incorrect. A letter must be received from WQD to permit commercial extraction of oil field wastes and these limitations would be stipulated by WQD in a T-1 response permit. This should be reflected in the document.

See 10.1.3 Wells, Well Operations and Maintenance, Page 2

The document defines the hydrogeology of shallow aquifers and their ability to recharge in riparian and alluvial settings. To present a complete water balance, it is recommended that

United States Forest Service, Intermountain Region, 204 25th Street, Ogden, UT 84401-2510

File Code: 7580

Date: JAN 5 1995

Mr. Alan R. Flarom, Wyoming State Director, Bureau of Land Management, P.O. Box 1828, Cheyenne, Wyoming 82002

Comment Letter #13

Dear Mr. Flarom:

This letter is in response to three separate draft Environmental Impact Statements (EIS's) issued by your Rock Springs office and dealing with potential gas well developments in southeast Wyoming. The EIS's are the Fossilfuel Natural Gas Infill Drilling, the Expanded Moss Arch Natural Gas Development, and Tractor's Steepwash Creek. The gas well development proposed in these EIS's could have adverse effects upon the Air Quality Related Value (AQRV) in the Bridger, Fitzpatrick, and Popo Alpa Wilderness under our administration.

The data for comment on the Tractor EIS has expired, and the remaining EIS's have data dates of June 4 and June 12. The Bridger-Tractor National Forest, which has been given lead responsibility for Air Resource monitoring in the Upper Snake River Basin, had no adverse notice and was not included on the mailing list for these EIS's. Only in the past three weeks we were the Bridger-Tractor National Forest staff made aware that these draft EIS's had been issued. For this reason, this initial response will only address the information needed by the Forest Service to adequately evaluate the proposals' potential impacts and to point out the major deficiencies we have in the documents. A more complete assessment of the effects upon AQRV and our recommendations will take place after the close of the comment period for the drafts, but prior to the issuance of the final EIS's.

Mr. Bill McManan of your Rock Springs office, has assured us that every effort will be made to satisfy our needs for additional information and recognize our authority as the Federal Land Manager responsible for protecting the AQRV's in these Class I Wilderness under the Clean Air and Wilderness Act provisions.

We have identified the following as major information needs and deficiencies of the EIS's:

- 1. No air quality analysis was provided in the EIS's for Fossilfuel Natural Gas Infill Drilling under a Stages-on-Draw Unit. We believe air quality analysis for these EIS's would be necessary.
2. None of the EIS's evaluated cumulative effects upon air quality. The only analysis presented in the Moss Arch EIS, evaluated the effect on the basis of air we will only. Sufficient analysis would need to consider the cumulative effects of all the wells.

Listing the Land and Natural Property

Mr. Alan Kerecse Ltr.

- 1. The Moss EIS used only the proposed wells in their unit rather than considering all of the new wells which could be drilled under all existing permits and the other EIS's. The number of all new wells could reach 4281. All potential new wells, regardless of permit status, must be evaluated for possible effects upon the Class I Wilderness AQRV.
2. The Moss EIS considered background relations based upon 193 data rather than current estimates. The effect of current relations and proposed relations from one well will need to be evaluated.
3. The Moss EIS evaluated only the estimates reported from the drilling phase. If there are any estimates to be expected from the producing wells, this should be included in a cumulative manner.
4. The supporting facilities needed for a potential development of this magnitude were not considered in the analysis. Production and compressor stations will certainly be part of the well field development as well as possible relative facilities in the changes in the composition of the gas is encountered. The effects of these facilities need to be evaluated.
5. A major revision in the modeling of visibility will be necessary. The use of Viadrome in the Moss EIS is not appropriate for adequately showing dispersion effect upon visibility in the wilderness. The Forest Service will be recommending a more appropriate model for visibility analysis.
6. The Bridger-Tractor National Forest has recently completed refinement of a model which predicts changes in high-alpine lake chemistry due to the atmospheric deposition of acid ions. This model is state-of-the-science and has been adapted specifically for the western United States alpine environment. The Forest Service will require the use of this model for predicting changes in the Lake Chemistry, which can then be compared to established limits for the wilderness.
7. There was no discussion of methods to mitigate, if not eliminate, the major pollutant NH3. NH3 has potential effects upon lake acidity, visibility, and plant growth (through its role in some pollutants). Measures to mitigate NH3 need to be fully realized.

Using the information supplied in the EIS, a very preliminary analysis by our staff suggests that the effect upon the buffering capacity of the more sensitive lakes in the Moss River mountains could result in a reduction of acid neutralizing capacity of more than 10 percent. 10 percent is the maximum amount allowable under the limits of acceptable change associated with these Class I Wilderness. We must underscore the importance of the information needs and deficiencies listed above.

We look forward to a closely coordinated and cooperative effort with the Bureau of Land Management as both agencies deal with this major development. Sincerely,

Elizabeth Litter, Regional Forester, Intermountain Region



Comment Letter #14

STATE OF WYOMING, OFFICE OF THE GAME AND FISH COMMISSION

June 5, 1995

JIM GERBER, Game Warden

STATE OF WYOMING, CHEYENNE, WY 82002

Bureau of Land Management, Green River Resource Area, Bill McManan, Project Coordinator, P.O. Box 1869, Rock Springs, WY 82902-1869

Dear Mr. McManan:

On behalf of the State of Wyoming, please be advised that we have reviewed the Fossilfuel Natural Gas Infill Drilling Project Draft Environmental Impact Statement and support the proposed action. In accordance with our own comment period given to affected state agencies, I have attached several comments for your review.

The State of Wyoming encourages you to give priority to these comments to proceed with the development of the resources that we undoubtedly these benefits to the United States and the State of Wyoming. As written in the Statement, these wells will allow full recovery of natural gas from the assets. This would also aid our efforts in the conservation of all natural resources.

Considering the fact that 1,070 wells already exist in the field, we feel that the inevitable degradation that occurs with any surface disturbance can be minimized when it occurs in an existing lease. Further, the proposed 1,317 wells over ten years (131 wells per year) will increase economic activity in the area. I might remind you that only 325 gas wells were completed in our state in 1994.

Thank you for the opportunity to comment on the above Statement.

Sincerely,

Jim Magginn, Director of Federal Land Policy

JM:dlj, Enclosures

WYOMING GAME AND FISH COMMISSION

May 17, 1995

Comment Letter #15

Mr. Julie Hamilton, May 17, 1995, EIS 6433, Page 2

Ranking. Two alternatives have been proposed. The first is a resource protection alternative (one for each area of development). This alternative would require additional drilling technology and utilization of some well sites in sensitive areas. The second alternative would require less work and would reduce the amount of disturbance by 94.4 acres and the number of wells by 69. The action allowed in the section is:

We submitted substantive comments during review of the preliminary Draft EIS. Most of those comments have been addressed in this draft. Please consider the following additional comments:

- 1. The use of Bayesian Probability Models for evaluating sensitive habitats appear significant. These estimates are a technical report are the most conservative, will thought out, and provide the most realistic analysis. These estimates are a reason to be concerned. However, given the extremely short time available to review the technical report, we would appreciate an opportunity to review the models in greater depth. We request the authors and BLM sponsor a technical presentation of the models to WQD and BLM biologists prior to drafting the final EIS.

- 2. Based on results of the Bayesian Modeling, predicted impacts to promoters and male deer winter habitats and sage grouse nesting habitats appear significant. These estimates are a reason to be concerned. However, given the extremely short time available to review the technical report, we would appreciate an opportunity to review the models in greater depth. We request the authors and BLM sponsor a technical presentation of the models to WQD and BLM biologists prior to drafting the final EIS.

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- 1. The following specific questions: (1) If all reclamation and mitigation plans are successful, what will the resulting level of impact be, and (2) To what extent will mitigation and mitigation plans be successful? Mitigation plans implemented on the ground, truly accomplishing mitigation, BLM should respond to these questions in the PEIS. Habitat losses should be quantitatively stated. Also, BLM should define effective procedures to restore or compensate habitat losses, along with reliable implementation procedures. Possible impacts include: erosion, streambank erosion, channeling, etc in appropriate locations; increased burning or reduced habitat; increased riparian habitat; rearing or modifying problem fences, reclaiming abandoned disturbances, etc.

- 2. Cumulative impacts to Endangered, Threatened, and Candidate Species: The DEIS states, "Loss associated with oil and gas development are negligible" (p.4-30). The DEIS then states, "Numbers of insignificant data about their populations, habitat use patterns and distributions, future population impacts to these populations are negligible and 'Threatened' can not be quantified" (p.4-30). It is unclear how BLM can conclude oil and gas effects are negligible when there is insufficient information about populations, habitat use, and distributions. Perhaps additional data collection and monitoring are warranted.

- 3. Based on modeling predictions, the "No Action Alternative" would clearly impact wildlife forest. This alternative is unlikely considering the current demand for gas and the economic potential of the Fossilfuel fields. Therefore the "No Action Alternative" is not a realistic alternative. This should be the minimum level of development considered for the area.

- 4. SEI: Cumulative Impacts to Endangered, Threatened, and Candidate Species: The DEIS states, "Loss associated with oil and gas development are negligible" (p.4-30). The DEIS then states, "Numbers of insignificant data about their populations, habitat use patterns and distributions, future population impacts to these populations are negligible and 'Threatened' can not be quantified" (p.4-30). It is unclear how BLM can conclude oil and gas effects are negligible when there is insufficient information about populations, habitat use, and distributions. Perhaps additional data collection and monitoring are warranted.

- 5. On page 4-77, the DEIS states, "Impacts to nesting mountain ptarmigan could accumulate their listing under the ESA." This would not be considered a negligible impact (40 CFR 100.17). The proposed action will disturb 4,830 acres of potential mountain ptarmigan nesting habitat. Noise, dust, and visual disturbance may impact nesting habitat suitability in additional areas. Surveys should be conducted to locate mountain ptarmigan nesting habitat and this information should be incorporated into the resource data used to site wells under the Resource Protection Alternative.

- 6. SEI: Construction vs. Production Disturbances: The draft EIS, continually differentiates between the area affected during construction and that which remains affected during production. The analysis promotes reclamation reduces the area affected during the production phase. However, some vegetation types (i.e. dense spruce) will be difficult to reclaim. BLM should comment on the length of time required for native shrubs to reestablish and should consider this in the analysis. In some areas (dense spruce nesting habitat), reclaiming small areas or some approach to earlier succession may be beneficial. In crucial big game habitat,

Mr. Julie Hamilton, May 17, 1995, EIS 6433, Page 3

closing and reclaiming roads, developing new water sources (outside crucial winter range), developing new access or conservation easements, etc.

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Ms. Julie Hamilton
May 17, 1995
Page 4 - SIS 6433

loss of shrub habitat, particularly in blocks covering several acres, can be a negative effect.

7. **NE Mitigation:** The FEIS SIS describes several measures to minimize irreversible wildlife impacts from seasonal restrictions on construction activities. Mitigation (as C.F.R. 1008.20) includes not only reducing the incidence of the effects, but also curbing the impact by repairing, rehabilitating or restoring the environment, and compensating for impacts by restoring and enhancing natural resources or services. NE should identify specific mitigation measures that will be implemented. NE should identify habitat and riparian habitat effectiveness which would be used to monitor the project. NE should identify specific measures to implement mitigation.

8. **NE Impacts to Recreation:** The FEIS fails to acknowledge hunting is a significant recreational resource, especially because the CIA is not considered a trophy hunting area. (page 4-19). Trooper hunting is an appropriate criterion for determining recreational opportunity. Harvest data in Chapter 3 (Tables 3-29 and 3-30) demonstrate substantial hunting takes place throughout the region. To request the FIS acknowledge hunting in an important recreational activity within the CIA.

9. **NE Buffer Issues for Terraplane Rock Bats:** The FEIS states, "Buffer zones would not exceed 100 feet from the edge of the site if the disturbance was no more than 120 feet away" (p. 4-29). Should the word "not" be deleted from this statement?

10. **NE Gathering Systems:** The proposed drilling area contains several winter ranges and migration routes used by antelope, sheep, above-ground pipelines can become barriers to antelope, sheep and other big game, particularly pronghorn antelope. NE should clarify whether any elevated gathering system or transmission piling will exceed 10' in diameter or will be elevated to a height exceeding 42'. If above-ground pipes will exceed either of these criteria for more than 1 mile of continuous length, we request the FEIS include a commitment to bury 50-ft segments or build 50-ft wide corridors to avoid obstructions.

Ms. Julie Hamilton
May 17, 1995
Page 4 - SIS 6433

The document will contain references to the draining of riparian areas for developing agricultural sediment. Based on our understanding, these statements appear to be in error. The riparian area has been defined in the plan for the purpose of dam repair, but no dredging or sediment occurred. We suggest clarifying these statements, if they are indeed appropriate, or deleting them from the final FIS.

Thank you for the opportunity to comment.

Sincerely,
Joe White
JOE WHITE
DEPUTY DIRECTOR

JW/TJCS
cc: Wildlife, Fish, NRS Division

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Ms. Julie Hamilton
May 17, 1995
Page 5 - SIS 6433

overgrowth at 15-10 intervals. All above-ground pipelines, regardless of size, should be at least 1 inch of ground clearance to allow movement of small mammals and reptiles.

11. **NE Range Impacts:** We request the FEIS provide a commitment to include a wildlife avoidance program during near employee orientation. This program should discuss ways to minimize human impacts on wildlife, legal protection for wildlife, and recreational opportunities. A 15-minute VHS version is available on loan from the NRS Information and Education Section in Cheyenne. An advance notice and personnel may accompany the program to provide additional discussion to avoid obstructions.

12. **NE Wildlife Nest Disturbance:** To reduce the potential for big game collisions, a conservative speed limit should be posted on all access and service roads. Forty-five mph is recommended. The FEIS should establish this as a condition for the project.

13. **NE Buffer:** There is no discussion of measures to minimize noise-related disturbance (page 4-21). To reduce the potential impact on sensitive wildlife species, particularly song groups during the breeding season, noise producing activities should be limited to less than 95 dB at 100 ft from the source. The FEIS should establish this as a secondary condition for the project.

Aesthetic Considerations:
Our review of the document indicates most of our previous comments have been incorporated. We found two areas still in need of clarification.

The practice of withdrawing water from the Green River by truck was discussed in the document, including any of our recommended mitigation measures. However, we could find no mention of any attempts at controlling the number of such sites utilized. We are presently aware of one site that was used extensively and one or two other used to a lesser extent. Continued use of these areas is acceptable and would help minimize potential fish habitat impacts. We recommend that NE contact fisheries personnel in our Green River region office to determine the locations of these sites. We also recommend no additional sites be established for this practice.

State of Wyoming
Oil and Gas Conservation Commission

Ms. Julie Hamilton
May 17, 1995
Page 5 - SIS 6433

Ms. Julie Hamilton
Office of the Superior
State Capitol Building
Cheyenne, WY 82002

Comment Letter #18

Re: Pontenelle Natural Gas Infill Drilling Project

The Pontenelle Natural Gas Infill Drilling Project is located in the State of Wyoming. The project is a gas well located in the State of Wyoming. The project is a gas well located in the State of Wyoming. The project is a gas well located in the State of Wyoming.

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The impact on the environment from this project will be minimal. The project is a gas well located in the State of Wyoming. The project is a gas well located in the State of Wyoming. The project is a gas well located in the State of Wyoming.

Carol White
Carol White
Deputy Director

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WYOMING STATE GEOLOGICAL SURVEY
804 308 UNIVERSITY STATEN A. LEAHNE WYOMING 82002 3028
(307) 766-2264 • FAX 307 766-2625
STATE GEOLOGIST: Gary S. Gann

United States Department of the Interior
BUREAU OF LAND MANAGEMENT
1915 NORTH WYOMING STREET
DENVER, COLORADO 80202
Comment Letter #19

May 3, 1995

Comment Letter #17

MEMORANDUM

TO: Julie Hamilton, Wyoming State Clearing House
FROM: Gary B. Glass, State Geologist
SUBJECT: Draft Environmental Impact Statement for the Fontenelle Infill Drilling Project (State Identifier #91054)

We have reviewed the Draft Environmental Impact Statement for the Fontenelle Infill Drilling project and submit the following comments:

Item 1. We want to stress that the economic value of these projects are substantial to cities, counties, and the State of Wyoming. Existing State and Federal regulations are more than adequate to assure continued responsible development of this already developed area. Both the State and the nation use natural gas as an essential and growing component of the energy sources available to their citizens. As domestic oil reserves diminish, the significance of natural gas can only increase, and development of the natural gas resources in Wyoming are very important in providing for the nation's energy needs.

Item 2. Referring to the discussion of geologic hazards in Section 3.11 on page 3-30, we want to note that this area is within Seismic Zone 2 of the Uniform Building Code. A magnitude 6.1 earthquake is the largest that might reasonably be expected in this area. The project, however, are within 35 miles of the Rock Creek and the Star Valley faults, both of which are capable of generating a magnitude 7.0 - 7.5 earthquake. Seismic potential is especially important if a critical facility, as defined by the Uniform Building Code, is proposed in the area.

Item 3. In Section 3.12, we note that there is also a potential for finding mammal fossils in the Bridge Formation. Considering the abundance of paleontologic resources in this area, the activities of these projects are not likely to have a significant adverse effect on those resources.

If you have questions on our comments, you may contact Mr. Jim Case (geologic hazards), or Alan Ver Plog (paleontologic resources).

GRB:uj
cc: Jim Case
Alan Ver Plog

Date of Issuance: May 3, 1995

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Julie Hamilton

Ms. Julie Hamilton
May 17, 1995
Page 5 - SIS 6433

overgrowth at 15-10 intervals. All above-ground pipelines, regardless of size, should be at least 1 inch of ground clearance to allow movement of small mammals and reptiles.

11. **NE Range Impacts:** We request the FEIS provide a commitment to include a wildlife avoidance program during near employee orientation. This program should discuss ways to minimize human impacts on wildlife, legal protection for wildlife, and recreational opportunities. A 15-minute VHS version is available on loan from the NRS Information and Education Section in Cheyenne. An advance notice and personnel may accompany the program to provide additional discussion to avoid obstructions.

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Aesthetic Considerations:
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The practice of withdrawing water from the Green River by truck was discussed in the document, including any of our recommended mitigation measures. However, we could find no mention of any attempts at controlling the number of such sites utilized. We are presently aware of one site that was used extensively and one or two other used to a lesser extent. Continued use of these areas is acceptable and would help minimize potential fish habitat impacts. We recommend that NE contact fisheries personnel in our Green River region office to determine the locations of these sites. We also recommend no additional sites be established for this practice.

State of Wyoming
Oil and Gas Conservation Commission

Ms. Julie Hamilton
May 17, 1995
Page 5 - SIS 6433

Ms. Julie Hamilton
Office of the Superior
State Capitol Building
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Comment Letter #18

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Carol White
Carol White
Deputy Director

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Public Service Commission
800 WEST 1ST STREET
CHEYENNE, WYOMING 82002
(307) 777-7421
FAX (307) 777-7422

Comment Letter #18

JM 05/03/95

MEMORANDUM

TO: MS JULIE L. HAMILTON
POLICY ANALYST
GOVERNOR'S OFFICE
FROM: JON P. JACQUOT
ENGINEERING SUPERVISOR
PUBLIC SERVICE COMMISSION

DATE: MAY 10, 1995
RE: ENVIRONMENTAL IMPACT STATEMENT FOR THE FONTENELLE NATURAL GAS INFILL DRILLING PROJECT, STATE IDENTIFIER NO. 91054

Thank you for the opportunity to comment on the referenced matter. The Commission requests that no unreasonable restrictions be placed on the provision of referenced gas.

The Commission requests that, in cases involving oil and gas leasing, the Bureau of Land Management not restrict the construction of utility and pipeline facilities necessary for the exploration and production of oil and gas.

If you should have any questions regarding this matter, please let me know.

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United States Department of the Interior



ECOLOGICAL SERVICES
4800 Myrtle Avenue
Cheyenne, Wyoming 82001

Comment Letter #20

ES-4411
mej/wj(Olivera.com)

June 29, 1995

To: District Manager, Bureau of Land Management, Rock Springs District, Rock Springs, Wyoming
From: Field Supervisor, Ecological Services, Cheyenne, Wyoming
Subject: Fossilisite Natural Gas Field Drilling Project Draft Environmental Impact Statement

Thank you for the opportunity to review the subject document (Statement). The U.S. Fish and Wildlife Service (Service) has commented extensively on past oil and gas development projects in southwest Wyoming, most recently the Moss Arch project. My primary concern has been that the analysis here has not adequately addressed the cumulative impacts of oil and gas development on wildlife resources. The Fossilisite Statement makes progress in this area, as evidenced in the modeling done by PH Technologies, Inc., in the technical report accompanying the Statement. However, since the model addressed only procedures, noise, odor, and light glare, many conclusions forwarded in the Statement, particularly regarding threatened, endangered, and candidate species, are generally vague or a mere tally of the number of acres of potential habitat impacted, rather than an analysis of the direct, indirect, and cumulative impacts of this form of habitat. As indicated in previous correspondence and during meetings with the Bureau of Land Management (Bureau), the submission of impact level data of habitat represents only the first step on cumulative impact analysis. Subsequent steps need to identify the actual biological/ecological/cumulative impacts. In fact, this Statement provides only a subset (percentage) of data that 200 words of discussion of cumulative impacts to special status species (Section 4.2.1.5).

As stated in our comments on the Moss Arch Draft Environmental Impact Statement, the Service believes adequate information is not currently available to effectively assess cumulative impacts on wildlife resources. This concern is supported by the Statement's discussion on page 4.0.0 stating, "Because of insufficient data about their populations, habitat use patterns and distributions, future cumulative impacts to these species can not be quantified." I understand the difficulty in determining the magnitude and extent of issues to be addressed in cumulative impact analyses. I have however identified adequate techniques for assessing cumulative impacts will be difficult. Furthermore, I believe an even higher priority, particularly

perhaps more difficult task, is securing financial resources for Bureau efforts such as the Southwest Wyoming Evaluation and Cumulative Effects Taskforce. While I commend the Bureau for initiating these programs, I believe the program needs and budget for the future is a firm commitment by the Bureau to assess and modify Bureau actions to reduce cumulative impacts to surface resources. Without secure funding, Bureau initiated programs are unlikely to provide useful and timely information regarding cumulative impacts associated with energy development.

Because this proposed action is one of many ongoing and proposed energy development projects in Wyoming (such as Moss Arch, Brown, Lathrop, and Continental Divide) and therefore, contributes incrementally to the cumulative impacts on wildlife resources, the Bureau should include in the Statement discussion of how cumulative impacts are currently being addressed in a Southwest Wyoming Evaluation, Cumulative Effects Taskforce, etc. I find sufficient information is available to adequately assess the cumulative effects, rather than only tally impacted acres. I believe the Bureau is compelled by the National Environmental Policy Act to disclose the relevant information needed to make "no significant impact" determinations is lacking. To do otherwise may result in false conclusions about cumulative impacts based on misapplication of assumed biological information.

Below, please find my specific comments and concerns with aspects of the Statement that relate to threatened, endangered, or candidate plants and animals, as well as migratory birds.

Dispersants, Page 2.5. I question the validity of assuming no surface disturbance associated with the placement of the Dallen gathering system. Although it is an above ground system, I would assume a certain amount of surface disturbance would accompany the traffic associated with construction and maintenance of the pipeline.

Black-footed Ferrets, Page 4-77. While the Bureau prohibits the address prairie dog black-footed ferret survey requirements, the information on prairie dog surveys comply's use and distribution within the analysis area as presented in the Statement is not adequate to reflect the potential value of the prairie dog surveys completed for future ferret reintroductions or the need for surveys, in accordance with the Service's 1989 Black-footed Ferret Survey Guidelines. Mapping of the complexes should occur early in the planning process as the size and distribution of the complexes will help determine the need for surveys, as well as the value of the complex to future reintroductions efforts. The need for surveys can be addressed after the complex is complete and site specific plans for development are generated.

The Service is interested in maintaining the size and distribution of large prairie dog complexes in Wyoming. Complexes in excess of 1,000 acres may provide suitable sites for future reintroductions. Though we currently do not maintain a list of mechanisms for preventing potential future reintroduction sites, information on the size and distribution of large prairie dog complexes is valuable. Provided the complex retaining program successfully preserves sufficient surface to meet the current demand at existing reintroduction sites, the Service may eventually

seek additional sites for reintroduction. To ensure that large complexes in the project area retain their current value as potential reintroduction sites, the Service recommends the following actions be implemented during development of the fields:

- Site Access and Preparation**
- Algae needs to avoid significant effects to prairie dog colonies and sensitive vegetation.
 - Install adequate drains to manage natural waterways and prevent erosion. Changes in water flow requires care during construction of surface drainage.
 - Incorporate present and future land uses in the design and alignment of facilities and roads to maintain total habitat loss and riparian disturbance.
 - Use the minimum width roadway necessary to meet short- and long-term land use plans.
 - If roads cannot avoid prairie dog colonies, design and lay-out roads that cross prairie dog colonies through: (1) the lowest prairie dog density areas (< eight burrows per acre), (2) the edges of prairie dog colonies, or (3) the narrowest extent of the colony as possible.

- Well-site Construction**
- Avoid locating well-sites in prairie dog colonies or use directional drilling techniques.
 - Maximize area affected by containing equipment and activities within the well site and rights of way.
 - Well-sites in prairie dog colonies should be located in low density prairie dog areas (< eight burrows per acre).

- Long-term Protection**
- Establish treatment and storage facilities of prairie dog colonies.
 - Oil residue and other contaminants from well site may be hazardous to wildlife. Remove hazardous materials to approved off-site facility before filling and reclaiming pits.
 - Mitigate significant habitat disturbances and losses occurring on colonies.

Placement of Controlled Production Facilities

- These facilities should be located off prairie dog colonies.

Pipeline Installation

- Avoid placing pipelines through prairie dog colonies.
- Where avoidance is not possible, pipelines should be routed through prairie dog colonies less than 30 acres and prairie dog burrow densities less than eight burrows per acre.
- In larger colonies, pipelines should cross the colony at its narrowest point and near the colony edge to minimize disturbance within the colony.
- Topsoil salvage and the double-trenching technique should be considered when burying large pipes. While this may disturb more surface, more rapid reclamation of vegetation should also occur. To minimize disturbance for smaller pipes, options such as the use of direct burying, post-till pipe, and other methods should be explored.
- Prevent waste water discharge in or near prairie dog colonies, unless appropriate State and Federal water quality standards are met. Even then, the quantity of discharge should not result in burrow inundation.

Spills and Cleanup

- Low-impact cleanup techniques should be used for spills within 1/8 mile of a prairie dog colony. Carefully consider the effects of dispersants, emulsifiers, and other chemical agents on prairie dogs and vegetation in the cleanup strategic plan.
- Spills on prairie dog colonies should be contained to avoid contamination of nearby prairie dog colonies.

Abandonment

- Due to the transient activities of prairie dogs, burial of drilling mud and other wastes must be carefully engineered, monitored, and coordinated. Mud removal from prairie dog colonies is recommended to avoid future significant impacts.
- Habitat enhancements may be recommended in some areas to encourage prairie dogs.
- Removal of concrete or other impervious surfaces and equipment is beneficial and recommended.

* Dry hole markers greater than 12 inches above ground level should be avoided or made removable for future parking. Remaining existing dry hole markers encourage riparian parking is also recommended.

Water Depletions from Green River Drainage, Page 4-74. As discussed in this section, based upon the best scientific and commercial information that is currently available, it is the Service's biological opinion that water depletions from the Colorado River system, such as those associated with the proposed project, are likely to jeopardize the continued existence of the Colorado riverless shrew, lesser and greater sage-grouse, and the greater sage-grouse or adverse modification of their critical habitat. The Service has developed reasonable and prudent alternatives to avoid the likelihood of jeopardy to the endangered fishes and to avoid destruction or adverse modification of their critical habitat. In the development of the reasonable and prudent alternatives, the Service has determined that project depletions impacts, which the Service has estimated to be less than one percent of the total available water, can be offset by (a) the water project proponent's one-time contribution to the Recovery Program in the amount of \$12.11 per acre-foot of the project's average annual depletion, (b) appropriate land practices of riparian forest permanent to State land, and (c) accomplishment of activities necessary to recover the endangered fishes as specified under the Recovery Implementation Program. Riparian habitat study, however, the Service noted it is essential that protection of stream flow proceed expeditiously, before significant additional water depletion occur.

In past discussions with the Bureau, the Service has expressed its desire to deal with water depletions from the Colorado River system as a result of energy development in southwestern Wyoming in a program-based consultation, rather than on a case-by-case basis, as it currently does. The Service commends this program-based approach would result in reduced paperwork and some savings for all parties, including the Bureau, Service, and operators. Used such time as a programmatic consultation in upstream, water depletion in relation to be consulted on a project-by-project basis.

Although depletion has been proposed by several companies in the area containing the Cumulative Impacts Analysis delineated in the Statement, the Service considers this one project and, therefore, considers the water depletion associated with this project to be 995 acre-feet (the total of depletions associated with the Dallen and Lincoln Field projects of the project). The Bureau should contact the Service as soon as possible to request issuance of formal consultation on this water depletion. Early progress with the Service will assure the Bureau of timely completion of the consultation process and, thus, facilitate adherence to schedule proposed by the project proponents.

Raptors, Pages 4-75, 79. On page 4-75 the Statement indicates the Bureau has adopted a 1 mile buffer zone around nesting ferruginous hawks to avoid disturbing them with human activities, yet the mitigation measure on page 4-79 discusses a 0.5 mile buffer during the reproductive period and a 1/2 mile buffer around nesting sites of northern baldpate.

This mitigation measure is inconsistent with the accepted Bureau buffer zone and is not effective in protecting the long-term productivity within riparian nesting territories. Timing restrictions to provide protection during the nest of construction, but do not protect nests in the future. The 1/2 mile buffer around the nests during the breeding season would allow production facilities to be located immediately adjacent to (within 1/4 mile) of nests that produced young. For some species, particularly ferruginous hawks, this close juxtaposition may be inhumane, and nests may facilities may not be used again. Although the lack of one nest may result in an overall impact, the proposed development does not preclude the riparian opportunity to replace the remainder of their territory. This may lead to reduced long-term productivity of some riparian species within the project area.

To minimize impacts of development on nesting raptors and the productivity of the Bureau and producers, an effort for taking under the Migratory Bird Treaty Act, the Service believes additional protective measures are necessary. Filing with similar riparian nesting energy development issues, the Service, in consultation with the Bureau's Plate River Resource Area and producers, developed a riparian management plan for the Cave Creek Field Development. Portions of the Riparian Management Plan were provided to the Bureau along with our comments on the Moss Arch project. The Service believes a similar riparian management plan should be developed for this project.

In order to obtain sufficient information to develop a timely riparian management plan for the Fossilisite area, I recommend our staffs meet soon to discuss data needs and management alternatives. Mary Jennings, of my office, will be the Service contact for this project.

Bald Eagles, Page 4-78. This section indicates the potential for impacts to bald eagles, but these impacts would be minimized with the imposition of appropriate buffer areas. Please provide the Service with a description of the buffer area size and duration, as well as a discussion of the criteria to be used to determine when the buffer area will be required.

Mountain Ptarmigan, Page 4-77. Although your cover letter indicates that the Bureau has determined the proposed action is not likely to contribute to the need to list any candidate species, the Statement indicates the proposed action would result in the loss of a total of 1/16 acre of potential mountain ptarmigan habitat as a result of construction-related and production-related disturbances. This may represent a significant impact to mountain ptarmigan and should potentially contribute to the need to list the species. The potential indirect impacts on habitat suitability should also be considered as they may also be significant. The cumulative impacts of this action and other concurrent actions in the region are not addressed at all.

The Service concurs with the mitigation measures outlined on page 4-79 to minimize impacts to mountain ptarmigan if they are found to be nesting or raising young in a site planned for development. I assume that surveys for mountain ptarmigan will be required in all suitable habitat to facilitate this mitigation. Listed below are the Service's recommended survey guidelines. While the Service agrees that ptarmigan surveys, avoidance of nesting and brood

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...ing areas, and timing restrictions will lessen the chance of direct impacts to and mortality of individual mountain plovers in the area. These restrictions do nothing to mitigate indirect effects, including changes in habitat suitability and habitat loss. Surveys are, however, a necessary starting point.

• Visual observations of the area within 1/4 mile of the proposed action and 100 yards of proposed access roads should be made to detect the presence of plovers. All plovers located should be observed long enough to determine if a nest is present.

• These observations should be made from a stationary vehicle, as plovers do not appear to avoid vehicles.

• If no visual observations are made from vehicles, the area should be surveyed on ATVs. Extreme care should be exercised in leaving plovers due to their highly sensitive and quiet nature. Surveys by foot are not recommended because plovers tend to flush at greater distances when approached using this method. Flushing nests during foot surveys is more difficult because of the greater flushing distance.

• Surveys should be conducted no more than 14 days prior to the date actual ground disturbance activities begin. If two surveys are required, they should be made at least 14 days apart, with the last survey no more than 14 days prior to the start-up date.

• The number of surveys required to clear a site for mountain plover prior to beginning a planned activity is dependent upon the start-up date, as shown below:

Date of planned activity	Number of surveys required
March 15 through April 15	1
April 15 through July 15	2
July 15 through August 15	1

• If an active nest is found in the survey area, the planned activity should be delayed at least 30 days. If a brood is observed, activities should be delayed at least seven days.

• Grading activities and new road construction should be minimized during the period from May 25 through June 30 to lessen hazards to early developing chicks. More plover activity has been identified on established roads than on two-tracks.

• No new surface disturbing activities should be allowed during the reproductive period, March 15 through August 15, in identified concentration areas. These are defined as areas where brood and/or adults have been documented in at least two of the past three years.

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designed for raptor protection shall be in accordance with Suggested Practices For Raptor Protection on Power Lines, The State of the Art, Raptor Research Report No. 4, 1981, published by the Raptor Research Foundation, Inc. (also cited in FR 11620, 1984), provided that such structures meet with the National Electrical Safety Code. Methods to minimize the potential for collisions with power lines are presented in Migrating Bird Collisions with Power Lines: The State of the Art in 1984. Avian Power Line Interactions Committee, 1984, published by the Edison Electric Institute. Authority for these measures resides with Section 4 of the Endangered Species Act of 1973 (as amended), the Migratory Bird Treaty Act and the Bald Eagle Protection Act which protects bald and golden eagles. In the above cited Federal Register publications, the following bulletins are also recommended: REA Bulletin 40-7, National Electrical Safety Code-ANSI C7, 1961 Edition and REA Bulletin 61-46, Powerline Contacts by Eagles and Other Large Birds.

The Service concurs with your determination that the proposed action is not likely to adversely affect the endangered whooping crane (*Grus americana*) or peregrine falcon (*Falco peregrinus*). At this time the Service does not have enough information to concur with your determination that the proposed action is not likely to affect the endangered bald eagle (*Haliaeetus leucorhynchus*) or black-footed ferret (*Mustela nigripes*). Our information needs are outlined above. The Service also has outlined concerns regarding potential impacts to the mountain plover and ferruginous hawk, as well as other migratory bird species. My staff looks forward to discussing these concerns with you.

If you have any questions, please contact me or Mary Jennings of my staff at the interlock address or phone (307)772-5374.



Charles P. Davis

cc: Director, WGF/D, Cheyenne, WY
Nemagne Coordinator, WGF/D, Lander, WY

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RESPONSES TO COMMENTS ON THE DRAFT EIS

Mitigation, Page 4-79 and Chapter 5 - I am confused regarding mitigation measures.

Chapter 5 indicates mitigation measures specified in the Record of Decision will include those measures discussed in Chapters Two and Four, as well as standard stipulations required by the Green River Resource Management Plan, the Bureau, and, perhaps, some additional measures. Chapter Two describes some measures related to construction and operation of the project that will provide protection for wildlife resources, such as using tanks rather than open pits for storage of waste water. Several measures are outlined in section 4.21.6.4, but the first paragraph of the section refers to these measures in addition to those in the Resource Protection Alternative. Would these mitigation measures apply to the Proposed Action also? The measures are worded in a manner to make it seem that the mitigation would, as to be voluntary and at the discretion of the project proponent (phrases such as "operators should... features should... surveys should... etc.). There should be a commitment by the Bureau to enforce these mitigation measures if they are to be depended upon to prevent impacts to listed or candidate species and migratory birds.

Cumulative Impacts, Page 4-79 - I am uncertain how the Bureau concluded "loss associated with oil and gas development are negligible," when, in the same paragraph, the Bureau states, "Because of insufficient data about their populations, habitat use patterns and distributions, future cumulative impacts to these species cannot be quantified." Please provide more information on how this determination was reached.

The cumulative impacts section should also identify other proposed projects that are related to this project. I believe this would include all approved and proposed oil and gas development projects in south-western Wyoming, as well as associated support activities including, but not limited to, facilities to handle production and marketing, disposal sites for hazardous waste, and increased access into the vicinity. Therefore, the cumulative impact analysis should not be limited only to soil disturbing activities within the "Cumulative Impact Study Area," but should include a variety of activities taking place in south-western Wyoming and potentially impacting wildlife resources. Furthermore, the Service needs some sort of description of the potential cumulative impacts to listed and candidate species resulting from these newly proposed oil and gas development projects. While I acknowledge that future projects need not be considered in cumulative impact analysis for section 7 consultation (future projects will undergo their own section 7 consultation), many oil and gas development projects have been proposed and are currently in consultation or have recently completed consultation and should, therefore, be considered in the cumulative impact analysis of this project.

Power Lines - I found no commitment to mitigate potential collision and electrocution hazards to migratory birds, particularly raptors. Two primary causes of raptor deaths are electrocutions and collisions with power lines. If any part of this project will involve construction of new power lines or modification of existing lines, the Service urges the Bureau to take several precautionary measures to prevent raptor and other migratory birds through proper raptor proofing techniques. Federal Register 49 Section 1779.10, 1984, allows for deviations from REA construction standards for raptor protection. Structures which are

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Responses to Specific Comment Letters

Responses to comments are organized by responder and are numbered in the order received. Page and section numbers, unless otherwise noted, refer to the draft EIS issued in April, 1995.

Wyoming Advocates For Animals

Comment 1-1. The DEIS considers potential impacts on wild horses in the analysis of impacts to grazing and range resources (see Sections 3.16, 4.19). As noted in the DEIS, the Little Colorado Desert herd management area which encompasses the project areas is currently being managed for 69 to 100 wild horses. Conflicts between oil and gas development and wild horses are minimal to non-existent. Very few wild horses use the area at the present time and additional development is not expected to result in direct negative impacts to wild horse populations. Potential conflicts with wild horses and livestock exist with the use of available water. Most, if not all water, except that found in the Green River, is controlled by the livestock operators through the pumping of wells. While wild horses are protected by Federal regulation, BLM does not consider wild horses a threatened or endangered species. Forage for wild horses is managed under BLM's wild horse program.

Office of Planning & Development, Lincoln County, Wyoming

Comment 2-1. BLM must complete the process required by the National Environmental Policy Act before a decision can be issued to proceed with intensive infill development.

Wyoming Department of Environmental Quality - Air Quality Division

Comment 3-1. BLM has communicated with the Wyoming Department of Environmental Quality regarding this letter and considered all the points and issues raised in developing the expanded air quality cumulative impact analysis. The expanded analysis has been completed and reviewed by the Wyoming Department of Environmental Quality - Air Quality Division. This analysis can be found in the expanded air quality analysis section found in Section 2, Addendum of the FEIS. The analysis of potential impacts to air quality has been expanded to consider potential, cumulative impacts in the region which includes the Fontenelle and Moxa Arch project areas.

Comment 3-2. Potential impacts from all pollutants cited have been considered in the expanded analysis of potential air quality impacts. The responder notes that the cumulative impacts of activities "are significant." In the NEPA process, BLM has used Federal and State air quality standards to be significant. BLM is also interested in evaluating the oil and gas emissions totals/impact from NO_x and VOC and has provided additional analysis of potential impacts. BLM has not been provided with any data which would indicate where Federal and State air quality standards are being violated in the Fontenelle area. The results of the expanded air quality impact analysis (see Section 2 Addendum of the FEIS) confirm that no violations are likely.

The responder notes that "The Air Quality Division does not currently have indications of general exceedances of standards from any of the criteria pollutants in the Fontenelle/Lincoln Road/Moxa area..." BLM understands that several of the operators in the Fontenelle area, at the request of the Division, have provided it with estimates of emissions from their field operations. To date, the Division has not found that the problem requires it to regulate natural gas drilling. Emissions from compressors are, and would continue to be, regulated by the State.

Comment 3-3. BLM is participating on the study team. It is BLM's understanding that the purpose of the study is, first of all, to define the location and extent of the problem. Trona mining, coal mining, gravel pits, housing developments, out-of-state sources, naturally occurring dust, Interstate-80 traffic and many other sources potentially contribute to visibility impacts. The intention of the study is not to develop a list of responsible parties.

Comment 3-4. The concerns expressed have been addressed in the expanded analysis of potential air quality impacts found in Section 2 Addendum of this FEIS.

Comment 3-5. The concerns expressed have been addressed in the expanded analysis of potential air quality impacts found in Section 2 Addendum of this FEIS.

Comment 3-6. Table 1-1 has been corrected to include Air Quality Division permitting/approval for compression sites, flaring, and other natural gas production and processing facilities. These approvals were not included in the list of authorizing actions because the Proposed Action does not call for the expansion of existing compressor stations. The companies estimate that existing compressor stations would be adequate for the foreseeable future. Field compressors are addressed in the expanded air quality analysis found in this final EIS. It must be remembered that much of the proposed production would be offset by declining production from existing wells. However, should expanded compressor stations become required, they must be permitted under Federal and State air quality regulations at which time BLM would expect the Air Quality Division to specify appropriate emissions reduction technologies to ensure conformance with Federal and State air quality regulations. Similarly, the Air Quality Division already reviews emissions from field compressors and specifies appropriate mitigation where necessary. If natural gas drilling and wellhead activities were found to constitute a significant source of pollutants, the Division could choose to regulate them.

Comment 3-7. Under BLM Onshore Order No. 1, the companies must comply with applicable Federal and State air quality regulations and submit appropriate permit applications to the Air Quality Division. At that time BLM anticipates that the Division would specify appropriate mitigation measures to ensure that regulated facilities are in compliance with Federal and State regulation. For example, as part of the permit process for compression units the Division usually requires low NO_x burners on compressor engines. It is BLM's understanding that the Division has not sought to regulate other field facilities because they, in terms of Federal and State regulations, constitute an insignificant source of pollutants and potential violation of Federal or State regulations has not occurred. BLM reviews the need for Vapor Recovery Units and venting of dehydration units as part of its APD process. The gas produced in the project areas tends to be a dry gas which requires minimal dehydration. BLM does not consider air quality monitoring a mitigation measure but would cooperate with the Division if it intends to establish additional monitoring stations within the Fontenelle area.

Lacking regulatory authority over air quality, BLM must look to Federal and State agencies for indications that oil and gas development activities are resulting in a substantial impact to the environment. Such impacts must be disclosed as part of the NEPA process. Definitions of "substantial impact" or "significant impact" will vary but BLM has decided to define such an impact which would result in a violation of Federal or State air quality regulations. The air quality analysis included in this FEIS indicates that while some impact to air quality is likely, proposed activities are unlikely to result in a violation of Federal or State regulations.

Comment 3-8. BLM understands that DALEN Resources had previously supplied the Division with estimated emissions of HAPs from its wellhead facilities and that none of the facilities were considered major emitters. The expanded air quality analysis in Section 2 Addendum addresses the level of HAP's.

Comment 3-9. Developing reasonable estimates of future, long-term emissions from construction and production activities is infeasible for several reasons. First, as noted in the DEIS, future construction and production would depend upon future gas prices which are notoriously fickle. Second, baseline conditions would vary over time as old wells are retired and new wells come on line. In this case of "reservoir replacement" a new well does not necessarily constitute an additional source of pollutants. Finally drilling constitutes a temporary source. Drilling activity and associated emissions would vary greatly from year to year depending upon natural gas prices, the type of rigs available, geologic conditions which affect drilling rates, and restrictions, such as crucial winter range, that effectively prohibit drilling in some areas from November 15 through April 30. For this reason, the expanded air

quality analysis found in this FEIS uses a typical well field development scenario to estimate emissions and the potential for violations of Federal and State air quality regulations.

Comment 3-10. See response to comments #3-7 and 3-9. Also see assumptions used in the expanded air quality impact analysis found in Section 2 Addendum of this FEIS.

Comment 3-11. See the expanded air quality impact analysis found in Section 2 Addendum of this FEIS.

Comment 3-12. The companies estimate that no additional centralized facilities would be required. Wellhead facilities (e.g., field compression and dehydration) have been addressed in the expanded air quality impact analysis found in Section 2 Addendum of this FEIS. Estimating additional compression needed in the Fontenelle area would be difficult for several reasons. First, future production from the proposed wells cannot be estimated. Second, many of the proposed wells are essentially replacement wells; that is, declining production from existing wells is offset by production from proposed wells. Third, reservoir characteristics and pressures affect where and when compression is needed. Finally, final design of proposed gathering lines (e.g., pipe diameter) can substantially affect where and when compression is needed. If additional compression is needed, impacts to air quality would be minimal as BLM expects that the Air Quality Division would require the companies to comply with Federal and State air quality regulations and standards. Federal regulations (43 CFR 3162 - *Requirements for Operating Rights Owners and Operators*) require that "the operating rights owner or operator, as appropriate, shall comply with applicable laws and regulations..." BLM requires that oil and gas operators on Federal lands comply with applicable Federal and State regulations and, if requested, provide evidence of such compliance.

DALEN Resources

Comment 4-1. See Section 2, Errata.

Comment 4-2. The Wyoming Game & Fish Department recently changed the boundaries of pronghorn ranges. These new range boundaries were reflected in the analysis conducted for the DEIS and the wildlife models technical report. A correct version of Figure 3-13 was included in the technical report. Figure 3-13 in the DEIS included a drafting error which has been corrected in the FEIS (see Section 2, Errata).

Comment 4-3. BLM requested additional information on the costs and feasibility of directional drilling from the companies. This information has been considered in an expanded analysis of directional drilling completed by BLM. Details of this analysis may be found in Appendix B of the FEIS. See Section 2 Addendum to the DEIS that addresses directional drilling.

Comment 4-4. BLM notes that DALEN has agreed to implement the changes made after BLM developed the Resource Protection Alternative. The DEIS called for *consideration* of directional drilling. While directional drilling is technically feasible, the economic feasibility of directional drilling over the next 10 years in the Fontenelle area would depend upon many variables, including reservoir characteristics, the price of natural gas and expected production from proposed wells based on local geologic conditions. BLM believes that directional drilling should be used in special cases where unique surface resources (e.g., cultural sites eligible for the National Register of Historic Places, Fontenelle Reservoir, wetlands, etc.) would be irretrievably lost if conventional drilling were used. Widespread use of directional drilling to reduce surface disturbance is not expected to be feasible over the next 10 years. See addendum in Section 2 for clarification; see Appendix B for details of this analysis.

Comment 4-5. The comment raises legitimate points regarding the savings, costs and feasibility of directional drilling which have been considered in BLM's expanded analysis of directional drilling (see Section 2 Addendum and Appendix B). The costs of additional pipeline and road construction and eventual reclamation of all surface disturbance when a well is abandoned were considered; however, this is a relatively minor part of the cost of drilling a well. Additional information on the costs and feasibility of conventional versus directional drilling was

solicited from BLM, company and industry experts. This information has been considered and wording changes incorporated into the directional drilling addendum (see Section 2).

Environmental Protection Agency

Comment 5-1. The "Resource Protection Alternative", BLM's preferred alternative, provides for all practicable means to avoid or minimize environmental harm. The FEIS has expanded the evaluation of impacts for air quality and cumulative effects. See Section 2 Addendum and Appendix A.

Comment 5-2. The proposed activities analyzed in this EIS are in no way connected--either infrastructurally, geologically or spatially--with proposed oil and gas activities in the Moxa area or in other parts of southwest Wyoming. Infill drilling projects in the Fontenelle, Moxa and other areas have independent utility; in other words, they are not dependent on the other for their completion, operation or success. Approval of the Fontenelle infill drilling projects would in no way result in a commitment to proceed with any other oil and gas project in southwest Wyoming; nor would it prejudice review, analysis or BLM decisions regarding other projects in the region.

BLM initially began this NEPA process with scoping for a document that would address infill drilling in the Lincoln Road area. However, about that time other companies independently approached BLM regarding additional infill drilling in the Fontenelle area. To avoid "piecemeal analysis" BLM prepared one environmental impact statement that would address all the infill drilling projects being proposed in the DALEN and Lincoln Road project areas by several oil and gas operators. These infill drilling projects were combined into one NEPA document because they overlapped geographically, essentially shared the same road and pipeline infrastructure, tapped similar natural gas reserves and would affect the same communities (e.g., LaBarge). For purposes of the EIS, BLM identified a cumulative impact study which would incorporate areas of proposed activities as well as a buffer area around the proposed activities. The "shared boundaries" referred to are boundaries of the cumulative impact study areas--not the areas proposed for development.

In reality, the DALEN and Lincoln Road projects are independent of one another and are not connected actions. Development of the DALEN infill drilling project would in no way affect the feasibility, likelihood, drilling, construction, operation or maintenance of the Lincoln Road project, or vice versa. For example, the level of well drilling that actually occurs under the DALEN project would be unrelated to activities occurring as part of the Lincoln Road project. The project proponent could decide to abandon the DALEN project without affecting the feasibility, construction or operation of the Lincoln Road project.

To further address public concerns about "piecemeal analysis," the Proposed Action considered the "maximum" or "worst case" level of development that could occur in the Fontenelle area over the next 10 years. In this way BLM would avoid a situation of staged developments for which several NEPA documents would have to be prepared. The likelihood that the projected levels of development will be reached is truly remote; therefore the Proposed Action far exceeds the level of reasonably foreseeable development. Nevertheless BLM consider the "maximum" or "worst case" development scenario to inform the public and the BLM decision-maker of the maximum impact that could occur associated with this level of development.

The resources adversely affected by the Proposed Action are largely separate from those affected by other projects in southwest Wyoming. For example, much of the Proposed Action would be constructed upstream of Fontenelle Reservoir which traps sediment added to the Green River. The Proposed Action would occur within different big game herd units, tap different oil and gas reservoirs and affect different visual resources and transportation corridors. The fact that the boundaries of the cumulative impact study areas touch does not indicate any relationship between the two sets of projects. While the respondent is free to take issue with the spatial extent of the cumulative impact analysis, it is important to note that Federal regulations define cumulative impact in temporal terms (40 CFR 1508.7) as:

"...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."

The EIS extensively discussed the cumulative impacts of past, present and reasonably foreseeable actions within the 965 square mile cumulative impact study area. This area was deemed sufficient to encompass possible connected actions and common resources. Federal regulations and the courts give the BLM the latitude to determine the appropriate spatial scale of analysis. The courts have generally deferred to such determinations unless the agency has arbitrarily defined the spatial scale of analysis to diminish the potential significance of the impacts of the project. The cumulative impact study area considered in this EIS extends far beyond that which has been found to be affected by the project. BLM is just completing a resource management plan for the Green River Resource Area which considers the impacts of future oil and gas development and the need for special management and mitigation measures. Section 2 incorporates an explanation of why the Moxa Arch project area is not included within the cumulative impact analysis area for the Fontenelle projects.

Comment 5-3. See response to comment #6-4. It is unclear what the respondent expects to learn by waiting for the results of such an extensive study. NEPA requires the BLM to undertake analysis adequate to expose environmental harms related to implementation of the proposed project. It does not require an encyclopedic or comprehensive compendium of resource data or analyses. BLM believes that its land use planning process, which incorporates extensive public involvement, coupled with the level of analysis provided in the Fontenelle EIS, sufficiently identifies and informs the public and decision-maker of the potential impacts of implementing the DALEN and Lincoln Road projects. The respondent has not identified specific, potential impacts which have been overlooked in the analysis.

Also, the Fontenelle EIS is not the final environmental review of the proposed activities. For example, as part of the Application for Permit to Drill (APD) process, BLM would conduct on-site environmental inspections of proposed well locations and access roads prior to any surface disturbing activity. Relocation or additional conditions of approval--such as those identified in the final Green River Resource Management Plan, a regional evaluation, or changes in Federal regulation--may be required by the BLM at that time.

BLM would continue to review and approve oil and gas development in southwest Wyoming in cases where, following NEPA analysis, the impacts of a proposal are found to be acceptable and in conformance with the BLM's land management goals and policies. BLM believes that the Fontenelle draft and final EISs adequately inform the decision-maker and the public of the potential impacts attributable to a "maximum", "worst case" development which could occur in the Fontenelle area over the next 10 years.

Comment 5-4. These recommendations have been considered in the expanded air quality analysis found in Section 2 Appendix and Appendix A of this FEIS. Also see response to comments found in Comment Letter #3.

Comment 5-5. The EPA has not developed or recommended any specific best management practices for the oil and gas industry. For this reason, the BLM has taken best management practices from a variety of sources and applied them to similar sorts of construction activities associated with oil and gas development. The suggested best management practices described in the DEIS have been successfully applied in the field and have been successfully used on a variety of interstate pipeline projects as well as oil and gas projects elsewhere in the western U.S. Sources of these practices include the following which will also be added to Section 2 Errata:

BLM and U.S. Forest Service. 1989 (3rd ed.). Surface operating standards for oil and gas exploration and development.

Environmental Protection Agency. 1976. Erosion and sediment control: Surface mining in the eastern U.S./Design. Washington, D.C.

Gray, D. and A. Leiser. 1989. Biotechnical slope protection and erosion control. Robert E. Krieger Publishing Company. Malabar, Florida.

Levinski, C. 1982. Best management practices for road activities, Volumes I (Location), II (BMP Catalogue). Idaho Department of Health and Welfare Division of Environment.

State of Nevada Conservation Commission and Department of Conservation and Natural Resources. n.d. Handbook of best management practices. Carson City, Nevada.

State of Washington Department of Ecology. 1992. Stormwater management manual/Technical manual. Olympia, Washington.

Tahoe Regional Planning Agency. 1988. Water Quality Management Plan: Volume II. Handbook of Best Management Practices. Elk Point, Nevada.

The BLM documents violation of environmental laws and regulations under two categories - undesirable events and incidences of non-compliance. Recordation of such events within the Fontenelle Projects area is included in Section 2 Errata.

The DEIS already documents existing impacts to wetlands (see Section 3.17 and Table 3-26). Under the Resource Protection Alternatives, existing roads would be used to the maximum extent feasible; this would minimize the number of stream crossings. In addition, proposed well pads would be a minimum of 500 feet from surface water and at least 100 feet from the banks of intermittent streams shown on U.S. Geological Survey topographic maps.

Comment 5-6. The BLM has no regulatory authority under Federal air and water quality regulations. The responsible regulatory agency is the EPA and/or the Wyoming Department of Environmental Quality. The Department of Environmental Quality has an air quality monitoring station in the cumulative impact study area.

BLM regulates oil and gas operations in the Fontenelle area under 43 CFR 3100. Under BLM Onshore Order No. 1, "...lessees and operators shall be held fully accountable for their contractor's and subcontractor's compliance with the requirements of the approved permit and/or plan." Onshore Order No. 1 requires that all activities comply with applicable Federal, State and local regulations. Failure to do so can result in the shutdown of operations. BLM periodically inspects facilities to ensure their compliance. A recent, in-house environmental audit of DALEN leases in the Fontenelle area found that no violations of air, water or BLM regulations were occurring. BLM cannot require the companies to complete such an in-house audit; however, BLM field inspections have found no systematic pattern of air, water or other environmental violations in the Fontenelle area. When found, BLM inspectors are required to report potential air, water and other environmental violations to the appropriate authority. BLM requests that other regulatory agencies report environmental violations to the BLM District Manager or Resource Area Manager.

Comment 5-7. All possible mitigation measures cannot be considered. Mitigation measures must be reasonable and cannot require illegal actions on the part of BLM or project proponents. BLM cannot deny the right to develop an existing oil and gas lease as a mitigation measure to reduce the impacts on wildlife caused by grazing. Such issues are beyond the scope of this EIS. Various management actions, to balance oil and gas development, grazing and other resource uses, are discussed in the draft Green River Resource Management Plan. The Resource Protection Alternatives already incorporate measures to reduce potential impacts on wildlife (see DEIS sections 2.4.2 and 4.22).

Land and Water Fund

Comment 6-1. It is unclear why the responder would have BLM prepare a supplemental EIS rather than an EIS. BLM has considered all public comments received on the DEIS and where appropriate incorporated changes into the FEIS. See Section 2.

Comment 6-2. Refer to General Comment B. BLM has analyzed the DALEN and Lincoln Road oil and gas operators Proposed Actions as well as Resource Protection Alternatives which incorporate additional environmental protection for sensitive resources. BLM believes that, in comparison to the Proposed Actions, the Resource Protection Alternatives best address the environmental concerns and Federal land policy goals.

While recognizing limits on its authority, BLM has analyzed the impacts of a No Action Alternative. Impacts of implementing the No Action Alternative were analyzed for each potentially affected resource (see subsections labeled "No Action Alternative" in Sections 4.3 through 4.23 in the DEIS). Also see response to Comment #10-9.

The responder has not identified specific, reasonable alternatives which should have been analyzed in the DEIS; nor were such alternatives suggested in the scoping process. The responder has not identified specific unresolved conflicts concerning alternative uses of available resources. Please see the Draft EIS for the Green River Resource Management Plan for indications of how BLM intends to address broad, region-wide trade-offs between resource uses. Under the No Action Alternative, existing management goals and practices would continue. Implementation of the Proposed Action would not affect or foreclose continued implementation of existing management goals and practices.

Analysis contained in the DEIS shows, for example, that past and existing developments have substantially altered the quality of big game crucial winter range (see Table D-1 for example). In addition, the lack of key environmental conditions (e.g., proximity to water) limits the effectiveness of much of the existing, potential wildlife habitat found in the project areas.

Comment 6-3. Private exploration and development of federal oil and gas leases is an integral part of the BLM oil and gas leasing program under authority of the Mineral Leasing Act of 1920 and the Federal Land Policy and Management Act of 1976. Natural gas is rapidly becoming the country's "energy-of-choice" because it is clean burning and less polluting. Federal oil and gas leases have been issued to the companies. Federal regulations (43 CFR 3162 - *Requirements for Operating Rights Owners and Operators*) require the holder of a Federal oil and gas lease to develop that lease in a manner "...which protects other natural resources and environmental quality, and which results in maximum ultimate economic recovery of oil and gas with minimum waste and with minimum adverse effect on ultimate recovery of other mineral resources." Furthermore, BLM Onshore Order No. 1 (issued under 43 CFR 3164) requires that lessees and operators conduct their exploration, development, production and construction operations in a manner which "results in diligent development and efficient resource recovery" while affording "adequate safeguards for the environment." BLM agrees with the responder that the agency clearly retains the authority to "strictly control" all development on BLM-administered lands. However, BLM must not take actions which would violate contractual rights.

Lease stipulations, along with the standard terms of a lease, define the limits of the lessee's rights and the Government's reserved authority. Within this reserved authority, the BLM may impose additional mitigation measures to ensure that proposed operations minimize adverse impacts to other resources, uses, and users. However, these additional measures must be consistent with the granted lease rights. The contractual controls existing in the lease provide substantial latitude within which the BLM may require modification to the siting, design, and interim and final reclamation measures. BLM may require modifications to proposed operations that would prevent economic extraction of otherwise commercial deposits of oil and gas only if there are resources, values, uses, and/or users present that cannot coexist with oil and gas operations, cannot be adequately managed and/or accommodated on other lands for the duration of oil and gas operations, and provide a greater benefit to the

public than that of oil and gas operations. In such cases, stipulations or conditions of approval are justifiable and would be used. In all likelihood the Government would be faced with buying back the lease in such a situation.

Environmental protection measures required to prevent unnecessary and undue degradation under the Federal Land Policy and Management Act (FLPMA) is within the terms of the lease, as all leases are subject to applicable laws and regulations. Because all oil and gas activities are subject to FLPMA, mitigation required to protect public lands from unnecessary and undue degradation is consistent with the lease rights granted. Unnecessary and undue degradation implies that there is also necessary and due degradation. For example, if there is only one route of access possible for development of an existing oil and gas lease, and that route presents the likelihood of some degradation of public lands or resources, such degradation may be considered necessary for the management of the oil and gas resource.

Protection or mitigation measures which would render a proposed operation uneconomic or technically unfeasible, so that a prudent operator would not proceed, is not considered to be consistent with a lessee's rights and can be required only in extreme circumstances, as discussed above. Some degradation (impact) from the oil and gas operation would be necessary for the management of the oil and gas resource. The use of stipulations or conditions of approval must be supported by the record, which must contain sufficient justification and indicate that less restrictive stipulations or conditions of approval were considered but rejected as not serving to adequately protect the public interest.

The Big Sandy Management Framework Plan (1982) identified lands in the Fontenelle area as available for lease subject to various resource protection requirements. Also, the Big Sandy/Salt Wells Oil & Gas Environmental Assessment and Decision Record (1992) regional assessment of oil and gas development, which included the Fontenelle area, reflected the BLM's oil and gas leasing program. The safeguards contained in the Management Framework Plan are designed to ensure that the environmental consequences of oil and gas activities are minimal. It was during this process that not leasing parcels within the subject area was considered. This decision process included full public involvement through public meetings and written comments. The Green River Resource Management Plan has reviewed this area again as to its suitability for oil and gas development. The Proposed Action does not call for additional oil and gas leasing but for development of existing leases.

Also see response to Comment #6-2.

Comment 6-4. See response to Comment #5-2. The Moxa Arch and Fontenelle projects would not have synergistic or "reinforcing impacts." Contrary to the responder's assertion, the projects would not occur in the same place and the observed adjacency of boundaries is simply a result of the expanded cumulative impact study areas used in each analysis in response to concerns expressed during scoping. No contiguous development has been proposed. The Fontenelle and Moxa infill drilling projects are entirely separate and independent in their utility, intent, construction, operation and maintenance.

As discussed in the response to Comment #5-2, the proposed activities analyzed in this EIS are in no way connected--either infrastructurally, geologically or spatially--with proposed oil and gas activities in the Moxa area. Infill drilling projects in the Fontenelle, Moxa and other areas have independent utility; in other words, they are not connected actions and are not dependent on each other for their initiation, construction, operation or success. Approval of the Fontenelle infill drilling projects would in no way result in a commitment to proceed with the Moxa infill drilling or any other oil and gas project in southwest Wyoming; nor would it prejudice review, analysis or BLM decisions regarding other projects in the region.

Contrary to the responder's assertion, Fontenelle infill drilling projects and the Moxa projects would not affect the same wildlife, recreation or water resources. The two projects would affect different herd units. The Fontenelle infill drilling projects would primarily affect the Piney, Pinedale and Steamboat elk herd units. The only overlap with the Moxa project would be a small area of the West Green River elk herd unit on the west side of the Green

River within the DALEN project area. The Fontenelle projects would primarily affect the Sublette antelope herd unit; the Moxa project would affect the West Green River, Carter Lease, and Uinta-Cedar Mountain herd units. The only overlap with the Moxa project would be a small area of the West Green River antelope herd unit on the west side of the Green River affected by the DALEN project. The Fontenelle projects would primarily affect the Sublette mule deer herd unit, with only small portions of the Steamboat and Wyoming Range herd units affected. The Moxa project would have a larger effect on the Wyoming Range and Uinta herd units and would have no effect on the Sublette or Steamboat herd units.

No common recreation resources would be potentially affected. Fontenelle Reservoir and the Blue Forest--the primary recreation resources potentially affected by the Fontenelle projects--are outside of the Moxa analysis area. The DALEN and Lincoln Road project areas offer little in the way of recreation resources or opportunities.

Substantially different watersheds would also be affected. The DALEN project potentially would affect the Green River above Fontenelle Reservoir, which acts as a sediment trap. The Lincoln Road project potentially would affect intermittent drainages but, with the implementation of best management practices and sediment control measures discussed in the DEIS, increased sediment in the Green River downstream from Fontenelle Reservoir would be minimal. None of the proposed wells in the Lincoln Road project area are closer than 0.75-1.0 miles to the Green River. In the broadest, regional sense, the same air quality resources could be affected; however, this is addressed in the expanded air quality analysis found in the Section 2 Addendum of this FEIS.

Considerable time and resources were expended in providing the public with an accurate picture as possible of the past, present and proposed oil and gas development in the cumulative impact study area. Thousands of records maintained by the Wyoming Oil and Gas Conservation Commission (WOGCC) were reviewed; well locations for every section of the cumulative impact study area were documented; several oil and gas industry databases were consulted; company records were gathered; aerial photographs and satellite imagery were used; and a geographic information system employed to describe and analyze the impacts of past and current well drilling in the cumulative impact study area. The DEIS provided estimates of existing as well as cumulative disturbance for key resources--see Tables 4-1 through 4-40.

BLM intended the Fontenelle DEIS to provide a detailed analysis of impacts to resources within the 965 square mile cumulative impact study area. This allowed analysis of impacts to site-specific resources such as leks, wetlands, steep slopes, canyons, specific areas of crucial winter range and smaller watersheds at a 1:24,000 scale and the development of recommended well relocations for the Resource Protection Alternatives. Expanding the scale of the analysis to include additional large areas such as the Moxa area (an additional 744 square miles) would have required analyzing impacts at a much smaller, less specific scale (e.g., 1:250,000). This scale of analysis may be appropriate for a regional analysis but BLM intended to provide a more detailed analysis in the Fontenelle DEIS. For example, nearly a week of computer time on a high-power workstation was needed to run one analysis of cumulative impacts to antelope winter range. This type of analysis would be virtually impossible to conduct for a much larger area.

The DEIS considers impacts on recreational hunting (see Section 4.6). The DEIS notes that while the Fontenelle area may be used for hunting and other dispersed recreation activities it does not provide high quality or particularly noteworthy hunting opportunities and certainly is not considered a recreation destination for tourists or an area that provides recreation opportunities of regional or national significance. Over the past years, as other NEPA documents on developments in the area have been completed, BLM has not received comments which would identify the Fontenelle area as a prime hunting area.

The responder incorrectly notes that the DEIS failed to analyze loss of big game crucial winter range. This was a major aspect of the impact analysis. The responder is referred to Section 4.22, Appendix C, D, and E and the technical report prepared and distributed to wildlife specialists, including the Wyoming Game & Fish Department. No comments were received which questioned the approach taken in analyzing such impacts or the results of the analysis.

The responder incorrectly notes that the DEIS failed to analyze impacts on nesting mountain plover. Please see Section 4.21. The DEIS notes that because this species nests on the ground it is susceptible to mortality from vehicles and construction equipment especially along two-track roads. The DEIS estimates the amount of potential plover habitat within the project areas and potential, direct impacts to that habitat and considers impacts on individual nesting birds. The DEIS suggests mitigation measures to protect this species.

The responder incorrectly notes that the DEIS failed to analyze direct impacts on raptors. For candidate species of raptors or those protected under the Endangered Species Act please see the analysis found in Sections 4.21.2, 4.21.3, 4.21.4 and mitigation and monitoring measures identified in Section 4.21.4. For other species please see the analysis found in 4.22.1, 4.22.2, 4.22.3 and mitigation and monitoring measures found in Section 4.22.3.4. The responder should note that BLM requires (see p. 4-80) that operators conduct raptor surveys in potential habitat prior to commencing construction. BLM requires avoidance of construction activities within raptor nesting buffer areas from February 1 through July 31. This restriction has been applied as a matter of course to oil and gas activities in the Fontenelle area for years. Annual raptor surveys may be required because different nests and nesting areas can be active in different years.

BLM believes that the cumulative effects of the Fontenelle infill drilling projects have been exposed so that the public and decision-makers have an accurate understanding of the potential impacts of a maximum development scenario in the cumulative impact study area. The responder has not identified cumulative effects which have not been addressed.

Comment 6-5. BLM has incorporated additional information into Section 2 Addendum of the FEIS and Appendix A regarding cumulative impacts on air quality. The responder is referred to the Green River Resource Management Plan draft and final EISs for additional documentation of the cumulative effects of oil and gas development. In addition, the Fontenelle and Moxa areas will be considered in the Southwest Wyoming Resource Evaluation being prepared by BLM.

Greater Yellowstone Coalition

Comment 7-1. Thank you for your comment. BLM's decision to combine the DALEN and Lincoln Road projects was based upon the overlap of the developments, sharing much of the same infrastructure, and affects upon the same resources.

Comment 7-2. BLM is concerned about regional impacts from oil and gas as well as other developments (e.g., iron mining) in southwest Wyoming. BLM would continue to review and approve oil and gas development in southwest Wyoming in cases where, following NEPA analysis, the impacts of a proposal are found to be acceptable and in conformance with the BLM's land management goals and policies. BLM has released the Draft and Final EISs for the Green River Resource Management Plan for the Green River Resource Area.

BLM believes that the Fontenelle draft and final EISs adequately informs the decision-maker and the public of the potential impacts attributable to "maximum", "worst case" development in existing oil and gas fields in the Fontenelle area. BLM believes that the DEIS for the Fontenelle infill drilling projects adequately addresses effects on wildlife populations and habitat. Analysis conducted for the DEIS (see Section 4.22, Appendices C-E) and the technical report prepared and distributed to wildlife specialists, including the Wyoming Game & Fish Department, suggests that the proposed projects would not have serious effects on wildlife populations or wildlife habitat. Some impacts on wildlife habitat (primarily low density sagebrush and greasewood/saltbush) would be unavoidable. No comments were received which questioned the analytical methods or approach taken in this analysis. To further reduce impacts to wildlife and vegetation, the DEIS recommends numerous mitigation measures. The wildlife models technical report points out the existence of several factors that limit existing habitat effectiveness (e.g., lack of water, existing roads). Wildlife populations would also be affected by numerous other factors beyond the control of BLM. For example, big game populations would be affected by the severity of winter weather and hunter harvest

rates. All wildlife populations and habitats affected by the Fontenelle infill drilling projects have been addressed in the Fontenelle draft EIS.

Comment 7-3. The proposed oil and gas developments in the Fontenelle and Moxa areas are not related "closely enough to be, in effect, a single course of action..." Infill drilling projects in the Fontenelle, Moxa and other areas have independent utility—that is, they are not dependent on each other for their initiation, completion, operation or success. Neither would BLM approval or denial of one action affect the approval or denial of the other. See response to Comment #5-2 and response to General Comment D. The requested discussion can be found in the Green River Resource Management Plan draft and final EISs and will also be considered in the Southwest Wyoming Resource Evaluation.

Comment 7-4. The responder is correct in noting that at this time BLM has initiated the Southwest Wyoming Resource Evaluation to determine whether cumulative environmental impacts are occurring that have not been projected in existing land use plans. See Section 2.

One of the goals of the evaluation is to determine the level of environmental protection that has been provided by existing resource management plans, lease stipulations, state-wide conditions of approval and management actions. A revision or amendment of the land use plan(s) will be prepared if there are indications that substantial impacts are going unaddressed under the existing management framework. Preparation of an EIS without this review and analysis of past land use management effectiveness would be premature.

Comment 7-5. The cumulative impact study area identified in the DEIS (see Figure 1-2, 1-3) was initially defined by placing a buffer area around proposed project areas; by identifying the extent of existing oil and gas development adjacent to these project areas; by identifying natural gas resources connected to these project areas that might be developed over the next ten years; and by identifying the extent of a cohesive infrastructure that might serve the proposed and reasonably foreseeable development. The actual area considered in the analysis of cumulative impacts varied by resource. For example, in considering socio-economic impacts, the area shown on Figure 1-2 was not used; rather this analysis considered impacts to Lincoln and Sweetwater counties.

Comment 7-6. See response to Comment #6-4.

Comment 7-7. The statement referred to has been selectively edited. The sentence referred to actually reads: "The Fontenelle Projects, when added to existing and reasonably foreseeable development in the Stagecoach and Jonah fields, is not expected to have a cumulative effect on the following resources: transportation, recreation, visual, cultural, noise, geology, paleontology, groundwater, floodplains, soils, grazing, wetland/riparian, and threatened, endangered, and species of concern. The following describes resources that would be affected cumulatively by the Fontenelle Projects and development in the Jonah and Stagecoach fields." The lack of cumulative effects of the Fontenelle Projects when combined with the Jonah and Stagecoach projects is due to the fact that the different projects affect different resources at different locations in different ways. For example, unlike the Fontenelle Projects, the Jonah project has no impact on the floodplain of the Green River; therefore the combination of the Jonah and Fontenelle projects cannot result in an increase in cumulative impacts to the floodplain.

The BLM has not said that the Fontenelle infill drilling projects would have no effect on cumulative impacts. The DEIS went to great lengths to discuss and quantify the cumulative impact of the Fontenelle Projects when combined with past, present and reasonably foreseeable activity in the cumulative impact study area. See Tables 4-1 through 4-4, 4-6 through 4-25, and 4-29 through 4-40 where cumulative impacts have been quantified for affected resources. The DEIS makes the point that profound impacts occurred years ago when the area was developed with U.S. Highway 189, oil and gas fields, ranches and other human activities (see DEIS Section 3.2). As a result, adding infill wells to the existing oil and gas field would not produce impacts or changes of a similar magnitude.

Comment 7-8. The term "designated land uses" was inappropriate. This statement has been corrected to read: "Nor would there be any change in the principal or major land uses, which include oil and gas production, livestock grazing, fish and wildlife habitat, and recreation." In other words, the principal and major uses recognized by the land use plan for this area, in accordance with the Federal Land Policy and Management Act (Sec. 202 (e)), would not be excluded. Nevertheless, BLM can require an oil and gas operator to modify their activities to ensure minimal disruption with other resource users. Since oil and gas development has been occurring in the Fontenelle area for over 70 years, most recreationists and others who use the area are aware of this. Given this information, BLM must assume that most recreationists and other users who enter the oil and gas field have done so freely and show a reduced sensitivity to this type of development. See Section 2 of the final EIS for change and clarification of the text.

Comment 7-9. The Code of Federal Regulations (40 CFR 1501.7(a)(5)) statement refers to the NEPA scoping process. The full text of the regulation reads: "As part of the scoping process the lead agency shall:...(5) Indicate any public environmental assessments and other environmental impact statements which are being or will be prepared that are related to but are not part of the scope of the impact statement under consideration." BLM did give consideration to EAs or EISs related to but not part of the scope of the DALEN and Lincoln Road projects EIS. The results of scoping identified no overlapping concerns between the Fontenelle projects and the Moxa Arch, Amoco Continental Divide, Altamont Pipeline (postponed indefinitely), or Rhone Poulenc (now OCI Wyoming) projects. Overlap or potential synergistic effect was determined to exist between the Fontenelle, Stagecoach, and McMurry Jonah projects (draft EIS at 3-7 through 3-9). Thus, BLM did not consider the projects referred to by the responder as part of, or related to, the environmental impact statement for the Fontenelle Projects. Separate scoping processes have been conducted for the other projects listed. While the responder may disagree with the spatial scale of the cumulative impact analysis, BLM has not chosen to ignore cumulative impacts. See responses to General Comment A and D, and comments #5-2, 6-4 and 7-7.

Comment 7-10. The DEIS builds upon a history of consultation between the BLM and U.S. Fish & Wildlife Service in matters of oil and gas development and threatened, endangered and species of concern. As a matter of course, BLM routinely contacts the U.S. Fish & Wildlife Service at the start of a NEPA process, seeks its comments and a list of potentially affected species (see Appendix A of the DEIS, for example). In terms of threatened and endangered species such as the black-footed ferret, the DEIS notes, for example, "Numerous prairie dog colonies have been identified by the BLM, Wyoming Game & Fish Department and past surveys within the cumulative impact study area. For example, in 1993, 107 square miles of the cumulative impact study area in the Lincoln Road Project Area were examined for prairie dog colonies." Surveys have been conducted in accordance with U.S. Fish & Wildlife Service guidelines. It is already BLM policy to require, prior to surface disturbing activities, site-specific surveys for threatened, endangered and species of concern where potential habitat for such species exists. If the survey indicates the presence of a threatened or endangered species then implementation of avoidance, mitigation and monitoring measures are coordinated with the U.S. Fish & Wildlife Service.

The DEIS utilizes the results of numerous studies in its consideration of potential impacts to cultural resources. BLM acknowledges that it usually conducts Section 106 compliance with the National Historic Preservation Act (NHPA) after doing more general NEPA level compliance. Since NEPA regulations indicate that to the extent possible other compliance efforts should be done before, or in conjunction with the NEPA document, BLM is not in violation of the NEPA regulations.

Completing the Section 106 compliance prior to NEPA documentation is often not practical because Section 106 is usually very location specific. BLM does Section 106 compliance following NEPA documentation because at the time of NEPA compliance we do not have site-specific information concerning well locations, rights-of-way, etc. to accurately determine the presence or absence of historic properties, whether or not any properties present are eligible for inclusion in the National Register of Historic Places, and whether or not the proposed Federal undertaking will have an effect on any historic properties.

As part of its site-specific APD process in the Fontenelle area, BLM routinely requires the documented completion of a cultural survey conducted by a qualified archaeologist. The survey must encompass potentially disturbed and adjacent lands. The purpose of such surveys is to identify sites potentially eligible for the National Register of Historic Places and to identify appropriate measures to avoid or mitigate impacts to such sites. Results of site-specific surveys are kept confidential to protect sites from vandalism but are on file with the BLM and the State Historic Preservation Officer.

In addition, an assessment of historical trails in the cumulative impact study area was conducted for the DEIS (referenced in the DEIS as Rosenberg Historical Consultants, 1994). A previous assessment was conducted as part of the environmental assessment completed for the original Fontenelle Project (referenced in the DEIS as Rosenberg Historical Consultants, 1991).

Comment 7-11. BLM maintains a list of all parties who have expressed an interest in oil and gas development in the Green River Resource Area. These parties received a copy of the scoping notice. In addition, a scoping notice was published in the Federal Register. BLM cannot control who comments during scoping. BLM routinely sends copies of EIS scoping notices and all draft and final environmental impact statements to the National Park Service, Division of Environmental Compliance, Washington, D.C. The U.S. Forest Service has commented on the DEIS. BLM has consulted with the Forest Service regarding its comments.

Comment 7-12. The need for a specific "wildlife sensitive alternative" was not defined during scoping or offered by the responder. BLM believes that existing BLM policies and stipulations intended to protect wildlife resources as well as the Resource Protection Alternatives adequately consider impacts to wildlife. The responder is referred to Section 3.22 and Appendices C-E for a detailed characterization of the wildlife resources in question. The responder has not identified specific impacts or alternatives which he believes were not adequately considered.

Comment 7-13. The Resource Protection Alternatives considered in the DEIS already incorporate your "Conservation Alternative." First, under the Proposed Actions or Resource Protection Alternatives, no drilling is proposed within Seedskaadee National Wildlife Refuge (p. 1-3). Heavy truck traffic would not use U.S. Fish & Wildlife Service roads. Under the Resource Protection Alternatives the closest well, road or pipeline would be located at least 0.25 miles from the boundary of Seedskaadee NWR and would average about 0.75-1.0 mile or more from the Green River where it passes through the refuge (p. 4-35). Elsewhere, most of the land along the Green River is private land (p. 3-2). Private land along the Green River has already been developed with U.S. Highway 189, ranches, hay fields, commercial and residential developments as well as oil and gas. BLM cannot impose stipulations on land it does not administer, such as private surface with private mineral rights or State lands.

Avoidance of sensitive areas listed on p. 5-5, as requested by the responder, was the basis of the Resource Protection Alternatives. Under the Resource Protection Alternatives, wells were relocated or eliminated to avoid steep slopes, problem soils, intermittent streams, wetlands and historic trails (see Appendix G). Directional drilling was incorporated into this alternative to avoid impacts to the Green River and reduce impacts within other sensitive surface resource areas. The Big Sandy River is outside the project areas (p. 3-41). No other perennial surface water is found within the project areas. Implementation of these measures would avoid most problems associated with erodible or sensitive soils. Additional erosion control and restoration measures described in Section 4.17.5 would further reduce potential impacts. Affected leases do not contain a "no surface occupancy" stipulation. Given the availability of the above described environmental protection measures, further imposition of a no surface occupancy stipulation is not warranted.

Comment 7-14. See response to General Comment B and comment #6-2. As cited in the draft EIS at 2-17, the Tenth Circuit Court of Appeals limits BLM authority to implement the No Action Alternative. BLM can only impose mitigation measures on a lessee once a lease has been issued. The Interior Board of Land Appeals (IBLA) case law is in accord with BLM's position (i.e., *Western Colorado Congress San Juan Citizen's Alliance v. BLM*, 130 IBLA 244, 248; *Southern Utah Wilderness Alliance v. BLM*, 122 IBLA 165, 171).

Comment 7-15. As recognized by the responder, oil and gas activity has occurred in the Fontenelle area for over 70 years. While not all land uses have co-existed with this development (e.g., wilderness recreation) BLM expects that existing principal or major land uses (e.g., livestock grazing, fish and wildlife habitat development and utilization, rights-of-way, recreation - motorized and petrified wood collecting) would continue.

Comment 7-16. The analysis cannot be "ignorant of the existing situation" as the Proposed Actions and Resource Protection Alternatives are infill drilling projects which, by their very nature, must be integrated into an existing oil and gas production and transportation infrastructure (see Road Development Plan in Appendix D).

Infill drilling is proposed to take advantage of this existing infrastructure. The incremental level of impact associated with adding wells to an existing oil and gas field and road network is much less than that associated with the initial development of a new field. Because an infill drilling project takes advantage of the existing infrastructure, incremental disturbance associated with a second set of four well pads and associated roads is less than the disturbance associated with the first four well pads and associated roads. This is particularly evident in impacts to wildlife, as discussed in Section 4.22 and Appendices C-E of the DEIS. The illustrated well spacing pattern is incorrect and is based on a rectangle not a section. For the sample eight well per section pattern used in the analysis see the final EIS Section 2 addendum.

BLM policy (FLPMA) differs from the responder's assumption of what constitutes multiple use, industrialization, and an "industrial site." Although the analysis assumes a "maximum" or "worst case" level of development at 8 wells per section throughout the project area, the likelihood that the projected levels of development will be reached is truly remote.

Comment 7-17. The draft EIS at 4-48 recognizes that "...implementation of either the Proposed Actions or RPAs is likely to result in significant impacts to water quality as a result of increased sedimentation and disturbance of saline soils." However, by applying the best management practices described in the draft EIS at 4-52 through 4-59, potential project-related and cumulative impacts from sediment and disturbance of saline soils can be reduced to avoid unnecessary degradation. The responder has not identified specific deficiencies in the analysis of potentially affected surface water resources and potential impacts to those resources.

Comment 7-18. See response to Comment #7-13. See Section 2 Errata for clarification of BLM stipulations regarding nesting species of concern and the addition of a mitigation measure that would prohibit water withdrawals from within Seedskaadee NWR. The responder should also note that prior to receiving authorization to proceed with proposed construction on public lands the oil and gas operator would be required to provide BLM with evidence that a Spill Prevention, Countermeasure and Control (SPCC) Plan has been prepared and implemented (see Section 5.1).

Comment 7-19. As noted in the DEIS (e.g., Section 2.2.1 and 2.2.2), the proposed wells would produce little water. Typically, one or two truck-trips per year would be required from each well site. Produced water would be disposed of in accordance with Federal and State regulations. These regulations allow for several methods of produced water disposal, including the use of properly permitted disposal wells. As no surface discharge of produced water is proposed, a water treatment plant would be unnecessary.

Comment 7-20. The Resource Protection Alternatives incorporate the relocation and/or elimination of well pads to protect wetland and riparian resources (see DEIS Appendix G). Best management practices to eliminate increased sedimentation in the Green River and Big Sandy River are described in Section 4.17.5.

Comment 7-21. The DEIS includes an extensive analysis of potential impacts to these species, including crucial range and habitat. The comments do not identify inadequacies with this analysis. The analysis seeks to quantify potential past, present, and reasonably foreseeable impacts. BLM fully intends to enforce reclamation, mitigation and monitoring measures.

Comment 7-22. See Section 4.22 for a discussion of standard Wyoming BLM stipulations as well as suggested mitigation measures which would be implemented to protect sage grouse from such impacts.

Comment 7-23. Birds avoid reserve pits during drilling due to the high level of human activity at the drill site. No production pits--potentially a more common, long term source of mortality--are proposed.

Comment 7-24. Mountain plovers are not a Federally-listed threatened or endangered species. Critical habitat for this species, as defined by the U.S. Fish & Wildlife Service, has not been delineated within the cumulative impact study area. The DEIS already calls for the implementation of protective measures (see Section 4.21.4.4) to ensure that the proposed activities do not accelerate the need to list the mountain plover.

Comment 7-25. As stated on p. 4-19, "Oil and gas operators should inform their employees, contractors and subcontractors of Federal and State laws, regulations and policies that pertain to the protection of threatened and endangered species, candidate species and sensitive species." Also see Section 2 Errata for clarification.

Comment 7-26. See response to Comment #7-13 and 7-18.

Comment 7-27. The DEIS did not intend to minimize the regional or state-wide significance of hunting as a recreation or subsistence activity or as an activity with substantial economic returns for the State and local communities. Rather, the DEIS attempted to offer some measure of the quality of hunting opportunities currently found in the cumulative impact study area. While the Fontenelle area may be used for hunting (and other dispersed recreation activities), it does not provide high quality or particularly noteworthy hunting or recreation opportunities, especially when much higher quality hunting and recreation opportunities are found less than an hour drive from the cumulative impact study area. To BLM's knowledge, only antelope outfitters depend upon hunting opportunities in the project areas for part of their livelihood. No other parties have applied to BLM for permits for outfitter activities on Federal lands in the Fontenelle area. See Section 2 Errata.

Comment 7-28. The Blue Forest specific site has been identified. The language was incorporated into the DEIS to ensure the protection of potential cultural/petrified wood sites and to respond to public comment received during scoping.

Comment 7-29. The statements cited should be placed in context of the larger discussion in the DEIS which notes that, given the small increase of in-migrant workers associated with the proposed projects (up to 55), such impacts are expected to be isolated and infrequent. Given these conditions no noticeable increase in visitation to the Area of Critical Environmental Concern or wilderness study areas is expected (see Section 2 Errata). The potential for impacts would be further reduced by implementation of mitigation measures described in Section 4.6.5. Also see the expanded discussion of potential impacts to air quality contained in Section 2 Addendum of this FEIS. Consideration of alternative management strategies for wilderness study areas is beyond the scope of this EIS.

Comment 7-30. This issue is addressed in the Big Sandy Grazing EIS and in the Green River Resource Management Plan draft and final EISs and is outside the scope of this EIS.

Comment 7-31. See the expanded air quality analysis found in Section 2 Addendum and Appendix A of this FEIS. BLM will work cooperatively with the Wyoming Department of Environmental Quality to prescribe, and require of industry, the air quality monitoring needed to assess the effects of the approved project on ambient air quality and air quality related values. Measures to control fugitive dust were considered in the DEIS (see Section 2.2 and 4.4.5, for example) and are currently being implemented in the field.

Comment 7-32. Restrictions on firearms were incorporated into the DEIS. See Section 4.6.5. However, BLM does not have the legal authority to prohibit the transport of legal firearms in personal vehicles through the cumulative impact study area. Also see response to Comment #7-25.

Comment 7-33. Posting of speed limits on State and County roads in the cumulative impact study area is at the discretion of the State of Wyoming or Sweetwater County. According to BLM road standards, resource roads (e.g., roads into individual well sites) would be designed for a maximum speed of 15 mph and local roads (e.g., roads into an area of multiple wells) would be designed for speeds of 15 to 30 mph (see DEIS at 2-21).

Comment 7-34. Road density standards are a management prescription whose definition and development for the BLM Green River Resource Area is outside the scope of this EIS. See the Green River Resource Management Plan for a discussion of the transportation network. Existing as well as new transportation plans would identify existing and proposed roads and roads slated for closure. DALEN has already closed and reclaimed roads within its project area. See the Section 2 Errata for clarification of a road closure policy to be incorporated into transportation plans.

Road closures must be coordinated with the needs of other resource user groups--e.g., recreation, grazing. No road construction is proposed within Seedskaadee National Wildlife Refuge and no new access points to the Green River are proposed. Some additional road construction would occur within the Green River floodplain to access drilling locations on private land. But given current levels of agricultural activity along the Green River, only an estimated 0.1 acre of new disturbance would occur in the riparian vegetation type (see Tables 4-29 through 4-32).

Comment 7-35. The Proposed Actions and Resource Protection Alternatives call for confining vehicles to construction sites and staked road and pipeline rights-of-way. The importance of this restriction is further reinforced by a mitigation measure listed in Section 4.9.5. BLM has the authority to halt the project if this restriction is not implemented by the companies. Enforcement of BLM ORV regulations is not the responsibility of one type of resource user. ORV use and control is discussed in the Green River Resource Management Plan. See response to comment #7-29.

Comment 7-36. See response to comment #7-10 related to required cultural resource inventories that must be completed prior to surface disturbing activities to ensure compliance with Federal regulations. Also see Section 2 Errata of discussion in Section 4.8.2 where it is stated that "BLM requires completion of Class III cultural resources surveys on areas potentially disturbed by oil and gas activities." This is corrected to read, "The appropriate level of inventory for historic properties will be required prior to approval of any APD, right-of-way, etc." BLM may determine that Section 106 compliance can be accomplished with some lesser level of inventory. Also see discussion in Section 4.13.2 for steps required to ensure protection of paleontological values. BLM policy requires the protection of scientifically significant fossils on Public lands. Individuals will be prosecuted under the law for theft or willful destruction of such fossils.

Comment 7-37. BLM requires that, unless previously surveyed or disturbed, a site-specific Class III survey be completed prior to surface disturbing activities. See response to Comment #7-10, 7-36. The DEIS and FEIS would incorporate the biological assessment. A biological opinion would be issued by the U.S. Fish & Wildlife Service after completion of the NEPA process. Under the Resource Protection Alternatives, where wetlands potentially would be affected, wetland delineations would be completed and the well pad relocated to an upland site if necessary. See response to Comment #7-20. Regarding air quality issues, see the expanded air quality analysis found in Section 2 Addendum of this FEIS. Also see response to Comment #3-12, 5-6, 7-31. Transportation plans have been prepared for the DALEN project area and are being prepared for portions of the Lincoln Road project area. These plans would be expanded and revised as necessary. (See Road Development Plan in Appendix D of this FEIS.) Reclamation plans must address site-specific conditions. The DEIS identifies reclamation, erosion and sediment control measures which would be applicable to the cumulative impact study area (see Section 4.17.5). All studies and surveys required for permits listed in Table 1-1 cannot be completed at this time given that many of these permit/approval processes (e.g., APD, road and pipeline rights-of-way) first require that project locations be staked in the field and project activities would occur over a ten year period. BLM range monitoring projects are beyond the scope of this EIS. See the Final EIS for the Green River Resource Management Plan.

Cabot Oil & Gas Production Corporation

Comment 8-1. The comment raises legitimate points regarding the savings, costs and feasibility of directional drilling. The DEIS called for *consideration* of directional drilling. BLM recognizes that there is substantial variation in the cost and feasibility of directional drilling in the Fontenelle area. BLM is sensitive to the arbitrary imposition of restrictions on drilling and production in situations where such restrictions cannot be justified on environmental grounds. BLM has solicited additional data from Cabot and other companies on reservoir characteristics and actual costs of past directionally drilled wells in the project areas. Obviously the feasibility of directional drilling over the next 10 years would vary with geology, energy prices, technological advancements and drilling costs. BLM recognizes that directional drilling may be the only option where unique surface resources (e.g., the Slate Creek Historic Trail) would be irretrievably impacted if conventional drilling were to be used. These concerns have been considered in the expanded analysis of directional drilling found in Section 2 Addendum and Appendix B of this FEIS. The expanded analysis of directional drilling has found that directional drilling is unlikely to be feasible (except in isolated cases) in the project areas in the foreseeable future. Also see response to Comment Letter #4.

Sierra Club Legal Defense Fund, Inc.

Comment 9-1. See response to Comment #5-2 and 5-3.

Comment 9-2. Several key points distinguish the proposed oil and gas activities from mining activities. First, the proposed activities would occur over a 10 year period and depending upon energy prices all, none or some unknown number of proposed wells would be drilled. In short, there is no up-front capital or other commitments which would drive the companies to complete all of the proposed wells. Second, in accordance with Council on Environmental Quality Regulation, BLM analyzed all oil and gas drilling that could potentially occur in the cumulative impact study area over the next 10 years. This "maximum" or "worst case" development scenario is based upon a geometric well spacing pattern. The Resource Protection Alternatives adjust this pattern to protect sensitive resources. Local geologic conditions would result in further adjustments to the spacing pattern and a likelihood that large, but still unidentified portions of the project areas, would be left undrilled. Rather than make irrational speculations about when specific wells would be drilled within the cumulative impact study area, the DEIS examined the maximum development scenario. Third, there is no formal development plan for the region. The DEIS combines the various drilling programs of DALEN, Cabot, Presidio and many other leaseholders. The respective projects of these companies, as well as companies developing oil and gas elsewhere in the region, are not functionally or economically dependent and have independent utility (see response to Comment #5-2, 6-4, 7-3).

Unlike the placer mine example cited by the responder, projects addressed in the DEIS would affect biological, cultural, hydrologic, geologic and other resources and infrastructure different from those affected by other projects in the region. Furthermore, the DEIS already addresses infill drilling projects proposed by several companies within an established oil and gas field.

Comment 9-3. BLM believes that the proposed oil and gas development activities and the on-the-ground situation in the Fontenelle area and Southwest Wyoming are substantially different from the Penfold example cited by responder. Furthermore, the responder erroneously says that "Only one type of agency action, leasing of minerals and permission to develop those leases, is being taken." No leasing of minerals has been proposed; rather, the DEIS addresses infill drilling and continued development of existing Federal oil and gas leases which have been issued to the companies. In practice, this continued development requires many agency actions--such as the site-specific analysis, review, and approval or denial of APDs and rights-of-way for roads and pipeline. See responses to Comment #5-2, 5-3 and 6-4 for a discussion of the geographical relationship between projects and fields.

Comment 9-4. The "entire southwestern corner of Wyoming" is not being transformed into an industrial park. Approximately 12.3 % of the public lands in southwestern Wyoming are developed for oil and gas, while numerous large areas within southwest Wyoming remain undeveloped. The transformation of southwest Wyoming "from an

open, nearly wild land" began over a century ago. Oil and gas development came to the Fontenelle cumulative impact study area over 70 years ago. Oil and gas production is part of the history of the region and nearby towns. A description of the history of this development is provided in Section 3.2. As noted by the responder, BLM is currently analyzing several proposals for infill drilling in the region. Infill drilling--which is defined as more closely spaced drilling of wells within the bounds of an existing oil and gas field--takes advantage of existing road, pipeline and production infrastructure. Infill drilling maximizes the production from an already developed resource. See response to Comment #5-2 regarding impacts on similar and different resources.

Comment 9-5. Contrary to the responder's assertion, "oil and gas leasing approvals" are not pending in the project areas or cumulative impact study area. And no "oil and gas leasing actions" are being considered in the Fontenelle DEIS. The responder has confused oil and gas leasing with the proposed infill drilling which continues development of existing Federal oil and gas leases.

The proposed projects mentioned by the responder are not similar in nature. The DEIS addresses proposals of several companies--collectively known as the Fontenelle Projects--to conduct infill drilling; Jonah is still essentially a wildcat prospect and the Stagecoach Draw is a new project area where only five exploratory wells had been drilled as of Spring, 1995 and a total of 72 wells are proposed.

Comment 9-6. See responses to Comment #5-2, 5-3, 6-4 and 9-3.

Comment 9-7. See earlier responses to your comments and response to General Comment D.

National Wildlife Federation

Comment 10-1. See response to Comment #7-9.

Comment 10-2. BLM believes that addressing the cumulative impacts of the widely disparate projects and resource uses mentioned is best addressed in its Southwest Wyoming Regional Resource Evaluation and in the Green River Resource Management Plan--not in an DEIS intended to address the specific impacts of a specific set of projects. See response to Comment #5-2, 6-3, 6-4 and 7-3. Oil and gas development is subject to a wide range of environmental restrictions found in existing BLM regulations and land use management documents. See DEIS Table 1-1 for example.

Comment 10-3. The Fontenelle DEIS defines the area for cumulative consideration of past, present and reasonable foreseeable development as follows: The cumulative impact study area (CISA), as described in DEIS Section 4.2.1, includes past, present and reasonably foreseeable developments which are related to each other. The boundaries of the cumulative impact study area were chosen after considering several factors: 1) the maximum limits of the proposed infill drilling projects which would constitute the project areas; 2) the addition of a buffer area to the project areas to account for raptor nesting, sage grouse leks and other biological or hydrologic considerations; 3) a cumulative impact study area which would capture the "empty zone" between the proposed project areas and other existing project areas; 4) an area which would encompass transportation and key infrastructure facilities; and 5) an area within which a reasonably specific analysis of well locations and specific resource conditions, conflicts and issues could be analyzed using current GIS capabilities. The DEIS already considers some development in the LaBarge area (see p. 3-6, for example). Please see the Big Piney LaBarge Coordinated Activity Plan for additional information on environmental requirements applicable to oil and gas development in that area.

In addition, to ensure full compliance with the intent of 40 CFR 1508.25, The cumulative impact analysis also encompassed oil and gas development proposals outside the CISA. An explanation of these proposals and the analysis of cumulative impacts is found in the DEIS Sections 4.2.2 and 4.2.3. Also see response to General Comment A and comments #5-2, 5-3 and 6-4.

Comment 10-4. For reasons cited in the response to Comment #10-3 and previous comments, the Moxa Arch, BTA Bravo, Greater Wamsutter, Amoco Continental Divide, and Wold Trona Mine projects are not considered related, i.e., "closely enough to be, in effect, a single course of action" which should be evaluated in the same environmental impact statement. The Altamont pipeline was a proposal that would route a major natural gas pipeline through the Fontenelle project area. This proposal has been indefinitely postponed. Also see the responses to Comment #7-3 and 9-2 regarding the independent utility of the projects. As noted in the response to Comment #9-3, hundreds of agency authorizations would be required to implement the Fontenelle Projects alone.

Comment 10-5. See response to Comment #7-6 regarding limitations on various scales of analysis.

Comment 10-6. BLM has determined "the multiple gas projects in southwest Wyoming" are not functionally related and the rationale is outlined in responses to Comments #10-3, 10-4 and 10-5. In addition, the responder has failed to distinguish between the development of an entirely new field--which certainly could require the construction of a new infrastructure--and the infill drilling (as addressed in the DEIS) which makes use of an existing infrastructure and network of roads, pipelines and production facilities. It is also important for the responder to know and understand that infill drilling serves to replace wells as well as to maintain production from the field and thus avoid premature abandonment and waste of the energy resource. These are necessary considerations in BLM's response to the federal laws regarding oil and gas resource management.

Comment 10-7. See responses to General Comment D and 7-4. See Section 2 Errata.

Comment 10-8. See responses to Comment #4-3, 4-4, 4-5 and 8-1. Additional information on directional drilling has been incorporated into the FEIS. See Section 2 Addendum and Appendix B.

Comment 10-9. The comment misrepresents the intent of the actual text of the DEIS. In the DEIS (p. 2-17) BLM recognizes that it has a legal obligation under NEPA to consider the No Action Alternative: "...this EIS considers the No Action Alternative [pursuant to 40 CFR Part 1502.14(d)]...." Later in Section 2.4.1, BLM recognizes and informs the public that: "The BLM's authority to implement the No Action Alternative is limited." This is not the same as saying that the No Action Alternative need not be considered. Similarly, the responder is aware of the legal questions that would surround an interpretation that BLM has unlimited authority to implement this alternative. Consequently, the No Action Alternative is considered for each affected resource and for each infill drilling project (DALEN and Lincoln Road). The responder has not identified any specific errors, omissions or oversights in the analysis of the No Action Alternative. Also see responses to Comment B and #6-2.

BLM does not grant any oil and gas operator an "unfettered ability to place as many wells as it chooses in a field." The responder is referred to Table 1-1 for a list of approvals and permits that would apply to any infill drilling. Also, see DEIS Appendix G, Tables G-1 and G-2, for specific description, well by well, of modifications incorporated into the RPA to mitigate impacts. Also see the discussion of stipulations and environmental protection measures that apply to oil and gas development on Federal lands in the Green River Resource Management Plan, BLM's onshore orders, 43 CFR and the Big Piney LaBarge Coordinated Activity Plan. In addition, well spacing patterns are regulated and must be approved by the Wyoming Oil and Gas Conservation Commission.

Comment 10-10. Assessing the alternatives on the basis of the simple difference in the number of wells or amount of surface disturbance overlooks important differences between the two alternatives. For example, the Resource Protection Alternatives would move wells outside of canyons and off of steep slopes. Because soils with the potential to cause downstream salinity problems occur on these slopes and within the canyons, avoiding these areas would minimize the possibility of impacts to water quality of Fontenelle Reservoir and the Green River. In addition, the Resource Protection Alternatives call for moving wells so they are located outside of historic trail buffers, moving wells at least 0.25 miles from the boundary of Seedskaadee National Wildlife Refuge (equivalent to at least 0.75-1.0 miles from the Green River); moving wells outside of a 100 foot wide buffer along the banks of

intermittent drainages; and the delineation and avoidance of wetlands. A list of changes is found in Appendix G of the DEIS.

Comment 10-11. When considering a directional drilling option, it is necessary to differentiate between technological and economic capability and what constitutes a reasonable alternative. For example, the DEIS considers the existing quality of the resources being disturbed (e.g., crucial winter range--see Section 4.22 and Appendices C-E) and their condition after implementation of the Proposed Action and project alternatives. The question of whether a directional drilling requirement would make a well undrillable due to economics, can be answered only on a well by well basis. At present, low gas prices would not allow most wells to be directionally drilled.

BLM has identified in the Resource Protection Alternative (RPA) that directional drilling would be a required consideration if there are already four well pads per section and the proposed access road and well pad would be located in an area where sensitive resources would be affected. For example, directional drilling was incorporated into the DALEN RPA to avoid impacts to the Green River. In the past, Cabot has directionally drilled wells to avoid impacts to historic trails. See responses to Comments #4-3, 4-4, 4-5 and 8-1. Additional discussion of the limits and constraints on the use of directional drilling has been incorporated into the FEIS. See Section 2 addendum and Appendix B of this FEIS.

Comment 10-12. In response to public scoping comments, the preparer of the DEIS expended substantial time and effort gathering information to provide quantitative estimates of potential impacts to resources. The statement of the responder is misleading. Apart from estimating direct disturbance, the DEIS also spends considerable time assessing other types of impacts in both quantitative and qualitative terms. Examples are: discussions of wildlife models which included consideration of displacement; the noise section (4.11); road traffic (Section 4.4); and socio-economic impacts (Section 4.3).

Given that nearly all of the project area is Federal land (Table 3-1), only isolated impacts to private residences would occur. In these cases oil and gas operators would have to negotiate private contracts with private landowners and mineral owners. BLM has received no comments from private landowners concerned about infill drilling in the vicinity of their properties. BLM is not in a position to judge the socio-economic impacts (positive or negative) of private contracts between private land/mineral owners and oil and gas operators.

Comment 10-13. As the DEIS points out, the Fontenelle area has been altered by over 70 years of oil and gas development activity as well as, grazing, agriculture, highway construction, gravel pits, construction of Fontenelle Reservoir, and other developments. The responder is urged to consult the discussion of existing development in the Fontenelle area (see Figure 3-6; Tables 3-2, 3-5). As pointed out earlier (see response to Comment #10-6, for example), the proposed project does not involve the development of a new oil and gas field in virgin land but is infill drilling in an area already developed for oil and gas production. BLM believes it has accounted for "the true extent of the disturbance".

Comment 10-14. Under NEPA (40 CFR 1502.22), BLM has an obligation to note data limitations. "When an agency is evaluating reasonably foreseeable significant adverse effects on the human environment in an environmental impact statement and there is incomplete or unavailable information, the agency shall always make clear that such information is lacking." BLM believes that the incomplete information noted in the DEIS is not essential to a reasoned choice among alternatives. Reliable historical data on populations of threatened and endangered species or wildlife populations within the cumulative impact study area simply is not available whatever the cost. For this reason, habitat models (see Appendices C-E) were used to estimate impacts due to past as well as reasonably foreseeable oil and gas development. In simple terms, the models estimated that historical resource development activities (e.g., road building, grazing, oil and gas activity) have reduced the quality of wildlife habitat to the point where additional infill drilling activity would result in a relatively small, incremental change in habitat

quality. Lacking historical population data, this appears to be the most reasonable way of estimating past and future impacts.

The assessment of impacts must consider the implementation of resource protection measures incorporated into the Proposed Actions and Resource Protection Alternatives, measures required by BLM or other Federal agencies as a manner of regulation and policy, or measures required by BLM and/or other Federal agencies to ensure compliance with Federal law such as the Endangered Species Act. BLM consults with the U.S. Fish & Wildlife Service regarding possible impacts and mitigation measures necessary to protect threatened and endangered species. As noted in the DEIS (p. 4-73), suitable nesting habitat for peregrine falcon--cliffs along the Green River--would not be affected by either the Proposed Actions or Resource Protection Alternatives. Similarly, the DEIS points out that with discontinuation of the Grays Lake experiment whooping crane have not been seen along the Green River in Wyoming since 1985 (p. 3-53). The proposed activities would not affect the general habitat utilized by whooping cranes in Wyoming. Furthermore, according to a letter received from the U.S. Fish & Wildlife Service (see comment letter #21, p. 9), "The Service [U.S. Fish & Wildlife Service] concurs with your determination that the proposed action is not likely to adversely affect the endangered whooping crane...or peregrine falcon..." If the experts at the U.S. Fish & Wildlife Service concur in this finding, BLM has not reason to question this conclusion.

The U.S. Fish & Wildlife Service has a protocol for surveying potential black-footed ferret habitat to ensure that proposed activities would not harm this species. As noted in the DEIS (p. 4-73), "If a proposed construction site would affect prairie dog colonies that might be suitable habitat for black-footed ferrets, BLM would give the operator the option of relocating the project component to avoid direct impacts to prairie dog burrows. If that is impossible, and the construction site was found to coincide with prairie dog colonies that meet U.S. Fish & Wildlife Service criteria for potential black-footed ferret habitat, then the BLM would require that a survey be conducted to locate black-footed ferrets in accordance with U.S. Fish & Wildlife Service survey guidelines." Surveys have been conducted in the cumulative impact study area using this protocol (see p. 3-50). It makes no sense to conduct surveys where suitable habitat does not exist. BLM is holding additional discussions with the U.S. Fish & Wildlife Service concerning potential impacts to this species. See Section 2 Errata.

Comment 10-15. See response to the previous comment. BLM requires the collection of data where suitable habitat for sensitive species would be potentially affected. This is done as part of a site-specific assessment of a project location. Given that such data has a "shelf life" of one year or less and given that hundreds of proposed wells may never be drilled, it would be unreasonable to require the operator to expend thousands of dollars on site-specific surveys at this time. The responder has not identified any specific potential impacts which have not been discussed to the public.

Comment 10-16. At this writing the mountain plover is not a Federally-listed species. The BLM would seek concurrence from the U.S. Fish & Wildlife Service that the proposed actions and Resource Protection Alternatives would not adversely affect Federally-listed species. The U.S. Fish & Wildlife Service has already concurred in the analysis found in the DEIS for peregrine falcon and whooping crane. BLM disagrees that there is no reliable data on habitats and intends to continue its policy of requiring the collection of survey data on potentially affected sensitive species where potential habitat exists.

Comment 10-17. Loss of migratory waterfowl from contaminated pits is not a known and documented problem in southwest Wyoming. It is a suspected problem that has not been proven. BLM has not been given any data to document the problem and our field people have not been able to document the problem. BLM requires the industry to take steps to assure that migratory birds do not enter a pit that could be harmful to it. The EIS has been modified to acknowledge that some loss of waterfowl in reserve pits may occur without this protection. See Section 2 Errata.

Comment 10-18. See General Comments. Displacement of wildlife (pronghorn antelope, mule deer and sage grouse) from roads and production locations was considered in the wildlife models (see Appendices C-E). For example, on pronghorn summer range, the models considered that land less than 0.3 miles from a road or well pad

would have a much lower probability of being suitable range for this species. Displacement was considered in the other models as well. This comment fails to consider that animals would habituate to human disturbance; that little traffic disturbance is associated with day-to-day maintenance of a producing field--typically one visit to a well site per day by a worker in a pickup truck; that out of 617,000 square miles in the cumulative impact study area, an estimated 5,828 acres (0.9%) are currently disturbed by oil and gas production activities (see Table 4-3) and this would increase by a maximum of 1,988 acres (0.3%) if the DALEN and Lincoln Road projects were to be approved at the "maximum" or "worst case" number of wells analyzed for in the DEIS.

Comment 10-19. At the risk of oversimplifying, the analysis found that when existing environmental conditions (e.g., lack of water) are combined with existing impacts (roads, well pads, grazing, traffic), the proposed activities are likely to produce little change in the availability of high quality habitat for wildlife species. For example, the models predicted (Table D-1) that, under existing conditions, 82.5 percent of the cumulative impact study area had a mule deer winter habitat probability rating of 0.50 or less. A probability rating of 0.50 or less is considered marginal habitat. In simple terms, this means that there is at best a 50-50 chance that this land would be considered suitable winter range habitat by mule deer. With implementation of the proposed infill drilling projects, 84.6 percent of the cumulative impact study area would have a 0.50 or less rating--a minor difference given the model's assumptions.

Similarly, the model analysis found that, under existing conditions (see Table C-2), 91.8 percent of the cumulative impact study area had a pronghorn winter habitat probability rating of 0.50 or less. In simple terms, this means that there is only a 50-50 chance on 91.8 percent of the land within the cumulative impact study area that it would be considered suitable winter range habitat by pronghorn. The Fontenelle infill drilling projects increase this to 92.4 percent.

In short, while the proposed infill drilling may disturb land classified by the Wyoming Game & Fish Department as crucial winter range, it would make very little, if any, difference in the overall availability of high quality range for mule deer and antelope. Given this, herd sizes within affected herd units may be more likely to be affected by harvest rates, and the severity of winter weather.

It should be recognized that to run these models for such a large area, several assumptions are made. For example, the models incorporated "worst-case" assumptions about reclamation. It was assumed that no successful reclamation had or would occur on pipeline corridors or areas not needed for production activities. Obviously this overstates the impact of the proposed activities. Similarly, as pointed out by the Wyoming Game & Fish Department (see Comment #15-8) some vegetation manipulation could benefit sage grouse. This also could not be considered in the model analysis.

Comment 10-20. The DEIS quantifies existing impacts on wetlands resulting from oil and gas activity (see Section 4.20). Under NEPA, BLM is required to recognize past impacts.

Comment 10-21. For this reason, the Resource Protection Alternatives avoid impacts to wetlands as shown in Tables 4-34 and 4-36.

Comment 10-22. Unavoidable disturbance (p. 4-48) was discussed in the context of the limitations of drilling technology and local geology. As noted in the DEIS (p. 4-49), under the DALEN Resource Protection Alternative "None of the proposed wells would be located within floodplains on BLM-managed lands." BLM has no jurisdiction over disturbance on private lands with private minerals within floodplains. Under the Lincoln Road Resource Protection Alternative, 20 wells would be drilled within 100 year floodplains. Under Executive Order 11988 (see Section 4.16.1), BLM can permit development within 100 year floodplains if no feasible alternative exists. Under this Executive Order, and as part of the APD process, the operator would be required to demonstrate that this is indeed the case. Additional mitigation measures are proposed in the DEIS (see Section 4.16.4.4).

Comment 10-23. See expanded air quality impact analysis found in Section 2 Addendum and Appendix A of the FEIS.

Comment 10-24. See response to Comment #7-28.

Comment 10-25. See response to Comment #7-27 and #10-26.

Comment 10-26. Past development can have a profound impact on a region; while the incremental impact of the additional wells can be small. For example, the development of the first 100 wells in a new oil and gas field would involve a substantial increment of impact associated with the construction of an entirely new infrastructure. The incremental impact associated with the next 100 infill wells is much smaller. More specifically, the first well may require a new 10 mile main access or "collector" road but once that road has been constructed only 1 mile of spur roads may be needed to access the next 5 wells.

In terms of recreation, the DEIS notes that while the Fontenelle area itself is used for hunting and other motorized, dispersed recreation activities it does not provide high quality or particularly noteworthy recreation or hunting opportunities. The Fontenelle area is not considered a recreation destination for tourists or an area that provides recreation opportunities of regional or national significance. Over the past years as other NEPA documents on developments in the Fontenelle area have been completed BLM has not received comments which would point to the Fontenelle area as providing noteworthy or favored recreation or hunting opportunities. When considering local recreation or hunting opportunities, the responder should consider that oil and gas development have occurred in the cumulative impact study area for over 70 years and that fact that much higher quality opportunities are found less than an hour drive from the cumulative impact study area. Furthermore, the economies of nearby towns such as Big Piney, LaBarge and Marbleton are directly tied to oil and gas production. This industry also makes an important contribution to the state's economy. A recent poll reported in the Casper Star-Tribune (October 10, 1995) found that an estimated 77 percent of the State "supported the development of more natural gas in Southwest Wyoming."

Comment 10-27. The comment (p. 4-23) is taken out of the context. The DEIS says: "Visitors to [affected] Class IV areas are most likely to be oil and gas field workers, local ranchers and the occasional hunter or recreation vehicle user. Visitors to Class IV areas are not expected to be highly sensitive to changes in visual qualities of the landscape." This statement is further clarified (see Section 2 Errata). The DEIS also states: "Class IV is the least sensitive VRM category and is intended to accommodate intensive resource uses such as mining and oil and gas development" (p. 4-26). The DEIS is not saying that user groups have no appreciation of natural beauty--only that user groups are unlikely to visit an existing oil and gas field in the pursuit of natural beauty or to be sensitive to changes in visual qualities caused by infill drilling in existing oil and gas fields.

Comment 10-28. BLM believes that under carefully controlled circumstances oil and gas development can be consistent with a visual resource management (VRM) Class II designation. According to BLM's definition (p. 3-21), changes in a Class II area "should not attract the attention of the casual observer." This does not mean that such activities must be invisible. Class II areas are centered on the Green River corridor (see p. 3-24) much of which is private land (see p. 3-2). The VRM system only applies to BLM-administered lands and BLM cannot regulate development on private land/ private minerals. The DEIS has quantified existing and potential impacts to Class II areas regardless of land ownership (see Table 3-12, 3-13, 4-10 through 4-13). Because a bottomhole location can be offset a maximum of about 2,600 feet from the surface location, some disturbance would be unavoidable in Class II areas if target proposed oil and gas reservoirs and bottomhole locations are to be reached--regardless of whether directional drilling is employed (see Section 2 Addendum and Appendix B for clarification). BLM has not made a decision regarding the authorization of additional development on leases.

Comment 10-29. No manipulation of the data or reclassification of land uses occurred. The data reported is "as is." The land use classification is based on aerial imagery and uses standard definitions to classify only the amount

of surface disturbance created by human activities. The database incorporates no reclassification of adjoining land use because such a classification would be a matter of opinion and whether it is used by cattle or wildlife or not, most of the adjoining land use as reported on the aerial imagery still meets the database's definition of "shrub and brush rangeland." All direct, indirect, and cumulative impacts are considered in the context of an oil and gas field as well as site-specific.

While not all types of land uses have co-existed with oil and gas development (e.g., wilderness or primitive non-motorized recreation) over the past 70 years, existing principal or major land uses (e.g., grazing, fish and wildlife habitat development and utilization, transportation, motorized recreation, petrified wood collecting, and rights-of-way) will continue. BLM sees no evidence that these resource uses would be completely displaced or eliminated by the proposed infill development. See the Green River Resource Management Plan for additional discussion on multiple use management for the area.

Comment 10-30. BLM can require an oil and gas operator to modify their activities to ensure minimal disruption with other resource users. For example, road closures or pipeline crossings of public roads can be coordinated to ensure that recreation or grazing users are not denied access; transportation plans can incorporate a requirement that heavy trucks avoid crossing Fontenelle Dam; drilling activities can be halted in crucial winter range from November 15 through April 30. These are all examples of "coordination" which are discussed in the DEIS and/or the Green River Resource Management Plan.

Comment 10-31. The restricted access in question would be to the well pad during drilling operations. See Section 2 Errata for clarification.

Comment 10-32. The EIS is not a decision document. The EIS contains only recommended mitigation measures which were developed as a result of the impact analysis. As such they remain only recommendations until BLM issues its record of decision; therefore the "should" and language is retained. Applicable mitigation measures will be incorporated into the Record of Decision and required by BLM as a condition of approval before issuance of an APD or right-of-way grant. BLM Onshore Order No. 1 (see Section 1.6.1) requires: "Lessees and operators have the responsibility to see that their exploration, development, production and construction operations are conducted in a manner which (1) conforms with applicable Federal laws and regulations and with State and local laws and regulations to the extent that such State and local laws are applicable to operations on Federal or Indian leases; (2) conforms with the lease terms, lease stipulations, and conditions of approval..." If a mitigation measure attached as a condition of approval is not implemented, BLM has the authority to halt project activities.

Comment 10-33. BLM requires that all pits with harmful fluids in them be maintained in a manner that will prevent migratory bird mortality. However, no production pits are proposed. Rather, surface tanks would be used. Human activity at a reserve pit--which is only a temporary pit associated with drilling operations--makes their use by migratory waterfowl unlikely. Reserve pits are not to have any hydrocarbons on the surface. Dewatering of a reserve pit or use of closed or semi-closed mud systems are alternatives to netting which BLM would also consider as part of the APD process. Little or no surface water is found in the project areas outside of the Green River floodplain. Please provide specific data on actual bird mortality resulting from migratory birds using reserve (not production) pits. No ponds or open tanks holding toxic materials are proposed.

Comment 10-34. In the models used to assess existing and future impacts to pronghorn and other species (p. 10, Technical Report) it was assumed that no successful reclamation had/would occur on pipeline rights-of-way, abandoned roads or locations or roadsides. Therefore the analysis is much more likely to have overstated impacts to wildlife and understated the benefits of successful reclamation. Successful reclamation of areas not needed for well field operations (i.e., pipelines, road-sides, and parts of well pads) is attainable. This is demonstrated throughout the Fontenelle projects area. Implementation of the measures listed in the DEIS Sections 4.17.5.1 *Erosion Control, Revegetation and Restoration Plans* and 4.17.5.2 *Best Management Practices* would eliminate or reduce the potential impacts to soils and vegetation and ensure the return of palatable plant species for wildlife food.

Comment 10-35. See Section 2 Errata for additional discussion of FLPMA and multiple use and the need to balance mineral development with other resource uses. In accordance with FLPMA (Sec. 103 (l)), management of the public lands within the Fontenelle projects area would occur so that the principal and major uses of grazing, fish and wildlife habitat development and utilization, mineral exploration and development, transportation, outdoor recreation (e.g., petrified wood collecting), and rights-of-way are not excluded, but would continue to co-exist with the natural gas development. FLPMA (Sec. 103(c)), in its definition of multiple-use, provides for "making the most judicious use of the land for some or all of these resources"; and "the use of some land for less than all of the resources".

Comment 10-36. No additional gas processing facilities have been proposed and BLM has received no proposals for additional gas processing facilities. It is likely that no additional gas processing would be needed in the foreseeable future for the following reasons: 1) gas produced in the Fontenelle area is very dry gas and requires relatively little processing; 2) well pad equipment (e.g., dehydration units) could take care of reasonably foreseeable gas processing requirements; 3) over the long-term, as production from existing wells declines, production from new wells would replace it, resulting in little change in the overall, long-term demand for gas processing; 4) existing processing facilities have the capacity to handle additional capacity; and, 5) if needed, expansion of existing central facilities, rather than the creation of entirely new facilities is more likely to occur.

Predicting future amounts of gas that may require processing is virtually impossible at this time for the following reasons: 1) the actual level of future well drilling and completions would fluctuate with energy prices, drilling and other costs; 2) actual quantity of gas produced would vary with geologic and reservoir conditions; and, 3) processing requirements would vary with the quality of the gas produced. The expanded air quality impact analysis in Section 2 Addendum of this FEIS includes consideration of well pad processing equipment. No discharge to waters is proposed or associated with this equipment.

Comment 10-37. See Section 2 Errata.

Texaco Exploration and Production Inc.

Comment 11-1. The terms "maximum foreseeable development" (MFD) and "reasonably foreseeable development" (RFD) as used in the Fontenelle DEIS refer to two different areas of potential development. MFD relates to the foreseeable development within the Fontenelle projects CISA whereas RFD relates to other foreseeable project development outside the Fontenelle CISA.

To address public concerns about piecemeal analysis and the preparation of supplemental NEPA documents, the Proposed Action was intended to include all reasonably foreseeable development over the next 10 years. BLM agrees that as the time horizon lengthens, what constitutes reasonably foreseeable becomes more and more uncertain--especially considering the number of companies involved in drilling within the project areas. For this reason, BLM, in cooperation with the companies, looked at the maximum amount of development that could reasonably be expected to occur in the Fontenelle projects areas over the next 10 years if all favorable conditions (e.g., energy prices, reservoir characteristics) were present. BLM recognizes that it is unlikely that all of the proposed wells would be drilled. Mitigation, as incorporated into the Resource Protection Alternatives, would apply to whatever level of development ultimately occurs. Implementation of mitigation is not contingent on the number of wells drilled.

Comment 11-2. The number of trips per year used on p. 2-9 reflects conditions typical of current DALEN and Cabot operations in the project area which produce a dry gas. BLM recognizes that individual wells and reservoirs could produce more water and condensate which would require more frequent hauling and in some cases fewer trips would be necessary. However, this is not expected to alter impacts to transportation systems provided such systems are constructed and maintained in conformance with BLM-approved transportation plans.

Comment 11-3. See response to Comment #4-3, 4-4, 4-5. Additional information on directional drilling has been incorporated into the FEIS. See Section 2 Addendum.

Comment 11-4. BLM agrees that formal surveys should not automatically be required and does not intend to automatically require them. Rather, current BLM procedures (see Green River Resource Management Plan) call for a Class I survey to identify whether other surveys have already been completed in the area proposed for disturbance. If the past survey has been adequate and the survey results do not suggest the need for additional site-specific work, another Class III would not be required. If the proposed development would occur on a previously disturbed site--for example, using the same area disturbed by a plugged and abandoned well--BLM has the authority to decide that a Class III survey is not required. The Class III requirement must be decided on a site by site basis and would be incorporated into the APD process.

BLM has the responsibility to ensure compliance with Federal regulations protecting cultural resources, but given personnel limitations BLM usually cannot complete Class III surveys on a schedule that corresponds to a company's proposed drilling schedule. For this reason, Class III surveys are often conducted at the company's expense by qualified, third-party archaeologists approved by BLM.

Operators have an obligation under Onshore Order No. 1 "...to see that their exploration, development, production and construction operations are conducted in a manner which (1) conforms with applicable Federal laws and regulations...(5) affords adequate safeguards for the environment..." Onshore Order No. 1 (III-A) defines the responsibility of the lessee and operators "to complete the field work and submit the required report" if there is reason to believe that properties listed or eligible for listing on the National Register of Historic Places are present in the area of potential effect (III-E). Conducting Class III surveys ensures that this obligation on the part of the oil and gas operator is met and that no Federal regulations protecting cultural resources are violated.

Restructuring the Federal oil and gas royalty system to provide "ecocredits" is an interesting suggestion that BLM is considering. However, BLM does not have authority to award royalty credits at this time. The granting of credits (e.g., "ecocredits") against rent/royalty payments or other credits to oil and gas companies are being considered by the Bureau's Onshore Oil and Gas Performance Review Team at this time. This consideration includes costs incurred by an applicant for voluntarily exceeding environmental requirements to process an application for a ROW, APD, oil/gas field development, etc., EA or EIS (e.g., paleontological clearance, T&E plant or animal clearance, raptor nesting surveys, etc.) that would typically be incurred by the BLM as part of the surface management agencies responsibility were it capable of completing such work in a timely manner. Credit consideration is also being given to applicants undertaking or cooperating in ecosystem enhancement projects (e.g., habitat restoration).

Comment 11-5. BLM agrees that surveys for black-footed ferrets should not automatically be required. Much of the land within the project areas is unlikely to provide potential habitat for this species and it would be pointless to conduct searches for them. However, such surveys have been required and have been conducted in accordance with U.S. Fish & Wildlife Service protocol where potential habitat, as defined by the U.S. Fish & Wildlife Service, exists. In such cases, surveys have been viewed as necessary to ensure compliance with the Endangered Species Act. Measures viewed as necessary to protect black-footed ferrets could change as the U.S. Fish & Wildlife Service reviews its protocol and the results of past surveys. BLM has the responsibility to ensure compliance with the Endangered Species Act and other Federal (e.g., Migratory Bird Act) and State wildlife regulations. However, agency personnel may not be able to complete biological surveys on a schedule that corresponds to a company's proposed drilling schedule. For this reason, biological surveys are often conducted at the company's expense by qualified, third-party scientists approved by BLM.

Section 6 of the oil & gas lease terms states, "...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". Also, the lessee/oil & gas operator have an

obligation under Onshore Order No. 1 "...to see that their exploration, development, production and construction operations are conducted in a manner which (1) conforms with applicable Federal laws and regulations...(5) affords adequate safeguards for the environment..." Conducting biological surveys ensures that this obligation is met and that the Endangered Species Act or other Federal and State wildlife regulations are not violated.

See response to comment #11-4 regarding "ecocredits". BLM urges the companies and other groups to volunteer ways of improving the process for addressing and mitigating impacts to wildlife species.

Comment 11-6. The sentences have been changed to read: "Riparian areas on Federal land which are undergoing reclamation should be fenced if livestock congregate in these areas. The need for fencing should be determined by BLM." (See Section 2 Errata.) These fences are not intended for livestock management but to ensure adequate reclamation of areas disturbed by oil and gas activities. While livestock management is not the responsibility of the companies, they are expected to implement measures, if deemed necessary, which would improve reclamation success. Given that relatively little riparian area would be disturbed by proposed activities this is not considered a costly requirement.

Comment 11-7. BLM recognizes that candidate species are not protected under the Endangered Species Act. BLM, however, considers candidate species as "species of concern." BLM reviews its policies on candidate species on a case by case basis. For example, following regional field surveys, it was found that a candidate plant species in the LaBarge area were more common than previously thought. In this case BLM, in cooperation with qualified botanists, took action to minimize impacts to its population and key habitat areas and allowed oil and gas development to continue.

Comment 11-8. "Potentially suitable habitat" is defined as habitat that possess key environmental conditions favored by the species in question (see Section 2 Errata). Potentially suitable habitat is used as a guideline to decide the need for, and geographical extent of, biological surveys. For example, if potentially suitable habitat for ferruginous hawk nesting occurs 0.25 miles or up to 1 mile from a proposed well site, that habitat should be examined as the buffer area around an active nest that would include the proposed well pad. However, if no potentially suitable habitat is present, there is little point in surveying for a species. Nesting activity varies by location from year to year but repeated lack of nesting activity could delete an area of potentially suitable habitat from consideration in future surveys. See response to comment #11-5.

Comment 11-9. See response to Comment #4-2.

Comment 11-10. BLM agrees that the project areas or cumulative impact study area do not include any critical habitat for any species as defined by the U.S. Fish & Wildlife Service and Endangered Species Act. This is recognized in the DEIS (Section 4.21.1) and, as noted in the DEIS, "Both the Proposed Actions and Resource Protection Alternatives would avoid adverse impacts to any Federally-listed species." BLM has sought U.S. Fish & Wildlife Service concurrence in this finding. BLM would continue to require implementation of protective measures to ensure that its actions do not result in Federal listing of a candidate species or adversely affect Federally-listed species. As necessary, BLM would consult with the U.S. Fish & Wildlife Service on the definition and implementation of appropriate protective measures--whether avoidance, relocation, compensation or mitigation. Any one or more of these types of measures could be appropriate depending on the species and U.S. Fish & Wildlife Service policy. Revision of BLM policies on threatened, endangered or candidate species is beyond the scope of this document.

Comment 11-11. BLM intends to honor valid, existing lease rights and has emphasized in the DEIS the Federal regulatory requirement that it balance protection of the environmental with lease rights. BLM has the authority to add more restrictive conditions of approval where there is a threat of undue degradation to the environment. A complete text of the referred to limitation on BLM's authority (43 CFR 3101.1-2) follows and has been added to the FEIS (see Section 2 Errata).

Surface use rights. A lessee shall have the right to use as much of the leased lands as is necessary to explore for, drill for, mine, extract, remove and dispose of all the leased resource in a leasehold subject to: Stipulations attached to the lease; restrictions deriving from specific, nondiscretionary statutes; and such reasonable measures as may be required by the authorized officer to minimize adverse impacts to other resource values, land uses or users not addressed in the lease stipulations at the time operations are proposed [emphasis added]. To the extent consistent with lease rights granted, such reasonable 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. At a minimum, measures shall be deemed consistent with lease rights granted provided that they do not: require relocation of proposed operations by more than 200 meters; require that operations be sited off the leasehold; or prohibit new surface disturbing operations for a period in excess of 60 days in any lease year. [53 FR 17352, May 16, 1988]

Comment 11-12. A Road Development Plan (Transportation Plan) has been approved for the DALEN Project area by DALEN in consultation with the BLM. A *Road Development Plan for the Lincoln Road Area* has been prepared by the Lincoln Road Operators (prepared by the engineering consulting firm of D.R. Griffin and Associates, Inc.) in consultation with BLM. As it states under "Purpose", the Plan "... is intended by the Lincoln Road Operators as a commitment to a quality assurance/quality control program for the location, design, construction and maintenance of roads required for expansion of their operations on public lands within the Lincoln Road Area." The Plan details "... the procedures by which transportation planning, road design, construction and road maintenance will be conducted by Lincoln Road Operators to meet their operational needs and Bureau of Land Management requirements for roading standards, safety, and resource protection."

Lincoln Road Operators will utilize an extensive network of existing roads in the Lincoln Road Area, much of which is shared with other road users. The incremental infill development of the Lincoln Road area will follow the guidelines provided in the *Road Development Plan for the Lincoln Road Area*. Transportation planning would consist of the annual review of plans for development between the operator and BLM. The review would entail assessment of existing roads and how the planned incremental well development roads would tie-in to the existing network to ensure safety and protection of natural resource values. As individual APDs are then prepared for submission to BLM, and following on-site inspection, they will address site-specific considerations relative to safety and environmental protection pertaining to access road location, design, construction and maintenance in accordance with the *Road Development Plan for the Lincoln Road Area*. Thus BLM intends that access road plans submitted as part of an APD be consistent with a field transportation plan, i.e., the *Road Development Plan for the Lincoln Road Area*. See Section 2 Errata and Appendix D of this FEIS.

Wyoming Department of Environmental Quality-Water Quality Division

Comment 12-1. No commercial disposal facilities are proposed. The FEIS (see Section 2 Errata) notes that commercial disposal wells and facilities must be permitted with the Wyoming Department of Environmental Quality. Commercial disposal wells would be considered Class I wells. Disposal wells which are drilled (or which would convert an existing oil and gas well to a disposal well) by an oil and gas operator for disposal of the operator's drilling fluids and/or produced water would be permitted with the Wyoming Oil and Gas Conservation Commission. Such wells are considered Class II wells. Applications for Class I or II wells require the well operator to specify types of wastes and measures taken to protect groundwater.

Comment 12-2. No discharges from condensate tanks and no discharge of tank bottoms, produced water or any other wastewater to the ground are proposed. No production pits are proposed. See Section 2 Errata.

U.S. Forest Service, Intermountain Region

Comment 13-1. BLM has communicated with the U.S. Forest Service regarding the comments contained in this letter and the development of an analysis which addresses these concerns. A study to address these concerns was

developed and has been completed. Some of the modeling capabilities cited were proprietary and were not available for this study. The U.S. Forest Service has reviewed and concurred in the results of that analysis. See the expanded air quality impact analysis found in Section 2 Addendum and Appendix A of this FEIS.

The Final EIS for the Fontenelle projects is modified to incorporate the appropriate level of cumulative air quality impact analysis, and includes the Moxa Arch, Stagecoach, Jonah, and other proposed developments.

Comment 13-2. The BLM concurs that the cumulative impacts to air quality from natural gas development as proposed in the Expanded Moxa Arch and Fontenelle infill drilling projects, and the Stagecoach Draw and Jonah developments should be considered together. A supplemental cumulative air quality impact analysis has been completed and is found in Section 2 Addendum and Appendix A of this final EIS. The analysis includes potential air quality cumulative impacts upon the Air Quality Related Values in the Bridger, Fitzpatrick, and Popo Agie Wilderness Areas. All appropriate measures identified in the supplement that further mitigate impacts to air quality will be required as part of the Moxa Arch and Fontenelle Records of Decision, or that are subsequently required by the State of Wyoming Department of Environmental Quality-Air Quality Division, will also be applicable to Texaco's Stagecoach Draw project and subsequent developments within the air quality analysis area.

Comment 13-3. A supplemental document, entitled *Technical Support Document Addendum* is included with the FEIS that examines the cumulative impacts of both the Moxa Arch and Fontenelle fields, and other developments such as existing power plants, trona plants, portions of the I-80 corridor, and railroad traffic. Emission sources which are not located in the Moxa Arch-Fontenelle-Stagecoach-Jonah area, have also been included in the cumulative modeling effort (including Greater Wamsutter, Mulligan Draw, Creston-Blue Gap, Dripping Rock, Hay Reservoir, and BTA Bravo).

Comment 13-4. WDEQ, Air Quality Division has provided more recent background concentration data collected at Seedskaadee National Wildlife Refuge and at Craven Creek Site (Memorandum from B. Dailey, Engineering Supervisor, to Mr. C. Collins, Administrator, WDEQC, September 22, 1995). These background data were used in the *Technical Support Document Addendum*.

Comment 13-5. The *Technical Support Document Addendum* considers the impacts of production as well as field construction.

Comment 13-6. The *Technical Support Document Addendum* also considers the effects of dehydration units, compressor engines, and other sources of emissions as appropriate.

Comment 13-7. The VISCREEN screening model computes plume/sky/terrain contrast. The VISCREEN model includes implicit assumptions about plume transport, chemical conversion, and light attenuation, all of which ensures that the computations are highly conservative. If a particular application fails the VISCREEN analysis, then users are advised to adopt a less conservative analysis, such as VISCREEN2 or PLUVUE. Use of VISCREEN is required by the EPA for all PSD sources which may impact Class I areas. The VISCREEN model is not appropriate for analyzing regional haze, nor does it claim to simulate regional haze.

Comment 13-8. The USFS should provide a copy of the model to BLM.

Comment 13-9. The *Technical Support Document Addendum* discusses NOx mitigation.

State Of Wyoming - Office of the Governor

Comment 14-1. BLM agrees that the proposed wells could have a substantial economic benefit for the State of Wyoming in terms of severance, sales and use tax revenues as well as benefits associated with the continued employment of local contractors, workers and service personnel. BLM is aware of a recent poll published in the

Casper Star-Tribune (October 10, 1995) which found that an estimated 77 percent of the State "supported the development of more natural gas in Southwest Wyoming." The analysis of proposed infill drilling considered the existing infrastructure and oil and gas production in the Fontenelle area.

Wyoming Game and Fish Department

Comment 15-1. Estimates of average well density are not very useful over such a large area. The cumulative impact study area is 965 square miles and well density is highly variable. For this reason, the DEIS provided more specific breakdowns on well density (see p. 3-6, for example). Some townships (36 square miles) were found to have over 300 wells while others had only 1 well.

Comment 15-2. Actually several models were used to assess impacts to wildlife. See Appendices C-E of the DEIS as well as the Technical Report provided to the Wyoming Game & Fish Department.

Comment 15-3. The technical report was provided to the Department several months ago. The third party consultant who prepared and ran the models has expressed his willingness to answer any questions. A technical presentation on the models was provided to several district and state office Wyoming Game & Fish Department biologists. No additional requests for presentations have been received.

Comment 15-4. BLM maintains documentation of actual revegetation success on federal surface disturbing activities. However, the models used to assess existing and future impacts to pronghorn and other species (p. 10, Technical Report) assumed that no successful reclamation had occurred or would occur on pipeline rights-of-way, abandoned roads or locations or roadsides. Therefore the analysis is much more likely to have overstated impacts to wildlife and understated the likelihood and benefits of successful reclamation.

Habitat losses were quantitatively disclosed--see Table 4-37 through 4-40. Quantitative assessments of impacts by vegetation type were also disclosed (see Section 4.18). Impacts to wildlife, as shown with the habitat models (Appendices C-E), are more than a straight measure of acres of disturbance. The models suggest that an additional well pad in an area of low probable habitat effectiveness has less impact than an additional well pad in an area of high probable habitat effectiveness.

The DEIS included a broad range of environmental protection and mitigation measures related to reclamation, protection and restoration of riparian areas, soils, water quality and revegetation. The reader is urged to review these sections of the DEIS as well. Some of the management actions suggested by the responder--such as adjusting grazing allotments, retiring allotments, fencing habitats, modifying problem fences, negotiating conservation easements--are beyond the scope of reasonable mitigation. For proposed BLM management actions within the Green River Resource Area, the responder is urged to review the final Resource Management Plan.

Comment 15-5. Thank you for the comment. Your concerns will be considered during BLM's preparation of its Record of Decision.

Comment 15-6. See responses to Comment #7-10, 10-14, 11-5, 11-10.

Comment 15-7. See responses to Comment #7-24, 10-16, and 21-10. Where there is the potential to adversely affect this species, BLM fully intends to require surveys and appropriate mitigation as part of BLM's APD or right-of-way permit processes.

Comment 15-8. The primary vegetation types affected would be low density sagebrush and greasewood/saltbush. For example, 500,000 acres of low density sagebrush are found in the 617,000 acre cumulative impact study area compared to 71,811 acres of high density sagebrush. Reclamation in sagebrush areas would not in itself be difficult; rather reclamation is more likely to be affected by slope and soil conditions and precipitation. Grading would be

minimized to reduce disturbance to shrubs and surface pipeline is proposed for use in the DALEN project area. Seed mixtures would incorporate shrub species but, as noted in the DEIS (p. 4-60), "...it could take 10 to 20 years for shrubs on these disturbed areas to reach preconstruction conditions." In the meantime, these areas would have been stabilized and revegetated with other species. The BLM is open to suggestions from the Wyoming Game & Fish Department as to where "reclaiming small areas of dense sagebrush to earlier succession may be beneficial." The DEIS considers existing as well as future loss of shrub vegetation.

Comment 15-9. Numerous environmental protection and mitigation measures discussed in the DEIS have implications for wildlife but may have been discussed in other sections such as chapter two and the soils, vegetation, wetlands, riparian resources and water quality sections of chapters three and four. The reader is urged to consider this discussion elsewhere in the DEIS. For example, the Resource Protection Alternatives include the avoidance of impacts to wetland and riparian vegetation which is important to wildlife. The discussion of impacts to soils includes measures intended to improve revegetation, reduce the amount of surface disturbance related to long-term production activities and restore native species to disturbed areas. Loss of big game crucial winter range is not simply a matter of acres of disturbance; rather, the DEIS has attempted to provide an explanation of the existing quality of big game winter range that would be disturbed. The analysis considers areas of potential high quality winter range as well as where existing development or inadequate environmental conditions (e.g., lack of water) limit the effectiveness of existing winter range. The models used in this analysis consider the indirect loss of habitat due to displacement (see Appendices C-E) from roads, for example, as well as the direct loss of habitat from production facilities. Imposition of a restriction which prohibits drilling in big game crucial winter range during the winter is, in part, intended to reduce indirect impacts such as traffic and displacement of animals.

Every effort is made to identify reasonable mitigation of wildlife impacts. In the process of identifying such measures, it is important to recognize that this must be accomplished within the policy framework of the Federal Land Policy and Management Act (FLPMA). FLPMA mandates multiple-use management of the public lands. In accordance with FLPMA (Sec. 103 (l)), management of the public lands within the Fontenelle projects area would occur so that the principal and major uses of grazing, fish and wildlife habitat development and utilization, mineral exploration and development, transportation, outdoor recreation (petrified wood collecting), and rights-of-way are maintained, not excluded. FLPMA (Sec. 103(c)), in its definition of multiple-use, provides for "making the most judicious use of the land for some or all of these resources"; and "the use of some land for less than all of the resources". Thus, certain impacts associated with oil and gas development are inherent to accommodating this multiple-use. Surface disturbance, human activity, facilities, visual intrusion, etc., impacts are necessary. Therefore, it would be unreasonable to expect mitigation of oil and gas development impacts to include such measures as eliminating livestock grazing. However, it may be appropriate to reduce AUMs commensurate with long-term forage taken out of production. Fencing riparian areas would be appropriate only if as a result of the development animals are drawn onto or forced onto riparian areas such that a deterioration of the riparian area occurs.

Comment 15-10. See response to Comment #7-17 and 10-26.

Comment 15-11. See Section 2 Errata for clarification.

Comment 15-12. Gathering lines, as noted in the DEIS (p. 2-13), are "typically 3 to 4 inches in diameter." Such lines are not a barrier to wildlife migration; therefore the suggested measures would not apply.

Comment 15-13. This has been identified in the DEIS. See Section 4.22.3.4 and 4.22.4.4. Thank you for the suggestion on available education materials.

Comment 15-14. See response to Comment #7-33.

Comment 15-15. In general, producing gas wells have few surface facilities--usually a meter and dehydration unit. This equipment creates little or no noise audible 50 feet away. Noise from a drill rig drops to background (30-40 dBA, depending upon local conditions) within 0.75 miles or less. This source is temporary and can be scheduled to avoid impacts to breeding and nesting sage grouse. Rather than imposing this restriction to reduce potential impacts on sage grouse, BLM would apply its state-wide conditions which require limitations on activities within the sage grouse nesting habitat. See Section 2 [Errata](#) for clarification of these conditions.

Surface uses and activities are not allowed within 0.25 miles of an active lek during the sage grouse mating season (between February 1 and May 15) between the hours of 6:00 PM and 8:00 AM. If an occupied sage grouse nest would be adversely affected, surface uses and activities would be delayed in the affected area until nesting has been completed. Field evaluations of sage grouse leks would be conducted by a qualified biologist in sage grouse nesting habitat (usually up to 2 miles of a lek) between February 1 and July 31.

Comment 15-16. Before any water withdrawal can occur from the Green River, a permit must be obtained from the Wyoming State Engineers Office. BLM does not regulate water withdrawal points on private land. However, BLM agrees that if existing water withdrawal sites are not contributing to sedimentation of surface water, these sites should be used rather than developing new sites. See Section 2 [Errata](#) for clarification. The DEIS includes specific measures intended to minimize the impacts of water withdrawal sites on water quality in the Green River (see Section 4.15.5).

Comment 15-17. The responder is correct in noting that draining of the reservoir has occurred for repairs to the dam. However, according to the Bureau of Reclamation, some removal of accumulated sediment occurred at the time repairs were being completed.

Wyoming Oil and Gas Conservation Commission

Comment 16-1. Thank you for your comment. Your concerns will be considered during BLM's preparation of its Record of Decision.

Wyoming State Geological Survey

Comment 17-1. Thank you for your comment. Your concerns will be considered during preparation of the Record of Decision.

Comment 17-2. No buildings have been proposed.

Comment 17-3. Thank you for your comment. BLM agrees that paleontological resources are unlikely to be adversely affected. In areas of proposed disturbance with a potentially high probability of locating such resources (i.e., the Blue Forest), BLM could require site-specific surveys and clearances. See Section 2 [Errata](#) for clarification of survey requirements.

Wyoming Public Service Commission

Comment 18-1. Thank you for your comment. No leasing is involved. BLM strives to minimize impacts on other resources and not to require any unreasonable restrictions.

U.S. Bureau of Reclamation

Comment 19-1. The Bureau of Reclamation was notified at scoping and has been involved from the initiation of the Fontenelle Projects EIS. Mr. Dave Krugar of your office was the contact. Dave reviewed the DEIS and

provided comments, including the *BOR Stipulations for Surface Use, Oil and Gas well Drill Sites, and Access Roads* that appear in Appendix H. Your additional comments have been considered in drafting the FEIS. An address correction has been made to ensure proper delivery of the FEIS.

Comment 19-2. See Table 3-1.

Comment 19-3. Issuance of rights-of-way will be in accordance with 43 CFR 2882.2-2. Where a right-of-way involves the Federal lands of two or more Interior agencies or the Federal lands of two or more non-Interior agencies, the Bureau of Land Management is the lead agency for processing the applications. The Bureau of Reclamation has been incorporated into Table 1-1 for processing rights-of-way on Federal lands under the jurisdiction of the Bureau of Reclamation. See Section 2 [Errata](#) and response to Comment #20-1.

Comment 19-4. Thank you for the comments. Appropriate clarifications have been made. See Section 2 [Errata](#).

Comment 19-5. See Section 2 [Errata](#).

Comment 19-6. See DEIS Table 4-5.

Comment 19-7. See Section 2 [Errata](#) for inclusion of reclamation stipulations. Also see DEIS Appendix H.

Comment 19-8. See DEIS Table 4-5.

Comment 19-9. See Section 2 [Errata](#) for clarification of BLM and Bureau of Reclamation responsibilities.

Comment 19-10. See Section 2 [Errata](#).

Comment 19-11. Due to the extensive size of the project areas and cumulative impact study area, the possibility that much of the area may not be developed for years, and the fact that specific project locations have not been staked, it would be infeasible to conduct a Class III (field) survey of the project areas at this time. Surveys would be conducted as needed on a site-by-site basis. See Section 2 [Errata](#) for clarification of requirements.

Comment 19-12. See Section 2 [Errata](#).

Comment 19-13. See Section 2 [Errata](#) and DEIS Appendix H.

Comment 19-14. Because activities in the DALEN and Lincoln Road project areas would be geographically separate and isolated from the Stagecoach and Jonah fields, the proposed activities would not contribute to cumulative impacts on the listed, area-specific resources within the Stagecoach and Jonah field. See Section 2 [Errata](#) for clarification. Cumulative impacts discussed under each resource in chapter four generally apply to the cumulative impact study area defined in chapter one.

Comment 19-15. These impacts have been recognized where they occur. As stated in the EIS (p. 4-10), "The Stagecoach project would add 250 acres to direct, cumulative impacts on antelope winter range but would not add to direct, cumulative impacts on other big game (e.g., mule deer, moose, elk) crucial winter ranges. No big game crucial winter ranges would be affected by the Jonah development." While the Stagecoach development would add to impacts on antelope crucial winter range, the BLM has concluded that "The additional impacts associated with the Stagecoach development are not expected to substantially alter the overall conclusions reached in this EIS in regard to impacts on, and the availability of, big game crucial winter range..."

Comment 19-16. Increased recreational use can be a positive or negative impact. However, given that the major transportation network is already in place, little increase in recreation use due to road construction or improvements is predicted.

Comment 19-17. See Section 2 [Errata](#).

Comment 19-18. See Section 2 [Errata](#). Stabilization of reclaimed sites is also important to ensure that off-site sedimentation is minimized.

Comment 19-19. See Section 2 [Errata](#). Some loss of forage would be an unavoidable impact.

Comment 19-20. Neither the grazing permittee nor the oil and gas operator will make this decision. This decision will be made by BLM (and BOR where BOR jurisdictional lands are affected) as part of its review of transportation plans submitted by oil and gas operators. See Section 2 [Errata](#) for clarification.

Comment 19-21. The DEIS is not a decision document. See response to Comment #10-32. The original language is retained.

Comment 19-22. See Section 2 [Errata](#).

Comment 19-23. Specific items are discussed in Section 5.2.1.

U.S. Fish and Wildlife Service

Comment 20-1. Where suitable habitat for a threatened, endangered or candidate species is lacking in the cumulative impact study area (e.g., marshes, grain fields near water), or would not be affected by project activities (e.g., lands within SeedsKadee NWR or within 0.25 miles of its boundaries), BLM believes that additional, lengthy discussion is not warranted. BLM is always willing to consider historical data from U.S. Fish & Wildlife Service on populations of special status species. To date, however, no such data has been provided by the U.S. Fish & Wildlife Service or located by those preparing the DEIS. Therefore, the BLM has chosen to analyze impacts on habitats which conceivably could be used by such species. Given that the proposed projects have been designed to have minimal impact on such habitats, it seems reasonable to conclude that the projects would make a minimal, if any, contribution to cumulative impacts on these species. In addition, no critical habitat for federally-listed species would be affected. BLM has taken a cautious course of minimizing or avoiding impacts to habitats and, given the dynamic nature of the resource, conducting future surveys to ensure that project activities are designed and scheduled to avoid adverse impacts.

Comment 20-2. This comment deals with matters outside the scope of this EIS.

Comment 20-3. The document under review is a draft EIS, not an environmental assessment. Under NEPA an environmental assessment is prepared to assist the decision-maker in making a determination of impact significance. An EIS must be prepared if the environmental assessment suggests that there is the potential for significant impacts. For this reason, BLM has chosen not to prepare an environmental assessment but to prepare an EIS. The EIS incorporates a biological assessment of the likelihood that the proposed projects would jeopardize the continued existence of a Federally-listed species or result in the destruction or adverse modification of critical habitat for such species. See Section 2 [Errata](#) for reference to the BLM's Southwest Wyoming Resource Evaluation initiated in February 1995.

Comment 20-4. See Section 2.3.3.2 for a discussion of disturbance. The DEIS notes that there would be no grading, blading or ditching. Vegetation would be subject to trampling but would regenerate.

Comment 20-5. Identification of new areas for ferret reintroduction is beyond the scope of this EIS. To date, no potential reintroduction areas or potential critical habitat for black-footed ferrets have been identified by the U.S. Fish & Wildlife Service or the BLM within the project areas.

In consultation with the U.S. Fish & Wildlife Service, BLM would require ferret surveys where necessary to ensure that proposed oil and gas development activities to ensure that appropriate conservation recommendations are taken and that no Federal action on the part of BLM would jeopardize the continued existence of the black-footed ferret or result in the destruction or adverse modification of critical habitat for that species. BLM would require the implementation of conservation recommendations and suggestions from the U.S. Fish & Wildlife Service regarding measures to minimize or avoid adverse effects of an activity on listed species or critical habitat, or the development of information about such species. BLM would continue to consult with the U.S. Fish & Wildlife Service regarding these comments and recommendations given that changes in the captive breeding and reintroduction program could alter survey guidelines and conservation recommendations.

BLM has already recognized the need to avoid impacts to prairie dog colonies that may support black-footed ferrets and has adopted state-wide policies regarding the protection of black-footed ferrets (p. 4-73). However, as noted in the EIS, the boundaries of prairie dog colonies are dynamic; therefore BLM would implement the following measures (p. 4-73): "If a proposed construction site would affect prairie dog colonies that might be suitable for habitat for black-footed ferrets, BLM would give the operator the option of relocating the project components to avoid direct impacts to prairie dog burrows. If this is impossible, BLM would require that a survey be conducted to locate black-footed ferrets in accordance with U.S. Fish & Wildlife Service guidelines (USFWS, 1988). If black-footed ferrets or their sign were discovered during surveys, all subsequent activities in the project area would be coordinated with USFWS." These measures have been reviewed and approved by the U.S. Fish & Wildlife Service in past NEPA processes. These measures would be revised as necessary to ensure compatibility with future changes in the Service's ferret program. Despite surveys in the cumulative impact study area (p. 3-50 - 3-52), there have been no confirmed sightings of black-footed ferrets in either project area. Nor have past surveys in portions of the project areas identified habitat suitable for their reintroduction (p. 3-50).

BLM has recommended the adoption of stormwater and sediment control devices (see Section 4.17.5). Road construction would be coordinated in accordance with the Road Development Plan (Appendix D of this FEIS) and the transportation plan and roads would be constructed in accordance with BLM road standards. Handling, transport and disposal of hazardous materials must be done in compliance with State and Federal regulations. All hazardous materials must be disposed of in an approved, permitted facility. Alternative methods to minimize disturbance (for example, use of surface line, co-location of roads and pipelines) have been explored. No waste water discharges are proposed. See Section 2 [Errata](#) concerning hydrostatic test water. No landfill activities are proposed. Solid waste would be hauled to an approved landfill or other disposal facility. Habitat enhancements to encourage the establishment of prairie dog colonies is beyond the scope of this EIS. Drill holes would be plugged, abandoned and marked in accordance with Federal and State regulations.

Comment 20-6. The Recovery Program fee is a one time fee based upon the maximum annual depletion; which would be roughly 40 acre feet per year for full development under this EIS. According to past correspondence received by BLM from the U.S. Fish & Wildlife Service, the Service has adopted a policy that if average annual depletion of a project falls below 125 acre-feet, payment of the fee is not required. If this is not the case, please provide written clarification. Payment of the per acre-foot fee to the Recovery Program is intended to mitigate potential, adverse impacts to threatened and endangered species of fish in the Colorado River Basin that would occur as a result of water withdrawals. BLM has required, and would continue to require, oil and gas operators to pay this fee to ensure that potential, adverse impacts to Federally-listed species of fish in the Colorado River Basin have been adequately mitigated and that, with implementation of this conservation measure, the proposed activities would avoid the likelihood of jeopardizing the continued existence of Federally-listed species or result in the destruction or adverse modification of critical habitat for such species. The U.S. Fish & Wildlife Service is being asked to concur in this finding.

Comment 20-7. BLM applies a one mile buffer area to nesting ferruginous hawks. See Section 2 Errata for correction and clarification.

Where potential nesting habitat exists, BLM requires surveys for nesting raptors to ensure that nests are identified and protected. Project activities would not affect key nesting habitats such as the Green River in Seedskaade NWR and land adjacent to the Big Sandy River. Considering the Green River Resource Management Plan as well as the results of past surveys, BLM has identified no raptor concentration areas within the project areas which would require preparation of a raptor management plan similar to those developed for raptor concentration areas identified in the BLM Platte River or Great Divide Resource Areas. Preparation of raptor management plans for areas outside of the DALEN and Lincoln Road project areas is beyond the scope of this EIS. BLM has made an addition to the Fontenelle FEIS Section 2 Errata, as provided for in the Stagecoach Draw EIS Record of Decision, to ensure appropriate protection of raptors.

Comment 20-8. See additional discussion of bald eagles in Sections 4.21.3.2., 4.21.4.1, 4.21.4.2 and 4.21.4.4. As pointed out in these other sections, the Resource Protection Alternatives require that "...no surface disturbing activities would occur between November 15 and March 15 within known bald eagle winter use areas thereby reducing potential impacts to eagles at roosts, perches and feeding areas. No permanent and high profile structures would be located within 1,970 feet (0.60 km) of an active bald eagle nest site" (see Section 2 Errata for change to DEIS p. 4-79). Prior to surface disturbing activities during the nesting season or in wintering areas, BLM would require completion of a field survey in these areas. The DEIS included the following mitigation measures:

"Surveys to locate bald eagle roost trees, perch sites and feeding areas along the Green River should be conducted to ensure that appropriate mitigation measures (buffer areas, scheduling, etc.) are being implemented." This requirement primarily would pertain to activities proposed by DALEN within the Green River riparian zone. None of the activities in the Lincoln Road area would occur within this riparian zone and the nearest well is approximately 0.75-1.0 miles from the Green River.

Comment 20-9. The mountain plover is not a Federally-listed species at this time. Given the broad habitat preferences of this species--including saltbush and low density sagebrush--some habitat impacts would be unavoidable. For this reason, BLM has chosen to focus on protecting individual birds and nests. Limitations on use of off-road vehicles is viewed as a key measure toward protecting this ground-nesting bird. The Resource Protection Alternatives incorporate such measures.

The "loss" of 9,156 acres is inaccurate. As stated in the DEIS, under the DALEN Proposed Action 750 acres of potential plover habitat (saltbush, low density sagebrush) would be disturbed by construction activities; 274 acres by long-term production activities and the difference (476 acres) reclaimed. Under the Lincoln Road Proposed Action, 6,576 acres of saltbush and low density sagebrush would be disturbed by construction activities and 1,556 acres disturbed by long-term production activities with the difference (5,020 acres) reclaimed. Cumulative impacts in terms of potential habitat loss by vegetation type have been addressed--see Tables 4-29 through 4-32.

The BLM thanks the U.S. Fish & Wildlife Service for providing the survey guidelines. BLM will incorporate the guidelines into Section 2 Errata of this FEIS as a measure that could be applied as appropriate in potential plover habitat. It would be helpful if the Fish & Wildlife Service would provide information on the source of these guidelines, i.e., do they represent final, U.S. Fish & Wildlife Service-approved guidelines? Are they currently under review? What process was used to develop and adopt these guidelines? Will BLM and the public be offered the opportunity to comment on these guidelines?

Comment 20-10. The DEIS is not a decision document. See response to Comment #10-32 regarding appropriate language for mitigation measures. The original language is retained. The Proposed Action would incorporate all applicable Federal (including BLM), State and local regulations. However, the Resource Protection Alternatives

expand this to include mitigation measures that were still in the draft stage as the Green River Resource Management Plan.

Comment 20-11. The sentence referred to is saying that wetland habitat loss due to oil and gas development has been negligible. This is because typically oil and gas development has not occurred within wetlands.

Comment 20-12. The responder requests that the cumulative impacts section identify "other proposed projects that are related to this project ... this would include all approved and proposed oil and gas development projects in southwestern Wyoming". Other than the projects addressed in the Fontenelle DEIS, no other oil and gas drilling projects occurring in southwest Wyoming are related to the DALEN or Lincoln Road projects. The Proposed Actions have included all reasonably foreseeable and connected actions. In practice, the DALEN and Lincoln Road projects, Stagecoach, Jonah, East LaBarge and Bird Canyon projects are primarily related to each other in terms of their overlapping use of an existing road-pipeline infrastructure. The level of well drilling that actually occurs under the DALEN project would be unrelated to activities occurring as part of the Lincoln Road project. DALEN could decide to abandon its project without affecting the feasibility, construction or operation of the Lincoln Road project. Also see response to General Comment A and comments #5-2, 5-3, 6-4, 7-2, 7-3, 9-2 and 10-4.

BLM's publication "*Guidelines For Assessing and Documenting Cumulative Impacts*" (April 1994) was used as a guide in selecting the cumulative impact analysis area. Based upon the specific boundaries of the proposed action, the impacted resources and their affected environment were identified. Cumulative impacts were analyzed in terms of the specific resource or ecosystem being impacted. For example, the physical boundaries of the Fontenelle Infill Projects cumulative impact analysis area (i.e., the Cumulative Impact Study Area (CISA) and Developments Outside the CISA [DEIS 4.2.3]) included the watersheds, the viewsheds, the biological boundaries (such as the habitat of the Sublette antelope herd unit), and other existing and reasonably foreseeable activity in these affected areas.

As BLM guidelines provide, it is not practical to analyze the cumulative impacts of a specific project on an entire region. Rather, the scope of the analysis should be based on the resource complexity of the area in which the impacts of the proposed action will be felt and on the degree of other activity in that area. Additive impacts were considered and included insofar as they related to the given resource being addressed. Interactive impacts were addressed insofar as they synergistically influenced each other. For example, the Fontenelle project affected only the Sublette antelope herd, as did the other activity in the affected area (Stagecoach Draw and Jonah project areas). There is no interactive impact between the Sublette antelope herd and the West Green River antelope herd unit (Moxa Arch project area). Thus, the cumulative impact analysis area did not include the herd unit west of the Green River.

Comment 20-13. No powerlines are proposed; therefore this discussion is not relevant.

Comment 20-14. Additional information has been furnished. BLM is seeking concurrence that the proposed activities are not likely to adversely affect the bald eagle or black-footed ferret.

SECTION 4 - APPENDICES

APPENDIX A - Summary/Table of Contents for the Air Quality Cumulative Impact Analysis Technical Report Addendum

APPENDIX B - Expanded Analysis of Directional Drilling Report of the BLM Wyoming Reservoir Management Group

APPENDIX C - Outline for Wildlife Protection and Impact Mitigation Plan

APPENDIX D - Road Development Plan

APPENDIX A

**Summary/Table of Contents
for the
Air Quality Cumulative Impact Analysis
Technical Report Addendum**

CUMULATIVE IMPACT ANALYSIS

EXECUTIVE SUMMARY

This Technical Support Document analyzes the cumulative air quality impacts of natural gas development at eight proposed natural gas developments:

- Moxa Arch Field
- Fontenelle Reservoir
- Stagecoach Draw
- Jonah Prospect Field
- Mulligan Draw
- Creston/Blue Gap
- BTA/Bravo Field
- Greater Wamsutter Area II

The purpose of this analysis is to determine the cumulative air quality impacts of pollutant emissions from all of these well fields together, coupled with the impacts of existing air pollutant sources in the vicinity, and with existing background air pollutant concentrations.

In reviewing this document it is important to understand the assumptions that have been made regarding resource development. In development of this analysis there is a great deal of uncertainty in the projection of specific plans (i.e. number of wells, equipment to be used and specific locations) for resource development for 20 years in the future. All of these factors affect air emissions as well as predicted air quality impacts. This analysis was based on the "worst case": 1) amount of development; 2) equipment necessary to produce the resource to its maximum capacity; 3) well spacing; and 4) assumed source locations. This emission scenario represents an upper bound which would not be exceeded. Review of current production activities in the area suggests that this level of air emissions and impacts would not be reached. Thus the impacts projected in this report should be viewed as a conservative upper bound estimate of potential air quality effects that are not likely to occur. It is also important to note that before development could occur, the Wyoming Department of Environmental Quality would require very specific air quality preconstruction permits which must examine project specific air quality effects. As part of these permits, (depending on source size), WDEQ would require a cumulative air quality impacts analysis. Thus, as development occurs additional site specific air quality analysis must be performed to ensure preservation of air quality resources.

The methodology in this Technical Support Document consists of five sequential steps:

First, well construction and operation scenarios were defined. These scenarios identified data which is needed to quantify pollutant emissions. These data include expected spacing, location, and number of wells; duration of construction and production activities; sizes and specifications of equipment that would be used during well drilling and operation, etc. Where there was uncertainty in specification, the general approach has been to estimate construction and operation sequences that would maximize air pollutant emissions, thereby ensuring that air quality impacts are not underestimated.

Second, the expected pollutant emission rates of proposed well field projects were calculated, using U.S. EPA emissions data and factors, as well as data provided by industry. This compilation of expected pollutant emissions, called the "emission inventory", quantifies the expected emissions that would occur if all of the projected well fields were constructed and operated. In this sense the emission inventory portrays a maximum, or "worst-case", indication of total pollutant emissions. Two distinctly different types of air quality analyses are required -- one a quantification of nearby effects (compliance with National Ambient Air Quality Standards (NAAQS) and Prevention of Significant Deterioration (PSD) increments), and the other an analysis of so-called "far field" impacts (visibility impairment, atmospheric deposition, and ozone formation). Consequently, different emissions scenarios were developed for single well emissions and for total well field emissions.

Third, the acquisition of representative meteorological data and existing background concentration data that

CUMULATIVE IMPACT ANALYSIS

characterizes the southwestern Wyoming environment was conducted. Because the well fields will be significant emitters of nitrogen dioxide (NO₂), a special air quality model run was made to simulate the transport and dispersion of NO₂ from existing major NO_x sources in southwest Wyoming. The findings of this model run were used to provide a measure of background NO₂ for this cumulative study.

Fourth, the meteorological data were used, in conjunction with the emissions inventories, to predict the maximum localized pollutant concentrations in the vicinity of the wells, and to calculate the pollutant concentrations at sensitive locations in the PSD Class I Bridger-Teton Wilderness area.

The fifth, and last sequential step, was the computation of potential impacts to Air Quality Related Values (AQRVs) in the Bridger-Teton PSD Class I area were made to quantify the impact of well field development on atmospheric deposition at sensitive lakes, and to compute the expected reduction in visual range (regional haze) caused by the proposed well development.

The findings of this cumulative analysis are as follows:

- The construction and operation of the eight well fields identified in this analysis would meet all applicable National Ambient Air Quality Standards (NAAQS) and Wyoming Ambient Air Quality Standards (WAAQS).
- Emissions expected from the eight proposed natural gas developments comply with applicable Prevention of Significant Deterioration (PSD) Class I and Class II Increments.
- Pollutant concentrations during production activity did not "overlap" from one well to adjacent wells, even with the densest assumed well spacing. That is, the maximum groundlevel concentrations from one well occurred at locations sufficiently close to the well that adjacent wells contributed insignificant concentrations to the overall maximum concentration.
- The impact of construction and operation of the eight proposed natural gas developments is below applicable significance criteria for atmospheric deposition within the Bridger-Teton Wilderness area. Computations of atmospheric deposition indicate that there will be no significant degradation of water quality even under "worst-case" emissions scenario.
- The modeled impact of the Moxa Arch, Fontenelle, Stagecoach Draw, and Jonah proposed natural gas developments examines impairment to visual range within the Bridger-Teton Wilderness area. Assuming a "worst-case" emissions scenario, only 8 days of the non-winter and 18 winter days are predicted to cause any perceptible visual range reduction; under the "less conservative" emissions scenario, no days exhibit visual range reduction.

CUMULATIVE IMPACT ANALYSIS

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UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

WYOMING RESERVOIR MANAGEMENT GROUP

ENGINEERING AND GEOLOGIC REPORT

DIRECTIONAL DRILLING ALTERNATIVES IN THE
FONTENELLE II - LINCOLN ROAD EIS AREA
LINCOLN AND SWEETWATER COUNTIES, WYOMING

October 27, 1995

APPENDIX B

Expanded Analysis of Directional Drilling
Report of the BLM Wyoming Reservoir
Management Group

Prepared By:

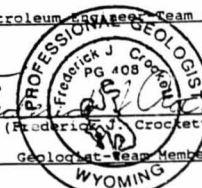
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EXECUTIVE SUMMARY

As requested by the Wyoming State Office, we have reviewed the directional drilling requirement proposed in the EIS for the Fontenelle II Unit and Lincoln Road projects. The enclosed report provides analysis of available information, suggests changes in applying the exceptions proposed in the EIS, comments on the effects of making a directional drilling requirement, and recommends procedures to be used in reviewing exception requests.

We recommend deleting that part of the proposed exception criteria that asks an operator to demonstrate that a directional well would be technically infeasible for geologic or physical reasons. There are no geologic or physical reasons to preclude a directional well.

At today's low gas prices, most directional well proposals would be uneconomic to drill. Only wells with very high recoverable reserves could be drilled. The information an operator would be required to submit on economics could be reviewed in the resource area. If verification is required, an analysis of the submitted recoverable reserve information would be difficult to do in the resource area. The large databases and analysis software needed to make a verification are not readily available there.

Hydrocarbons and royalties would be wasted if additional drilling pads could not be permitted. A reservoir analysis would need to be made on a well by well basis to determine reserves and resultant royalty not recovered. Any determination made could be controversial. Also a management decision would be needed in each case. This decision would determine whether losses of hydrocarbon resources and resultant royalties would be unacceptable when weighed against surface disturbance impacts.

REPORT OF THE ADVISORY TEAM

The Wyoming State Office asked the Wyoming Reservoir Management Group to review the "Fontenelle Natural Gas Infill Drilling Projects Draft Environmental Impact Statement" as it relates to application of a directional drilling requirement. An advisory team was formed and has provided an analysis which is summarized below. Some changes in applying the requirement are recommended and problems associated with applying an exception are discussed. Also, some recommendations on how to analyze exceptions to operator applications are made.

This review covers two proposed drilling project areas, Fontenelle II Unit (Attachment 1) and Lincoln Road (Attachment 2). In certain parts of these areas, operators have proposed drilling more than four wells per 640 acre section. The Resource Protection Alternative of this draft EIS proposes that in areas of sensitive surface resources, any wells in excess of four per section would be required to be drilled from existing well pads (Attachment 3). This alternative proposes an exception provision to allow additional well pads if certain criteria are met. Operators would be required to answer three items (Attachment 3) before an additional well pad could be considered in sensitive surface resource areas. Two of these items relate to geologic and economic aspects of the directional drilling requirement and have been reviewed by this team.

The team divided the two items into four specific questions for analysis. The team would have liked to prepare an analysis for specific areas where directional drilling would be required. Since the team was not able to obtain maps to analyze particular proposed site restrictions, a general analysis of the two project areas was prepared.

Each of the four questions is listed below and an answer is supplied. The team then provides an explanation discussing the analysis of known facts surrounding the question. A recommendation is then supplied that comments on the effects of applying this type of exception to the directional drilling requirement. Where appropriate, recommendations about making possible changes to the exception criteria are included.

1. Do geologic or physical reasons preclude directional drilling in the two project areas?

Answer: No.

Explanation: In the two project areas there are no geologic or physical reasons to preclude directional drilling to the target reservoirs. In fact, directional wells occur in both areas. Two directional wells are known from the Fontenelle II Unit and at least six are known from Lincoln Road. These

wells were directionally drilled because of topographic considerations or proximity to historical trail segments.

Recommendation: We recommend deleting from the proposed exception criteria that part of item 2 that reads "or technically (for geologic or other physical reasons) infeasible".

2. If drilling is limited to four well pads per section, would a directional drilling requirement make a well undrillable due to economics?

Answer: This question can be answered only on a well by well basis. At present, low gas prices would not allow most wells to be directionally drilled.

Explanation: An economic analysis was prepared for Fontenelle II Unit (Appendix A) and Lincoln Road (Appendix B). Both analyses related the costs of drilling vertical and directional wells at three different production rates and four different gas prices. The team also determined well payout times for each of these scenarios.

Analysis of Appendix A and B information for Fontenelle II Unit and Lincoln Road shows that at the present gas price of about \$1.00/MCFG, most directional wells would be uneconomic to drill. Only directional wells with large amounts of estimated recoverable reserves could be economically drilled. The team did find that if prices increase to \$2.00/MCFG, then most directional wells could be economically drilled. Only directional wells with estimated recoverable reserves of less than one BCFG would still be uneconomic to drill.

Recommendation: In their submission for exception, an operator would be asked to supply information on expected recoverable reserves, well costs, gas price, and payout. Some of this information could be reviewed in the resource area office. Making an analysis of the submitted recoverable reserves would be difficult to do in the resource area office, since the large databases and analysis software are not readily available at that location.

3. If additional drilling pads can not be permitted, would an unacceptable waste of hydrocarbons occur?

Answer: In almost all cases some waste of hydrocarbons would occur.

Explanation: The reservoir is broken up into small producing blocks or compartments. To be able to encounter all potentially producing compartments and drain them, a

relatively close well spacing is required. A discussion of why this compartmentalization occurs is presented in Attachment 4.

Attachments 5 (Fontenelle II Unit) and 6 (Lincoln Road) show selected wells with acres drained plotted against estimated recoverable reserves. This information gives some idea of the compartmentalization occurring in both areas. Both attachments show that only one well is capable of draining a compartment of 160 acres. Most compartments are smaller than 160 acres and many are smaller than 80 acres, indicating that significant amounts of hydrocarbons would not be recovered if drill pads are restricted to four per section and directional drilling is not economic.

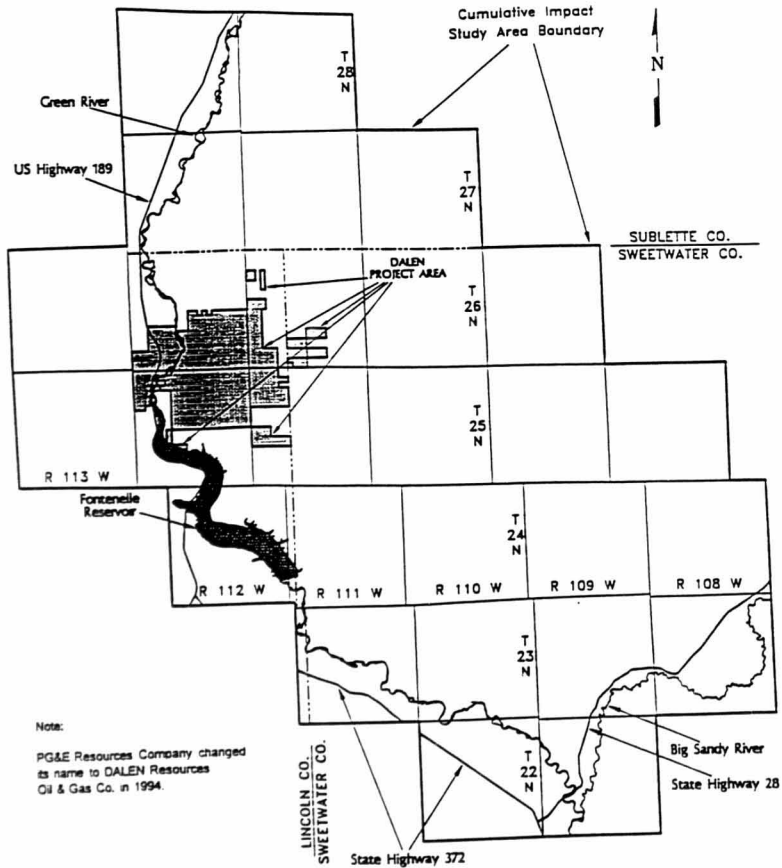
Recommendation: If additional drilling pads cannot be permitted in Fontenelle II Unit and Lincoln Road, hydrocarbons would remain in some compartments and not be recovered. A reservoir analysis would need to be made on a well by well basis to determine the amount of reserves not recovered. This analysis would be difficult to do in the resource area office, for the reasons described above in answer to question 3. Any determination made could be controversial. Also, a definition of unacceptable waste would need to be made. This definition would not be based on geologic or engineering criteria, but on some type of management balancing of potential reserve loss against losses due to surface disturbance.

4. If additional drilling pads can not be permitted, would an unacceptable loss of federal royalty occur?

Answer: In almost all cases loss of royalty would occur.

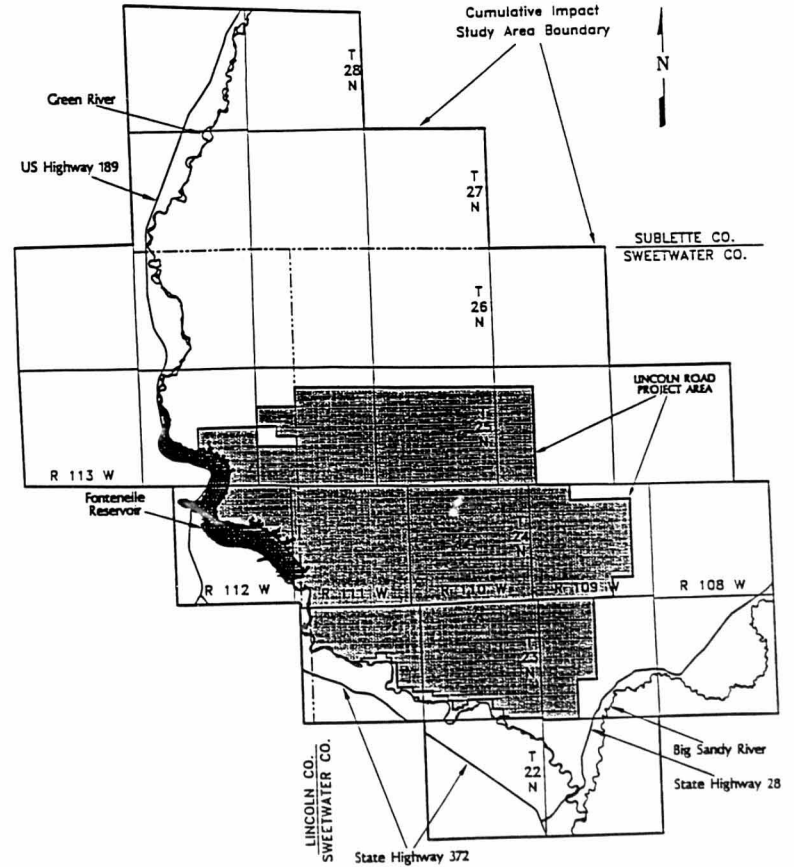
Recommendation: Since the team has found that if additional drilling pads cannot be permitted and hydrocarbons would not be recovered, then, royalties would also not be received. The study required to answer question 3 would be used to determine lost royalty on an individual well. Here also, a definition of unacceptable loss of royalty would need to be made and could be controversial.

ATTACHMENT 1 - Location of the Fontenelle II Unit (Dalen Project Area) and Cumulative Impact Study Area.



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ATTACHMENT 2 - Location of the Lincoln Road Project Area and Cumulative Impact Study Area.



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**ERRATA TO FONTENELLE INFILL DRILLING PROJECTS EIS
CONCERNING MAXIMUM NUMBER OF WELL PADS PER SECTION**

Page 2-20, left column, ¶ 3, lines 1-11 states,

"Directional Drilling Considerations. The RPA [Resource Protection Alternative] incorporates directional drilling to reach target bottom-hole locations where necessary to avoid sensitive surface resources such as wetlands, historic sites, etc., or to reduce unnecessary surface disturbance within crucial winter ranges, Class II viewsheds, etc. BLM will require the operator/lessee to consider directional drilling in areas of sensitive surface resources or to drill from an existing pad where four well pads already exist within a section."

In response to concerns identified by respondents commenting on the Fontenelle Natural Gas Infill Drilling Projects Draft EIS, the following change/addition would be made to the impact analysis section of the EIS as opportunity for additional impact mitigation.

Instead of the statement that BLM will require the operator/lessee to consider directional drilling in areas of sensitive surface resources or to drill from an existing pad where four well pads already exist within a section, the statement would be changed as follows to be more explicit.

Once there are four well pads within a section, BLM would require the use of an existing well pad to directionally drill additional wells within areas where sensitive surface resources exist. Sensitive surface resource areas within the Fontenelle Natural Gas Infill Drilling Projects area are defined as: Crucial winter range for antelope, deer and moose; sage grouse leks (1/4 mile radius), Blue Forest area (containing petrified wood collection area, sensitive landforms, concentration of vertebrate paleontology, and raptor nesting), and Class II Visual Resource Management areas (see map __).

Within the sensitive surface resource areas the number of well pads would be limited to 4 per 640 acres. Additional wells would be drilled from one of the existing well pads. The total number of well pads could not exceed the total analyzed in the EIS (i.e., total for the DALEN Project Area and total for the Lincoln Road Project Area).

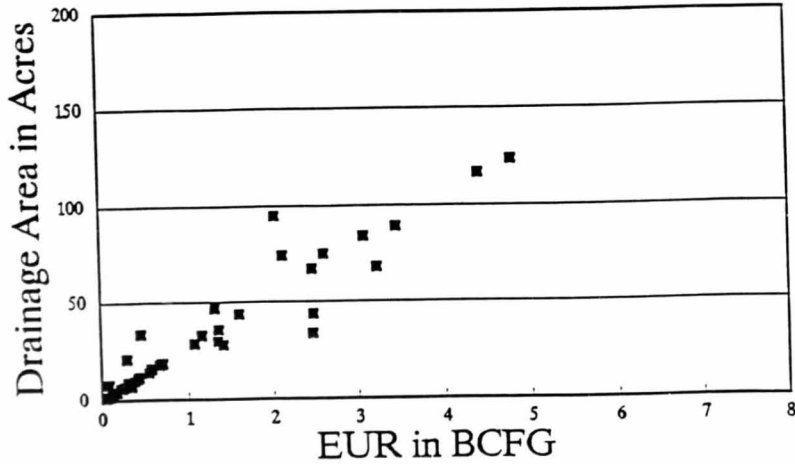
Outside the sensitive surface resource areas the number of well pads per section (e.g., 4, 6, 8, etc.) would be determined by site specific analysis of environmental limitations (e.g., steep slopes, sensitive soils, cultural or paleontological values, prairie dog complex of 8+ active burrows per acre constituting potential black footed ferret habitat, etc.).

SECOND FRONTIER COMPARTMENTALIZATION

The Second Frontier sandstones in the two areas reviewed were deposited in a wave-dominated, multi-river delta system (Winn et al, 1984). Sands were deposited as river, marine shoreline, and offshore sand ridge sediments.

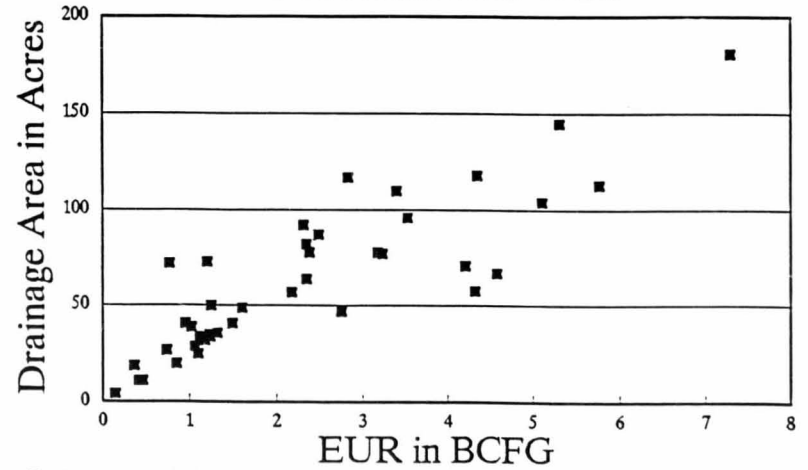
The Frontier Formation is a stratigraphically complex reservoir (Union Pacific Resources 1991, Doelger et al 1993, Moslow and Tillman 1986, Winn et al 1984, and Dutton and Hamlin 1992). These sources have indicated a number of reasons that cause the Frontier to be broken up into compartments that limit the area that can be drained by a well. Some of the reasons that lead to compartmentalization of Frontier sand bodies are: erosion of marine facies by overlying fluvial facies; capping of marine sequences by offshore shale; channel sands of limited areal extent; stacking of channels; shale drapes within channels; and porosity and permeability variations due to compaction and cementation. All this variation causes permeability and flow barriers to exist in both vertical and lateral directions within the different reservoir facies (Moslow and Tillman, 1986). High variation in average reservoir pressure differentials is an indicator of this compartmentalization (Moslow and Tillman, 1986).

Fontenelle Analysis Area 48 Frontier Fm. Wells



Drainage areas and EUR calculated by Dalen Resources Corp.
Average EUR is 1.10 BCFG and average drainage area is 30 acres.

Lincoln Road Analysis Area 50 Frontier Fm. Wells



Drainage areas calculated by Dalen Resources Corp. and Cabot Oil and Gas Corp.
Average EUR is 2.28 BCFG and average drainage area is 63 acres.

REFERENCES

- Doelger, M.J., D.M. Mullen, and Barlow & Haun, Inc., 1993, Frontier Formation: in C.A. Hjellming, ed., Atlas of Major Rocky Mountain Gas Reservoirs: New Mexico Bureau of Mines and Mineral Resources, p. 50 and 52.
- Dutton, S.P., and H.S. Hamlin, 1992, Interaction of Burial History and Diagenesis of the Upper Cretaceous Frontier Formation, Moxa Arch, Green River Basin, Wyoming: in C.E. Mullen, ed., Rediscover the Rockies: WGA Forty-Third Field Conference Guidebook, p. 37-50.
- Moslow, T.F., and R.W. Tillman, 1986, Sedimentary Facies and Reservoir Characteristics of Frontier Formation Sandstones, Southwestern Wyoming: in C.W. Spencer and R.F. Mast eds., Geology of Tight Gas Reservoirs: AAPG Studies in Geology, p. 271-295.
- Union Pacific Resources, 1991, Wyoming Oil and Gas Commission Docket #414-91.
- Winn, R.D. Jr., S.A. Stonecipher, and M.G. Bishop, 1984, Sorting and Wave Abrasion: Controls on Composition and Diagenesis in Lower Frontier Sandstones, Southwestern Wyoming: AAPG Bulletin v. 68, no. 3, p. 268-284.

APPENDIX A FONTENELLE FIELD ENGINEERING STUDY (VERTICAL AND DIRECTIONAL DRILLING)

The most appropriate method of determining economic feasibility of vertical versus directional drilling in the Fontenelle Field was to graph drilling costs of both types of wells against net present value and against recoverable reserves. Graphs were constructed at gas prices of \$1.00/MCFG, \$1.25/MCFG, \$1.50/MCFG, and \$2.00/MCFG. The net present value for both vertically and directionally drilled wells was calculated at these four gas prices, assuming three different initial producing rates.

Decline curve analysis was used to determine recoverable reserves assuming a range of three initial producing rates. The three initial producing rates used provide a range for analysis from wells thought to be marginally economic to very good productive wells. Initial producing rates and resulting calculated recoverable reserves for the three scenarios are:

1. Initial producing rate of 700 MCFGPD and recoverable reserves of 1,026 MMCFG (Reference Attachment No. A1);
2. Initial producing rate of 1,000 MCFGPD and recoverable reserves of 1,557 MMCFG (Reference Attachment No. A2); and
3. Initial producing rate of 1,300 MCFGPD and recoverable reserves of 2,087 MMCFG (Reference Attachment No. A3).

For each of the three scenarios a hyperbolic decline was assumed with an exponent of 2.25. Decline rate depends on the initial producing rate, with a greater initial decline rate for scenarios with greater initial producing rates. A cutoff of 30 MCFGPD was used to determine the point at which a well could not continue to be economically produced. Production projected below this economic limit of 30 MCFG was not included as part of the recoverable reserve for each scenario.

TRADITIONAL DRILLING METHODS

Drilling costs (including completion and surface facility costs) of \$680,000 for a vertically drilled well in the Fontenelle Field were obtained from Enserch Exploration, Inc. Drilling costs for a directionally drilled well were estimated to increase their cost by \$65,000 to \$745,000. The extra drilling costs were estimated assuming directional drilling expenses of \$80,000 with a potential savings of \$15,000 in road and pad construction and in surface facilities since a directional well would be drilled from an existing well location.

Once the recoverable reserves for the three scenarios were determined, the net present value was calculated. This value was calculated for both a vertically and directionally drilled well at gas prices of \$1.00/MCFG, \$1.25/MCFG, \$1.50/MCFG, and \$2.00/MCFG (Reference Attachment No. A4).

Graphs were then constructed which show the curves for a vertically and a directionally drilled well when recoverable reserves on the x-axis are plotted against net present value on the y-axis at gas prices of \$1.00/MCFG, \$1.25/MCFG, \$1.50/MCFG, and \$2.00/MCFG (Reference Attachment Nos. A5, A6, A7, and A8). Findings at each of these gas prices are listed below.

1. Attachment No. A5 shows that at a gas price of \$1.00/MCFG, recoverable reserves would need to be 2,530 MMCFG for a vertical well, and 2,758 MMCFG for a directional well, for the net present value to equal zero. Recoverable reserves need to be greater for a directionally drilled well than for a vertically drilled well with a difference of 228 MMCFG at \$1.00/MCFG.
2. Attachment No. A6 shows that at a gas price of \$1.25/MCFG, recoverable reserves would need to be 1,955 MMCFG for a vertical well, and 2,136 MMCFG for a directional well, for the net present value

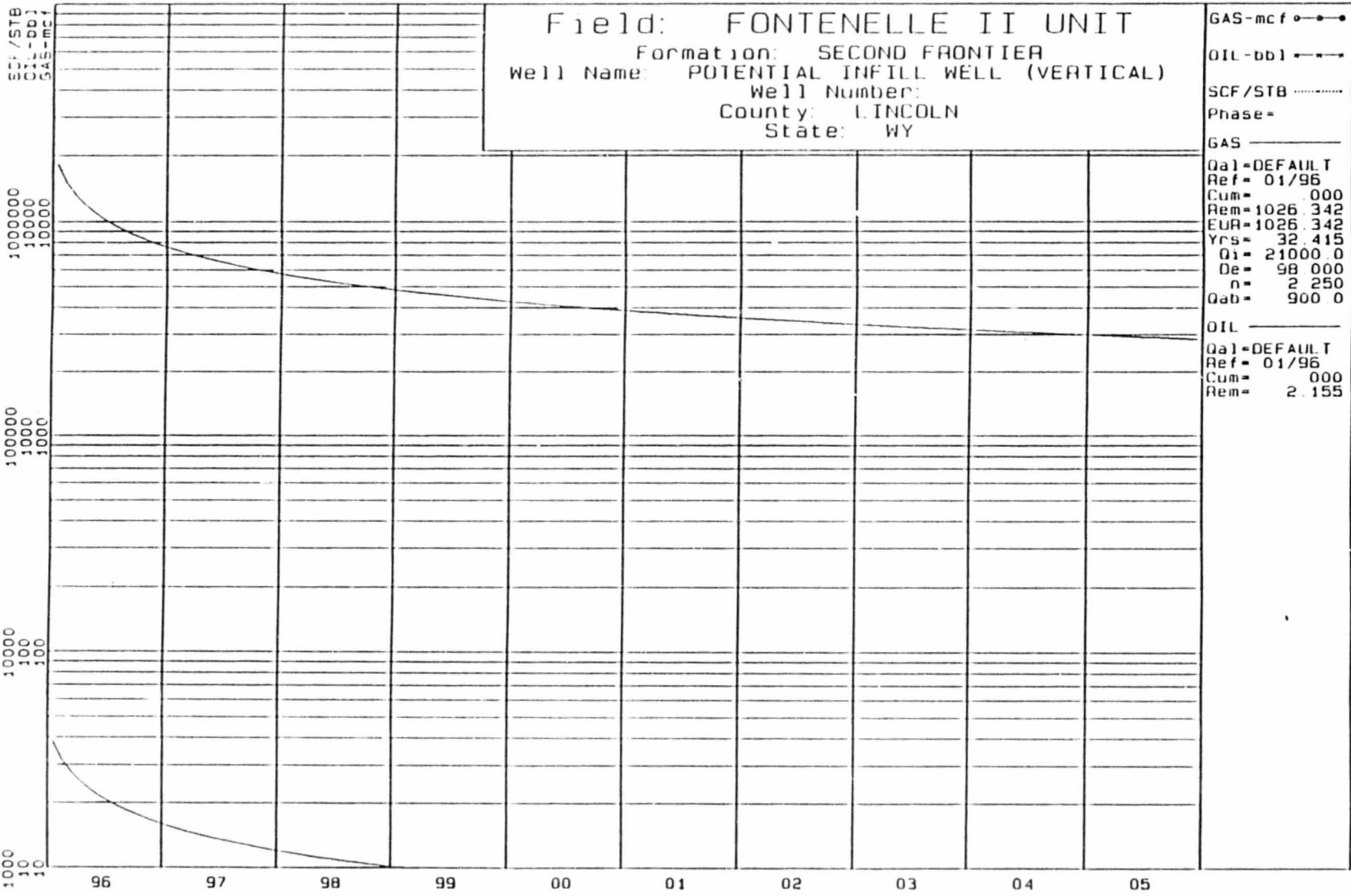
to equal zero. Recoverable reserves need to be greater for a directionally drilled well than for a vertically drilled well with a difference of 181 MMCFG at \$1.25/MCFG.

3. Attachment No. A7 shows that at a gas price of \$1.50/MCFG, recoverable reserves would need to be 1,591 MMCFG for a vertical well, and 1,742 MMCFG for a directional well, for the net present value to equal zero. Recoverable reserves need to be greater for a directionally drilled well than for a vertically drilled well with a difference of 151 MMCFG at \$1.50/MCFG.
4. Attachment No. A8 shows that at a gas price of \$2.00/MCFG, recoverable reserves would need to be 1,182 MMCFG for a vertical well, and 1,280 MMCFG for a directional well, for the net present value to equal zero. Recoverable reserves need to be greater for a directionally drilled well than for a vertically drilled well with a difference of 98 MMCFG at \$2.00/MCFG.

This information shows that the higher the gas price, the smaller the difference between recoverable reserves for a vertical and directional well.

CONCLUSIONS

1. A directionally drilled well with an initial producing rate of 700 MCFGPD could not be economically drilled at a gas price below \$2.00/MCFG.
2. A directionally drilled well with an initial producing rate of 1,000 MCFGPD could not be economically drilled at a gas price of \$1.00/MCFG, \$1.25/MCFG, or 1.50/MCFG. This well could be economically drilled at a gas price of \$2.00/MCFG, however, the payout time of 8.76 years at a gas price of \$2.00/MCFG would be considered excessive by industry standards.
3. A directionally drilled well with an initial producing rate of 1,300 MCFGPD could not be economically drilled at a gas price of \$1.00/MCFG or \$1.25/MCFG. This well could be economically drilled at a gas price of \$1.50/MCFG or \$2.00/MCFG, however, the payout time of 10.56 years at a gas price of \$1.50/MCFG would be considered excessive by industry standards.
4. The current spot natural gas price at Opal, Wyoming, as reported by Northwest Pipeline for October 1995 is \$1.05/MCFG. The average spot natural gas price for 1995 is only \$1.09/MCFG (Reference Attachment No. A9). At these current gas prices, a directionally drilled well could not be drilled economically until recoverable reserves were greater than 2,750 MMCFG. If gas prices were to rise to \$2.00/MCFG, recoverable reserves would still need to be greater than 1,275 MMCFG.



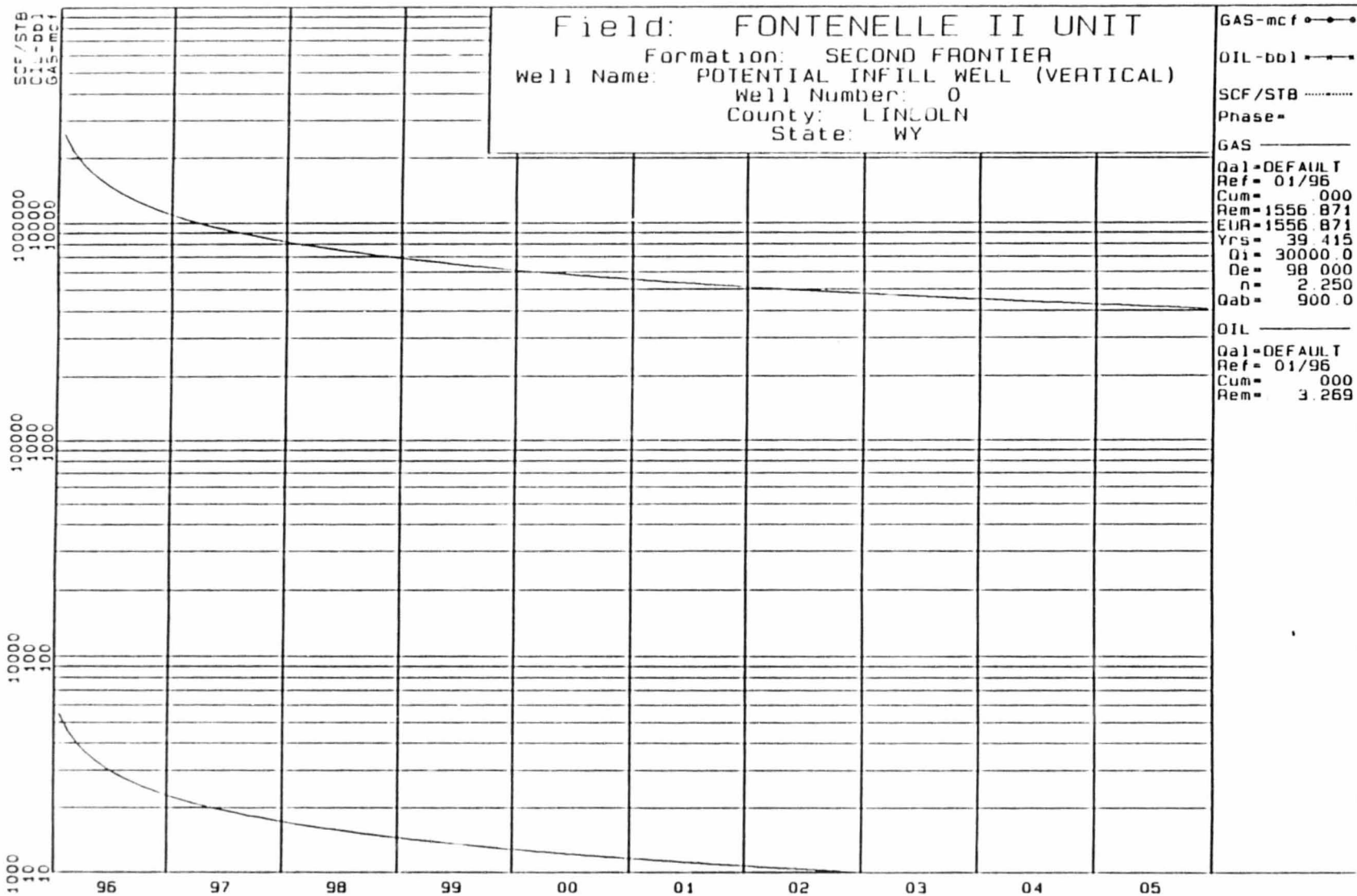
Field: FONTENELLE II UNIT
 Formation: SECOND FRONTIER
 Well Name: POTENTIAL INFILL WELL (VERTICAL)
 Well Number:
 County: LINCOLN
 State: WY

GAS-mcf ●—●—
 OIL-bbl ———
 SCF/STB
 Phase=
 GAS ———
 Qa1=DEFAULT
 Ref= 01/96
 Cum= 000
 Rem=1026 342
 EUR=1026 342
 Yrs= 32 415
 Qi= 21000 0
 De= 98 000
 n= 2 250
 Qab= 900 0
 OIL ———
 Qa1=DEFAULT
 Ref= 01/96
 Cum= 000
 Rem= 2 155

DATE

124

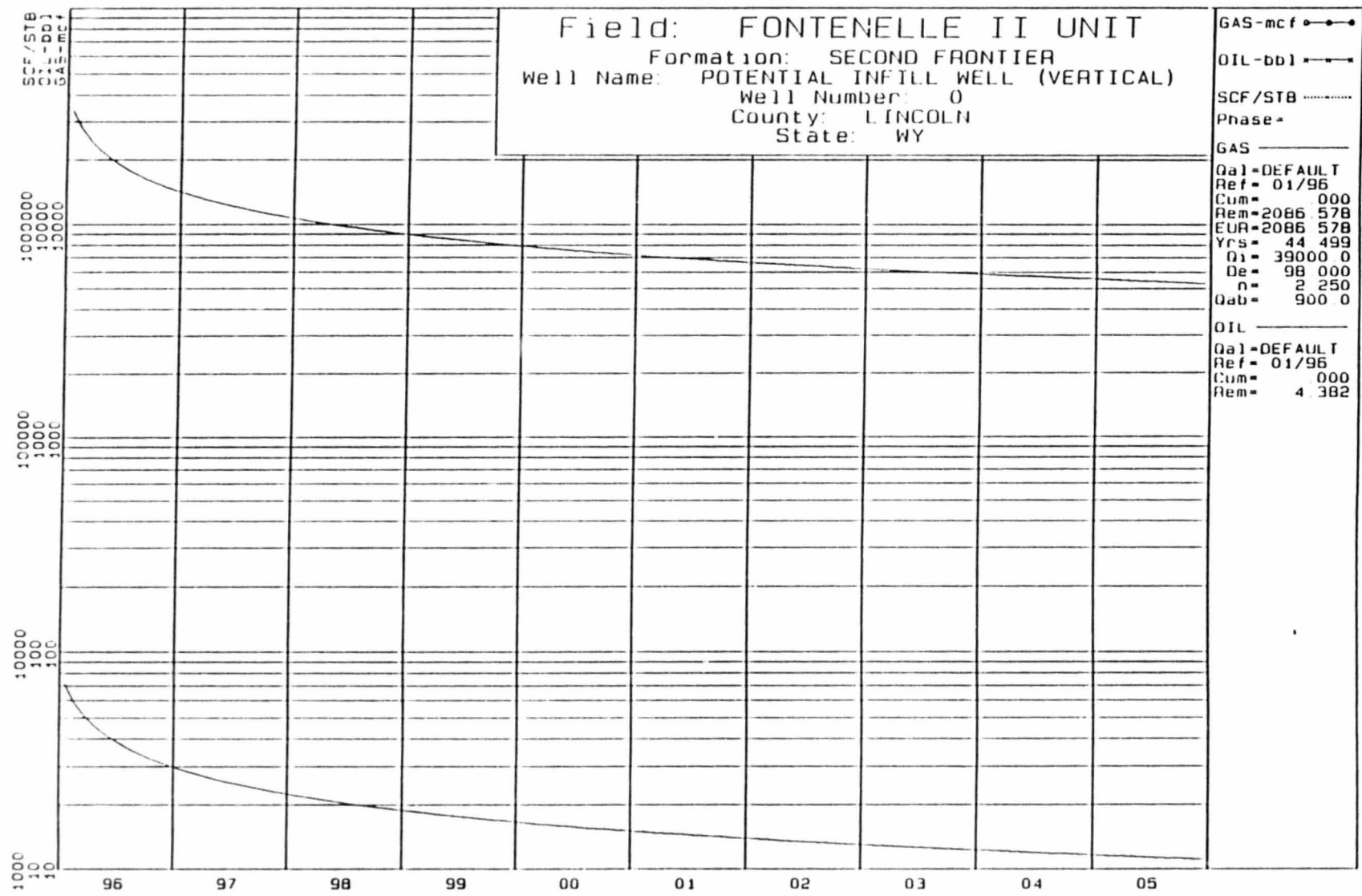
ATTACHMENT NO. A1 - Hypothetical Well (initial potential of 700 MCFGPD)



Field: FONTENELLE II UNIT
 Formation: SECOND FRONTIER
 Well Name: POTENTIAL INFILL WELL (VERTICAL)
 Well Number: 0
 County: LINCOLN
 State: WY

GAS-mcf ●—●—
 OIL-bbl - - - -
 SCF/STB
 Phase=
 GAS
 Qa1=DEFAULT
 Ref= 01/96
 Cum= 000
 Rem=1556.871
 EUR=1556.871
 Yrs= 39.415
 Qi= 30000.0
 De= 98.000
 n= 2.250
 Qab= 900.0
 OIL
 Qa1=DEFAULT
 Ref= 01/96
 Cum= 000
 Rem= 3.269

DATE
 /25



DATE

126

FONTENELLE NATURAL GAS INFILL DRILLING PROJECTS
DRAFT ENVIRONMENTAL IMPACT STATEMENT
VERTICAL AND DIRECTIONAL DRILLING ALTERNATIVES
FONTENELLE II UNIT

Type of Drilling (Traditional)	Drilling Costs (\$)	Initial Producing Rate (MCFPD)	Decline Curve Recoverable Reserves (MCF)	Economical Recoverable Reserves (MCF)	Gas Price (\$/MCF)	Net Present Value (\$)	Payout (years)
Vertical	680,000	700	1,026	741	1.00	-498,144	NA
Directional	745,000	700	1,026	741	1.00	-563,144	NA
Vertical	680,000	700	1,026	849	1.25	-402,660	NA
Directional	745,000	700	1,026	849	1.25	-467,660	NA
Vertical	680,000	700	1,026	919	1.50	-304,596	NA
Directional	745,000	700	1,026	919	1.50	-369,596	NA
Vertical	680,000	700	1,026	1,002	2.00	-105,533	NA
Directional	745,000	700	1,026	1,002	2.00	-170,533	NA
Vertical	680,000	1,000	1,557	1,269	1.00	-352,618	NA
Directional	745,000	1,000	1,557	1,269	1.00	-417,618	NA
Vertical	680,000	1,000	1,557	1,379	1.25	-221,228	NA
Directional	745,000	1,000	1,557	1,379	1.25	-286,228	NA
Vertical	680,000	1,000	1,557	1,448	1.50	-68,509	NA
Directional	745,000	1,000	1,557	1,448	1.50	-133,509	NA
Vertical	680,000	1,000	1,557	1,532	2.00	218,440	6.69
Directional	745,000	1,000	1,557	1,532	2.00	153,440	8.76
Vertical	680,000	1,300	2,087	1,796	1.00	-203,001	NA
Directional	745,000	1,300	2,087	1,796	1.00	-268,001	NA
Vertical	680,000	1,300	2,087	1,904	1.25	-17,311	NA
Directional	745,000	1,300	2,087	1,904	1.25	-82,311	NA
Vertical	680,000	1,300	2,087	1,975	1.50	169,198	7.78
Directional	745,000	1,300	2,087	1,975	1.50	104,198	10.56
Vertical	680,000	1,300	2,087	2,025	2.00	117,080	3.44
Directional	745,000	1,300	2,087	2,025	2.00	478,080	4.14

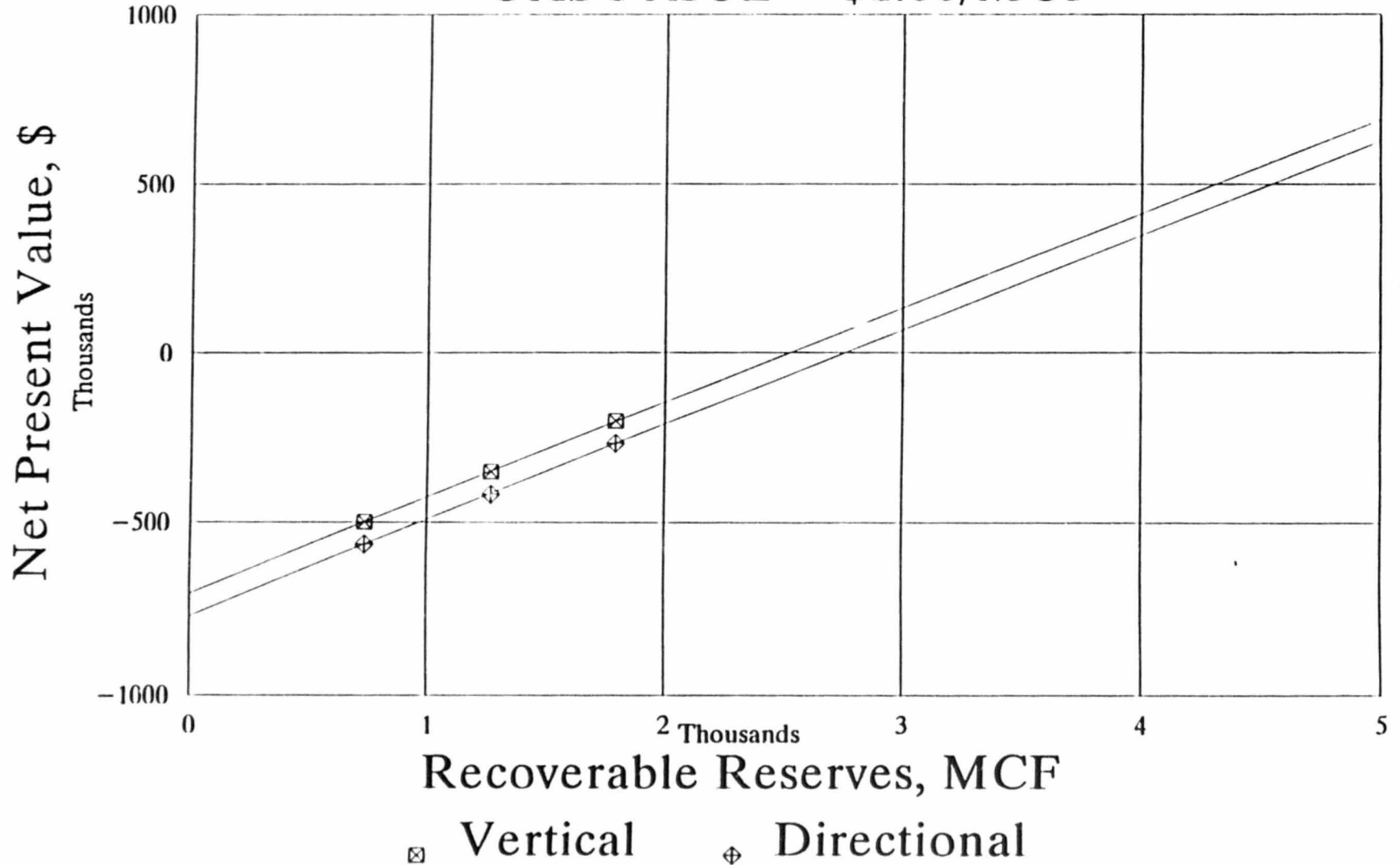
Assumptions

1. Condensate Yield - 2.1 BBL/MMCF
2. Operating Costs - \$1500/month
3. Discount Rate - 10 percent
4. Royalty Rate - 12.5 percent

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FONTENELLE II UNIT

GAS PRICE - \$1.00/MCF



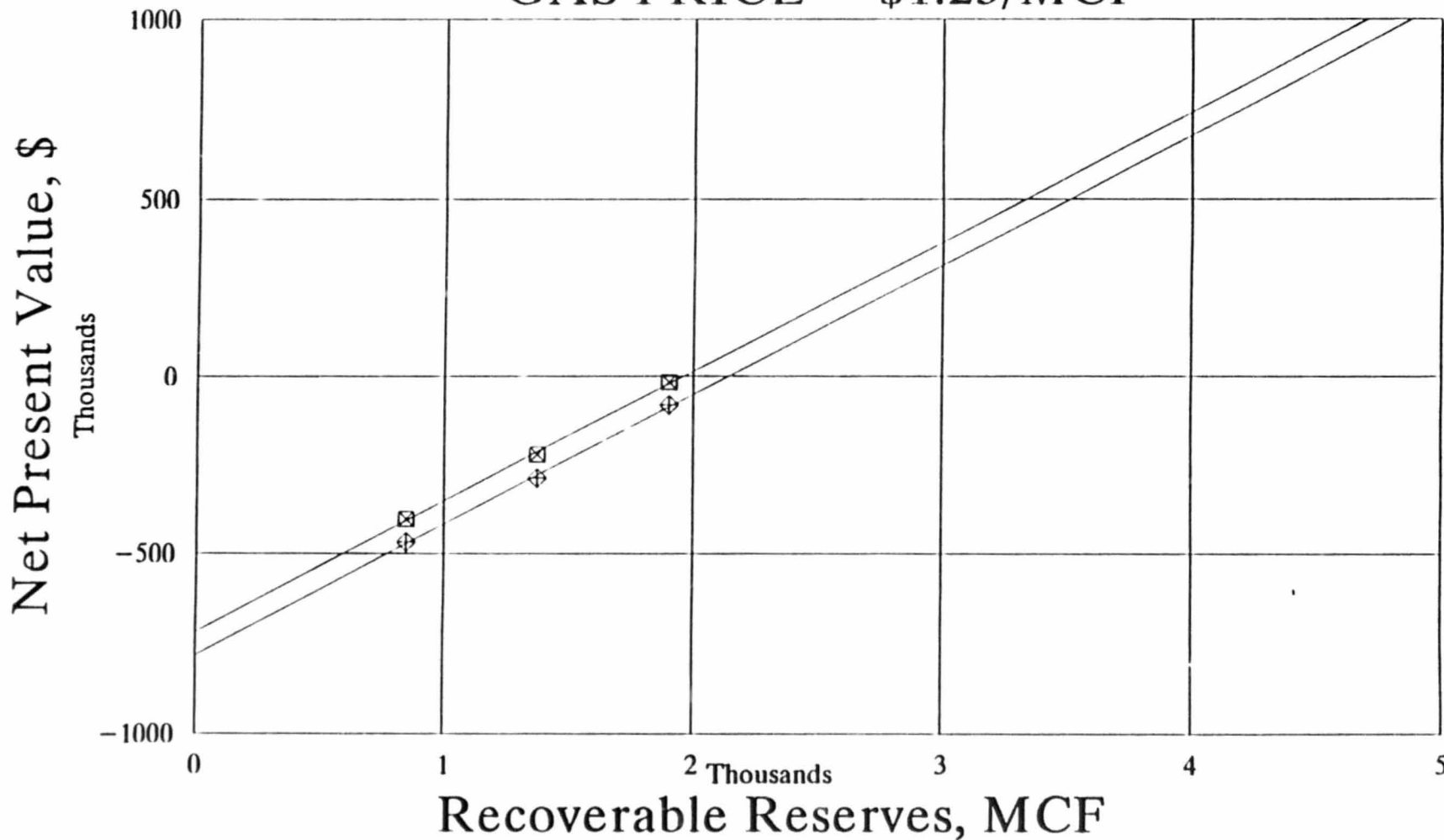
ATTACHMENT NO. A5 - Graph at Gas Price of \$1.00/MCFG

Traditional

128

FONTENELLE II UNIT

GAS PRICE - \$1.25/MCF



ATTACHMENT NO. A6 - Graph at Gas Price of \$1.25/MCFG

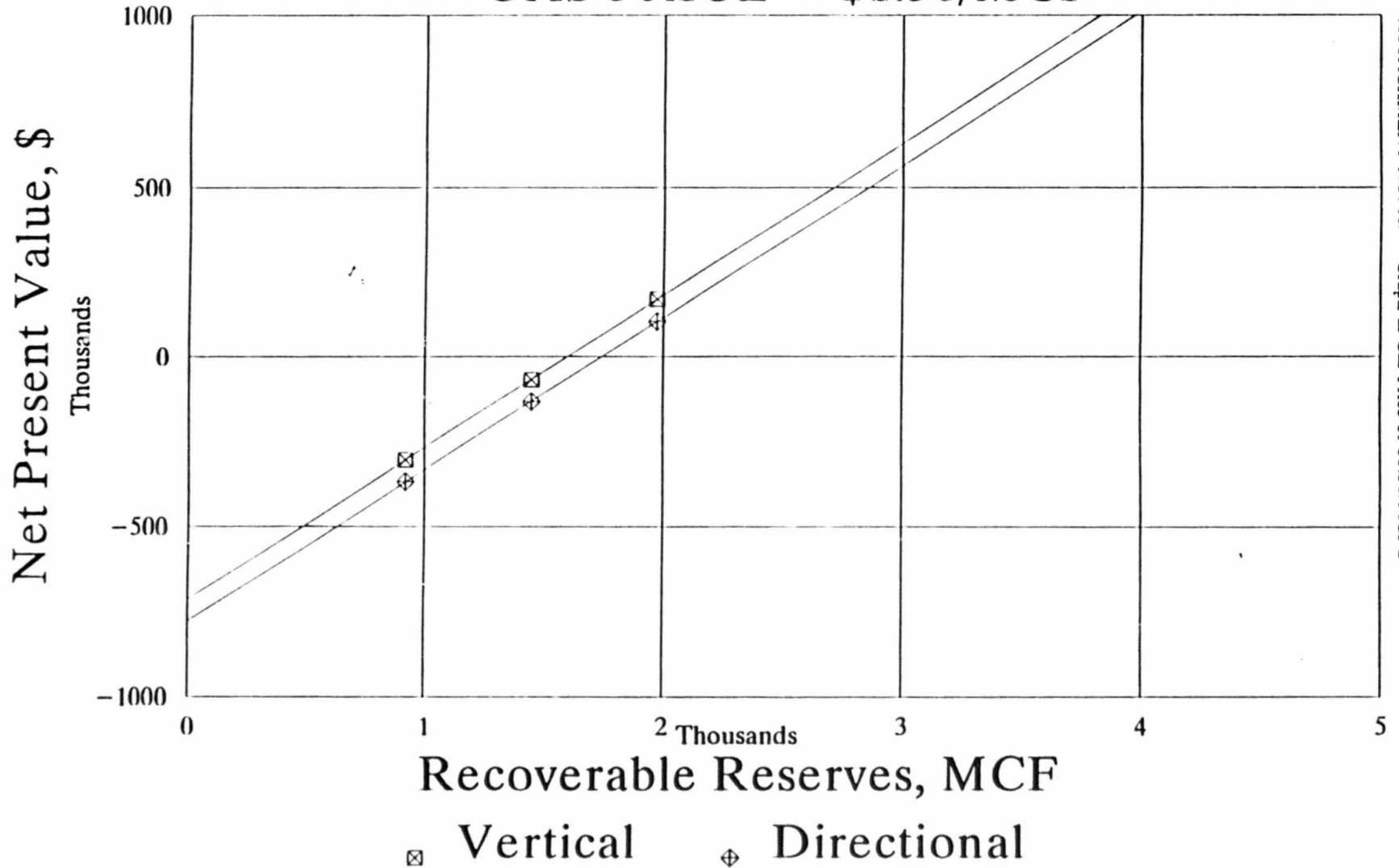
Vertical Directional

Traditional

1.25

FONTENELLE II UNIT

GAS PRICE - \$1.50/MCF



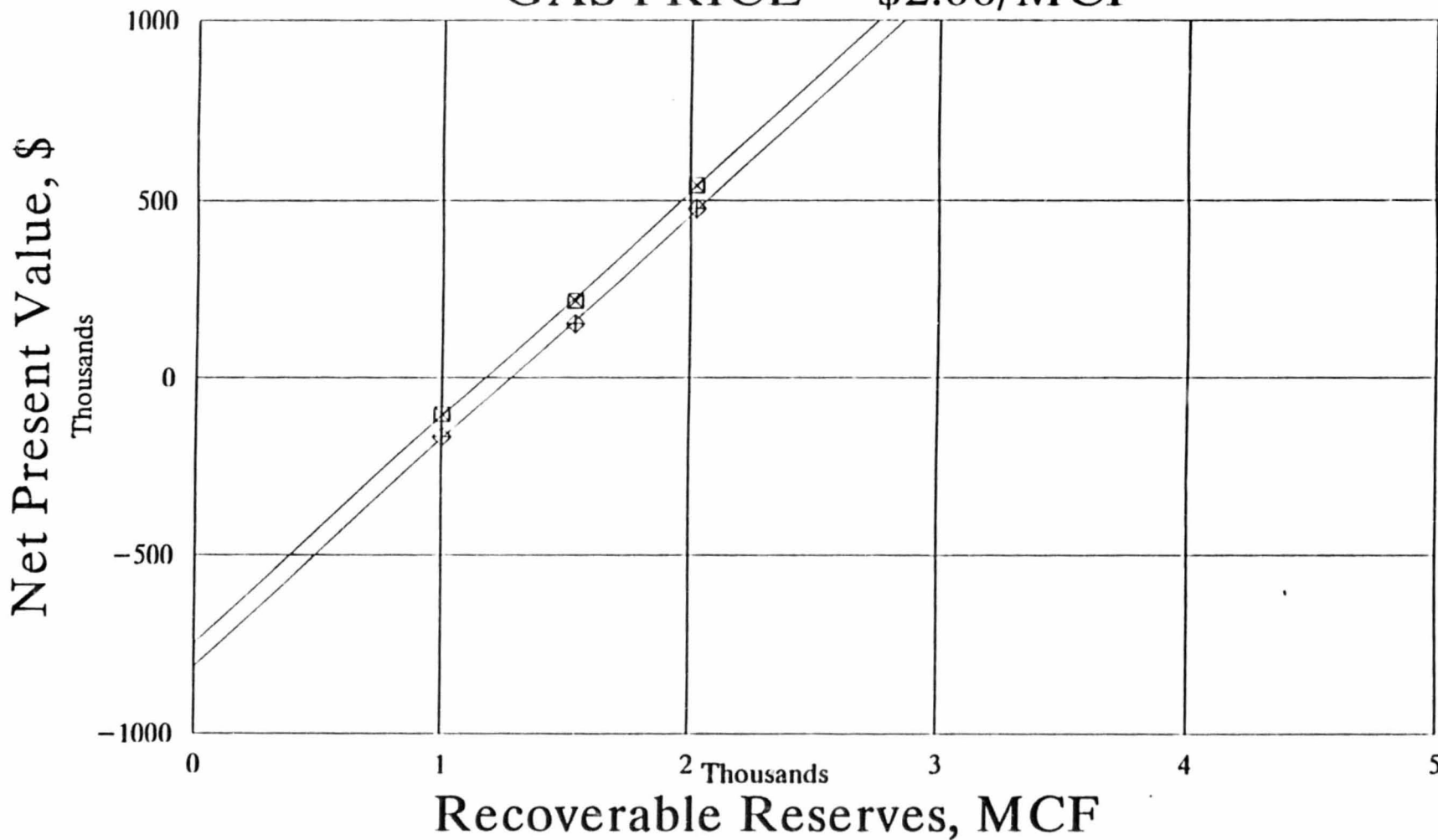
ATTACHMENT NO. A7 - Graph at Gas Price of \$1.50/MCFG

Traditional

130

FONTENELLE II UNIT

GAS PRICE - \$2.00/MCF



ATTACHMENT NO. A8 - Graph at Gas Price of \$2.00/MCFG

⊠ Vertical ⊕ Directional

Traditional

131

SPOT NATURAL GAS PRICES
NORTHWEST PIPELINE
OPAL, WYOMING

Month & Year	Date of Oil & Gas Journal	Price (\$/MMBTU)	Month & Year	Date of Oil & Gas Journal	Price (\$/MMBTU)	Month & Year	Date of Oil & Gas Journal	Price (\$/MMBTU)	Month & Year	Date of Oil & Gas Journal	Price (\$/MMBTU)
Jan-86	NA	NA	Jan-89	23-Jan-89	1.35	Jan-92	20-Jan-92	1.35	Jan-95	16-Jan-95	1.40
Feb-86	NA	NA	Feb-89	27-Feb-89	1.35	Feb-92	17-Feb-92	1.00	Feb-95	20-Feb-95	1.10
Mar-86	NA	NA	Mar-89	03-Apr-89	1.25	Mar-92	16-Mar-92	1.15	Mar-95	20-Mar-95	1.05
Apr-86	NA	NA	Apr-89	UNKNOWN	1.15	Apr-92	20-Apr-92	1.15	Apr-95	17-Apr-95	1.05
May-86	NA	NA	May-89	08-May-89	1.15	May-92	18-May-92	1.25	May-95	15-May-95	1.10
Jun-86	NA	NA	Jun-89	12-Jun-89	1.10	Jun-92	15-Jun-92	1.35	Jun-95	19-Jun-95	1.15
Jul-86	21-Jul-86	1.45	Jul-89	17-Jul-89	1.05	Jul-92	20-Jul-92	1.20	Jul-95	17-Jul-95	1.00
Aug-86	18-Aug-86	1.50	Aug-89	14-Aug-89	1.10	Aug-92	17-Aug-92	1.55	Aug-95	21-Aug-95	0.90
Sep-86	15-Sep-86	1.45	Sep-89	11-Sep-89	1.10	Sep-92	21-Sep-92	1.65	Sep-95	18-Sep-95	1.05
Oct-86	20-Oct-86	1.35	Oct-89	09-Oct-89	1.15	Oct-92	19-Oct-92	2.10	Oct-95	16-Oct-95	1.05
Nov-86	17-Nov-86	1.35	Nov-89	13-Nov-89	1.40	Nov-92	16-Nov-92	1.80	Nov-95		
Dec-86	15-Dec-86	1.35	Dec-89	11-Dec-89	1.65	Dec-92	21-Dec-92	1.90	Dec-95		
Average-86	NA	1.41	Average-89	NA	1.23	Average-92	NA	1.45	Average-95	NA	1.09
Jan-87	19-Jan-87	1.35	Jan-90	08-Jan-90	2.05	Jan-93	18-Jan-93	2.25	Jan-96		
Feb-87	UNKNOWN	1.40	Feb-90	12-Feb-90	1.50	Feb-93	15-Feb-93	1.60	Feb-96		
Mar-87	16-Mar-87	1.30	Mar-90	12-Mar-90	1.15	Mar-93	15-Mar-93	1.80	Mar-96		
Apr-87	20-Apr-87	1.25	Apr-90	09-Apr-90	1.10	Apr-93	19-Apr-93	1.80	Apr-96		
May-87	18-May-87	1.20	May-90	14-May-90	1.10	May-93	17-May-93	2.30	May-96		
Jun-87	15-Jun-87	1.20	Jun-90	11-Jun-90	1.10	Jun-93	21-Jun-93	1.70	Jun-96		
Jul-87	20-Jul-87	1.15	Jul-90	16-Jul-90	1.15	Jul-93	19-Jul-93	1.60	Jul-96		
Aug-87	17-Aug-87	1.15	Aug-90	13-Aug-90	1.10	Aug-93	16-Aug-93	1.70	Aug-96		
Sep-87	21-Sep-87	1.15	Sep-90	17-Sep-90	1.15	Sep-93	13-Sep-93	1.90	Sep-96		
Oct-87	19-Oct-87	1.15	Oct-90	15-Oct-90	1.30	Oct-93	18-Oct-93	1.80	Oct-96		
Nov-87	16-Nov-87	1.15	Nov-90	12-Nov-90	1.60	Nov-93	15-Nov-93	1.80	Nov-96		
Dec-87	21-Dec-87	1.15	Dec-90	10-Dec-90	1.60	Dec-93	20-Dec-93	2.40	Dec-96		
Average-87	NA	1.22	Average-90	NA	1.33	Average-93	NA	1.89	Average-96	NA	
Jan-88	25-Jan-88	1.45	Jan-91	14-Jan-91	1.45	Jan-94	17-Jan-94	1.90	Jan-97		
Feb-88	15-Feb-88	1.45	Feb-91	18-Feb-91	1.10	Feb-94	21-Feb-94	1.80	Feb-97		
Mar-88	21-Mar-88	1.35	Mar-91	11-Mar-91	1.05	Mar-94	21-Mar-94	1.95	Mar-97		
Apr-88	18-Apr-88	1.25	Apr-91	08-Apr-91	1.05	Apr-94	18-Apr-94	1.60	Apr-97		
May-88	16-May-88	1.10	May-91	13-May-91	1.00	May-94	16-May-94	1.60	May-97		
Jun-88	20-Jun-88	1.10	Jun-91	10-Jun-91	1.00	Jun-94	20-Jun-94	1.35	Jun-97		
Jul-88	18-Jul-88	1.10	Jul-91	15-Jul-91	0.95	Jul-94	18-Jul-94	1.45	Jul-97		
Aug-88	22-Aug-88	1.15	Aug-91	12-Aug-91	1.00	Aug-94	15-Aug-94	1.45	Aug-97		
Sep-88	19-Sep-88	1.25	Sep-91	09-Sep-91	1.10	Sep-94	18-Sep-94	1.35	Sep-97		
Oct-88	24-Oct-88	1.30	Oct-91	14-Oct-91	1.20	Oct-94	17-Oct-94	1.20	Oct-97		
Nov-88	21-Nov-88	1.30	Nov-91	11-Nov-91	1.25	Nov-94	21-Nov-94	1.50	Nov-97		
Dec-88	19-Dec-88	1.30	Dec-91	16-Dec-91	1.50	Dec-94	19-Dec-94	1.60	Dec-97		
Average-88	NA	1.26	Average-91	NA	1.14	Average-94	NA	1.56	Average-97	NA	

ATTACHMENT NO. A9 - Spot Natural Gas Prices

APPENDIX B
LINCOLN ROAD FIELD ENGINEERING STUDY (VERTICAL AND DIRECTIONAL DRILLING)

The most appropriate method of determining economic feasibility of vertical versus directional drilling in Lincoln Road Field was to graph drilling costs of both types of wells against net present value and against recoverable reserves. Graphs were constructed at gas prices of \$1.00/MCFG, \$1.25/MCFG, \$1.50/MCFG, and \$2.00/MCFG. The net present value for both vertically and directionally drilled wells was calculated at these four gas prices, assuming three different initial producing rates.

Decline curve analysis was used to determine recoverable reserves assuming a range of three initial producing rates. The three initial producing rates used provide a range for analysis from wells thought to be marginally economic to very good productive wells. Initial producing rates and resulting calculated recoverable reserves for the three scenarios are:

1. Initial producing rate of 600 MCFGPD and recoverable reserves of 1,067 MMCFG (Reference Attachment No. B1);
2. Initial producing rate of 1,000 MCFGPD and recoverable reserves of 1,609 MMCFG (Reference Attachment No. B2); and
3. Initial producing rate of 1,500 MCFGPD and recoverable reserves of 2,065 MMCFG (Reference Attachment No. B3).

For each of the three scenarios a hyperbolic decline was assumed with an exponent of 1.5. Decline rate depends on the initial producing rate, with a greater initial decline rate for scenarios with greater initial producing rates. A cutoff of 30 MCFGPD was used to determine the point at which a well could not continue to be economically produced. Production projected below this economic limit of 30 MCFG was not included as part of the recoverable reserve for each scenario.

TRADITIONAL DRILLING METHODS

Drilling costs (including completion and surface facility costs) of \$650,000 for a vertically drilled well in the Lincoln Road Field were obtained from Cabot Oil & Gas Corporation. Drilling costs for a directionally drilled well were estimated to increase their cost by \$60,000 to \$710,000. The extra drilling costs were estimated assuming directional drilling expenses of \$75,000 with a potential savings of \$15,000 in road and pad construction and in surface facilities since a directional well would be drilled from an existing well location.

Once the recoverable reserves for the three scenarios were determined, the net present value was calculated. This value was calculated for both a vertically and directionally drilled well at gas prices of \$1.00/MCFG, \$1.25/MCFG, \$1.50/MCFG, and \$2.00/MCFG (Reference Attachment No. B4).

Graphs were then constructed which show the curves for a vertically and a directionally drilled well when recoverable reserves on the x-axis are plotted against net present value on the y-axis at gas prices of \$1.00/MCFG, \$1.25/MCFG, \$1.50/MCFG, and \$2.00/MCFG (Reference Attachment Nos. B5, B6, B7 and B8). Findings at each of these gas prices are listed below.

1. Attachment No. B5 shows that at a gas price of \$1.00/MCFG, recoverable reserves would need to be 2,018 MMCFG for a vertical well, and 2,193 MMCFG for a directional well, for the net present value to equal zero. Recoverable reserves need to be greater for a directionally drilled well than for a vertically drilled well with a difference of 175 MMCFG at \$1.00/MCFG.
2. Attachment No. B6 shows that at a gas price of \$1.25/MCFG, recoverable reserves would need to be 1,597 MMCFG for a vertical well, and 1,732 MMCFG for a directional well, for the net present value

to equal zero. Recoverable reserves need to be greater for a directionally drilled well than for a vertically drilled well with a difference of 135 MMCFG at \$1.25/MCFG.

3. Attachment No. B7 shows that at a gas price of \$1.50/MCFG, recoverable reserves would need to be 1,332 MMCFG for a vertical well, and 1,442 MMCFG for a directional well, for the net present value to equal zero. Recoverable reserves need to be greater for a directionally drilled well than for a vertically drilled well with a difference of 110 MMCFG at \$1.50/MCFG.
4. Attachment No. B8 shows that at a gas price of \$2.00/MCFG, recoverable reserves would need to be 1,016 MMCFG for a vertical well, and 1,096 MMCFG for a directional well, for the net present value to equal zero. Recoverable reserves need to be greater for a directionally drilled well than for a vertically drilled well with a difference of 80 MMCFG at \$2.00/MCFG.

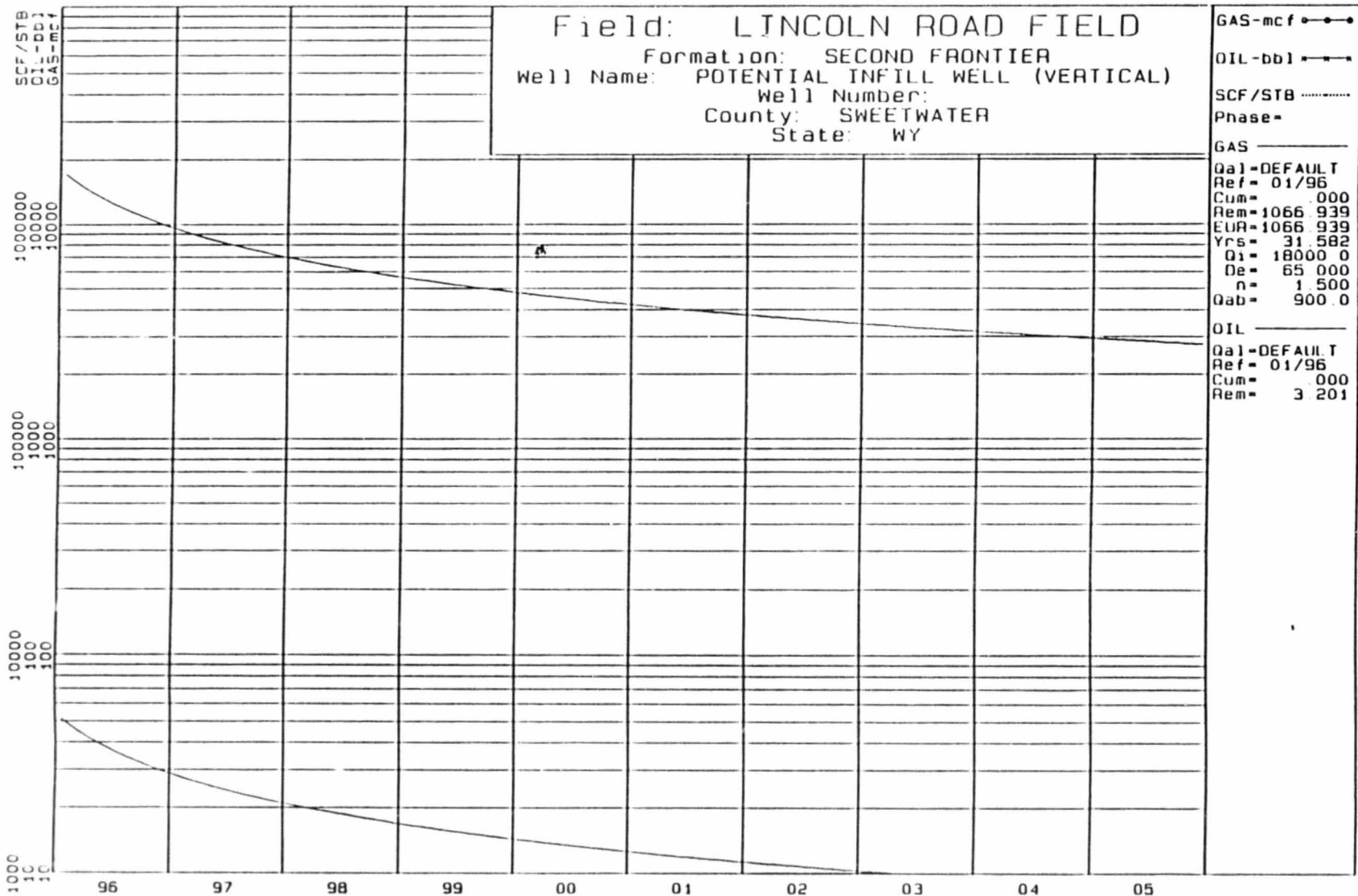
This information shows that the higher the gas price, the smaller the difference between recoverable reserves for a vertical and directional well.

CONCLUSIONS

1. A directionally drilled well with an initial producing rate of 600 MCFGPD could not be economically drilled at a gas price below \$2.00/MCFG.
2. A directionally drilled well with an initial producing rate of 1,000 MCFGPD could not be economically drilled at a gas price of \$1.00/MCFG or \$1.25/MCFG. This well could be economically drilled at a gas price of \$1.50/MCFG or \$2.00/MCFG, however, the payout time of 13.71 years at a gas price of \$1.50/MCFG would be considered excessive by industry standards.
3. A directionally drilled well with an initial producing rate of 1,500 MCFGPD could not be economically drilled at a gas price of \$1.00/MCFG. This well could be economically drilled at a gas price of \$1.25/MCFG, \$1.50/MCFG, or \$2.00/MCFG, however, the payout time of 9.40 years at a gas price of \$1.25/MCFG would be considered excessive by industry standards.
4. The current spot natural gas price at Opal, Wyoming, as reported by Northwest Pipeline for October 1995 is \$1.05/MCFG. The average spot natural gas price for 1995 is only \$1.09/MCFG (Reference Attachment No. B9). At these current gas prices, a directionally drilled well could not be drilled economically until recoverable reserves were greater than 2,200 MMCFG. If gas prices were to rise to \$2.00/MCFG, recoverable reserves would still need to be greater than 1,100 MMCFG.

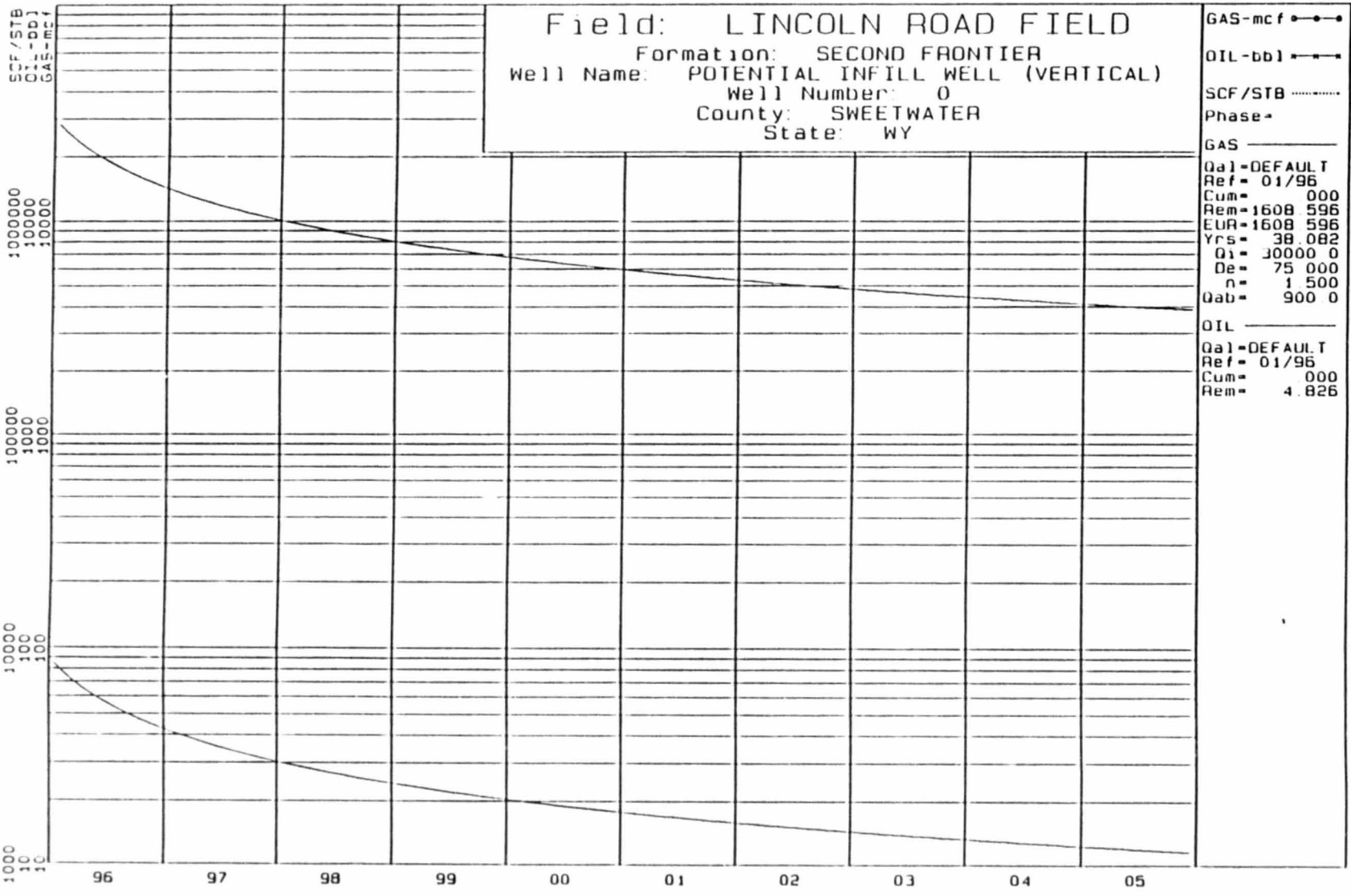
SLIM HOLE DRILLING METHODS

The potential for slim hole drilling exists in the area and would substantially reduce the drilling costs for a vertical or directional well. Slim hole drilling costs of \$500,000 for a vertical well were obtained from Cabot Oil & Gas Corporation. Drilling costs for a directional well were calculated to increase by \$75,000 to \$575,000. The extra drilling costs were calculated assuming directional drilling expenses of \$90,000 with a potential savings once again of \$15,000 in road and pad construction and in surface facilities since a directional well would be drilled from an existing well location. Since no slim hole drilling has been tried in the Lincoln Road Field, an economic analysis using these lower drilling costs was not performed. Slim hole drilling would allow the drilling of locations with lower recoverable reserves or could possibly allow directional drilling where costs are now excessive.



DATE

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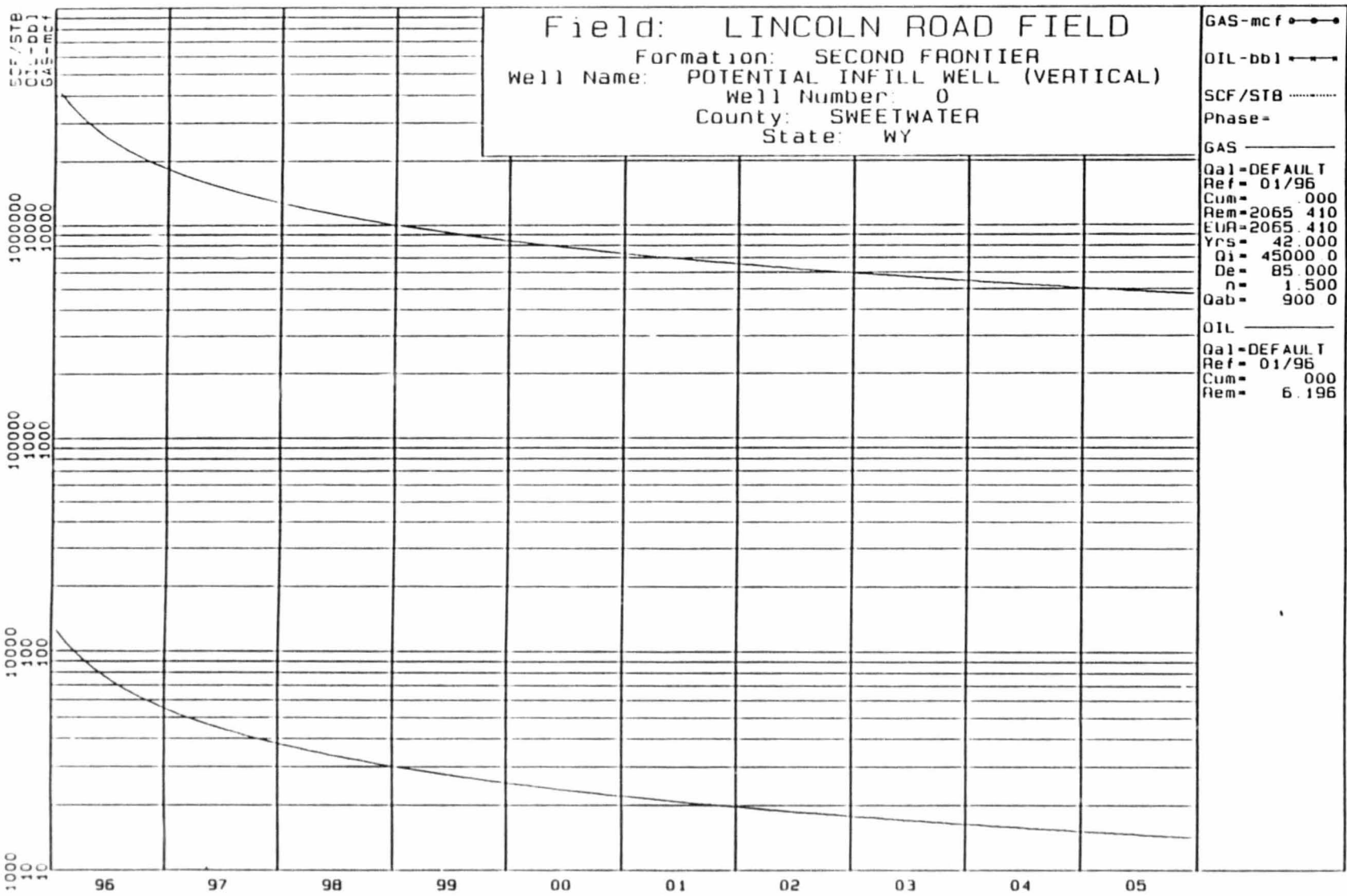
Field: LINCOLN ROAD FIELD
 Formation: SECOND FRONTIER
 Well Name: POTENTIAL INFILL WELL (VERTICAL)
 Well Number: 0
 County: SWEETWATER
 State: WY

GAS-mcf ●—●—
 OIL-bbl —●—
 SCF/STB
 Phase-
 GAS
 Qal-DEFAULT
 Ref-01/96
 Cum-000
 Rem-1608 596
 EUR-1608 596
 Yrs-38.082
 Qi-30000 0
 De-75 000
 n-1 500
 Qab-900 0
 OIL
 Qal-DEFAULT
 Ref-01/96
 Cum-000
 Rem-4.826

ATTACHMENT NO. B2 - Hypothetical Well (initial potential of 1,000 MCF/GPD)

DATE

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Field: LINCOLN ROAD FIELD
 Formation: SECOND FRONTIER
 Well Name: POTENTIAL INFILL WELL (VERTICAL)
 Well Number: 0
 County: SWEETWATER
 State: WY

GAS-mcf ●●●●
 OIL-bbl ●●●●
 SCF/STB
 Phase-
 GAS
 Qa1-DEFAULT
 Ref = 01/96
 Cum = .000
 Rem = 2065.410
 EUR = 2065.410
 Yrs = 42.000
 Qi = 45000.0
 De = 85.000
 n = 1.500
 Qab = 900.0
 OIL
 Qa1-DEFAULT
 Ref = 01/96
 Cum = .000
 Rem = 6.196

DATE 137

FONTENELLE NATURAL GAS INFILL DRILLING PROJECTS
DRAFT ENVIRONMENTAL IMPACT STATEMENT
VERTICAL AND DIRECTIONAL DRILLING ALTERNATIVES
LINCOLN ROAD FIELD

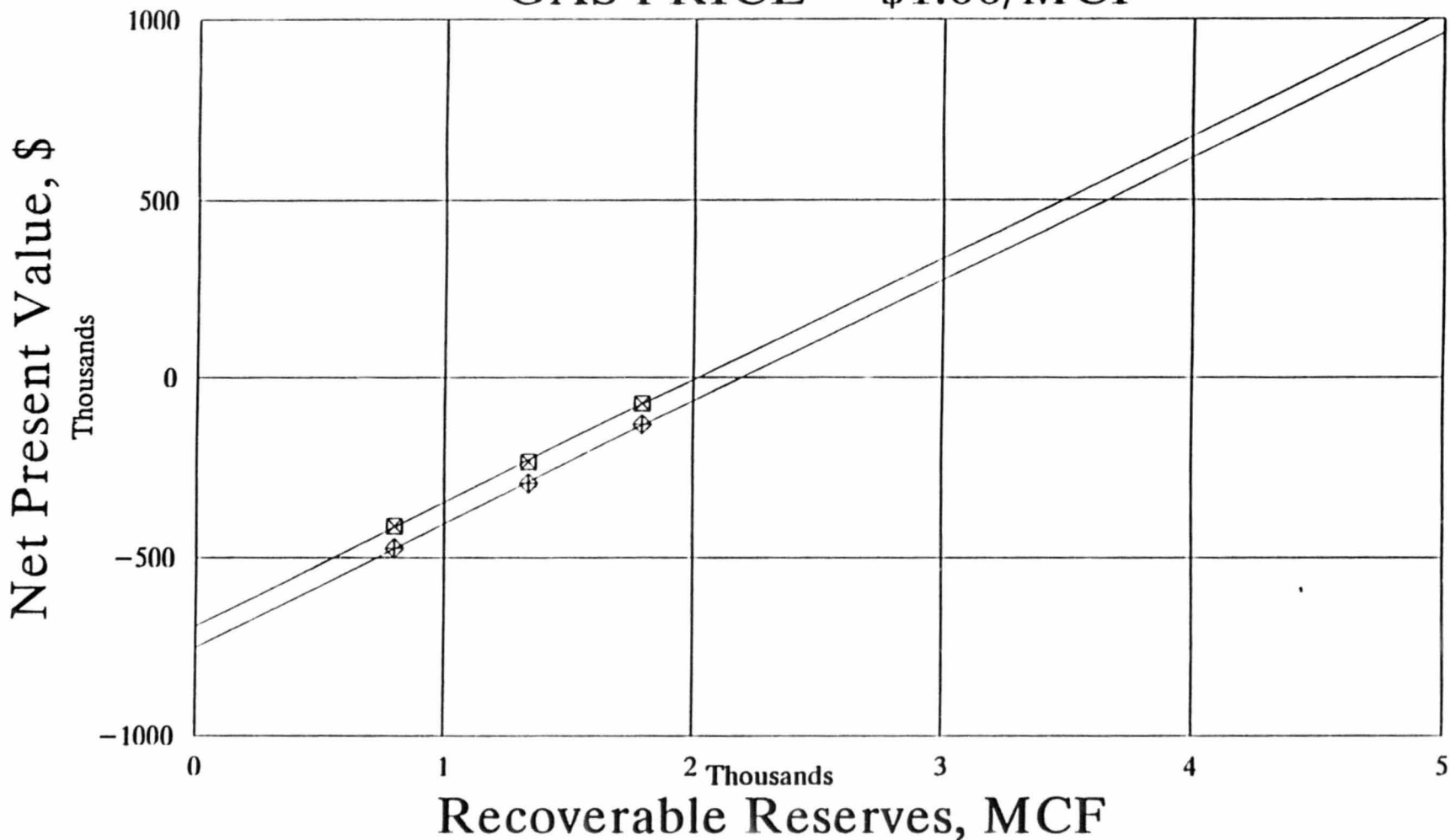
Type of Drilling (Traditional)	Drilling Costs (\$)	Initial Producing Rate (MCFPD)	Decline Curve Recoverable Reserves (MCF)	Economical Recoverable Reserves (MCF)	Gas Price (\$/MCF)	Net Present Value (\$)	Payout (years)
Vertical	650,000	600	1,067	799	1.00	-414,757	NA
Directional	710,000	600	1,067	799	1.00	-474,757	NA
Vertical	650,000	600	1,067	904	1.25	-305,892	NA
Directional	710,000	600	1,067	904	1.25	-365,892	NA
Vertical	650,000	600	1,067	971	1.50	-194,440	NA
Directional	710,000	600	1,067	971	1.50	-254,440	NA
Vertical	650,000	600	1,067	1,052	2.00	31,429	13.54
Directional	710,000	600	1,067	1,052	2.00	-28,571	NA
Vertical	650,000	1,000	1,609	1,341	1.00	-235,831	NA
Directional	710,000	1,000	1,609	1,341	1.00	-295,831	NA
Vertical	650,000	1,000	1,609	1,446	1.25	-72,491	NA
Directional	710,000	1,000	1,609	1,446	1.25	-132,491	NA
Vertical	650,000	1,000	1,609	1,512	1.50	92,240	8.49
Directional	710,000	1,000	1,609	1,512	1.50	32,240	13.71
Vertical	650,000	1,000	1,609	1,593	2.00	423,297	3.23
Directional	710,000	1,000	1,609	1,593	2.00	363,297	3.93
Vertical	650,000	1,500	2,065	1,798	1.00	-72,717	NA
Directional	710,000	1,500	2,065	1,798	1.00	-132,717	NA
Vertical	650,000	1,500	2,065	1,901	1.25	137,831	6.53
Directional	710,000	1,500	2,065	1,901	1.25	77,831	9.40
Vertical	650,000	1,500	2,065	1,967	1.50	349,334	3.51
Directional	710,000	1,500	2,065	1,967	1.50	289,334	4.38
Vertical	650,000	1,500	2,065	2,041	2.00	773,430	1.80
Directional	710,000	1,500	2,065	2,041	2.00	713,430	2.10

Assumptions

1. Condensate Yield - 3 BBL/MMCF
2. Operating Costs - \$1500/month
3. Discount Rate - 10 percent
4. Royalty Rate - 12.5 percent

LINCOLN ROAD FIELD

GAS PRICE - \$1.00/MCF



ATTACHMENT NO. B5 - Graph at Gas Price of \$1.00/MCFG

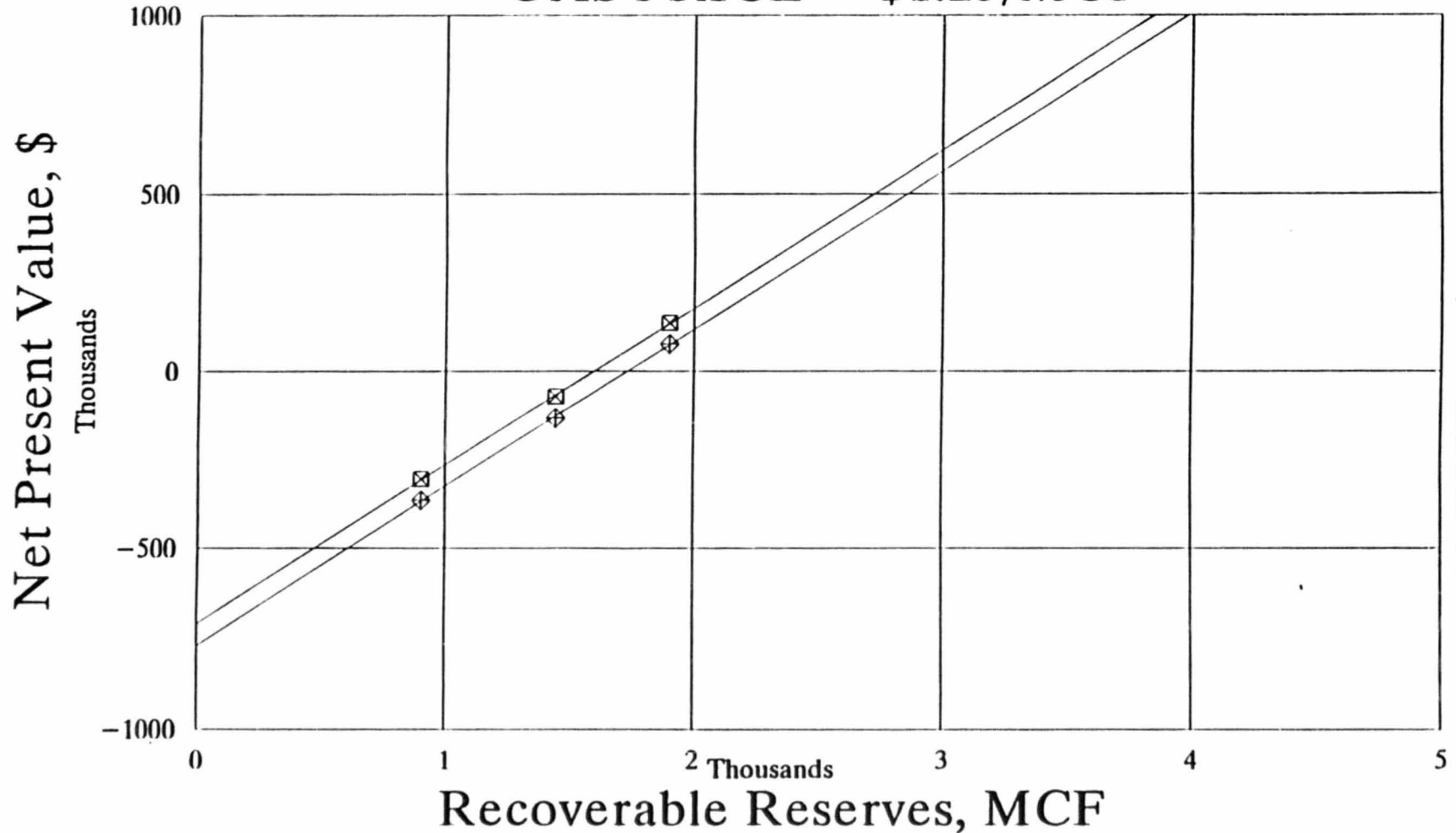
Vertical Directional

Traditional

139

LINCOLN ROAD FIELD

GAS PRICE - \$1.25/MCF



ATTACHMENT NO. B6 - Graph at Gas Price of \$1.25/MCFG

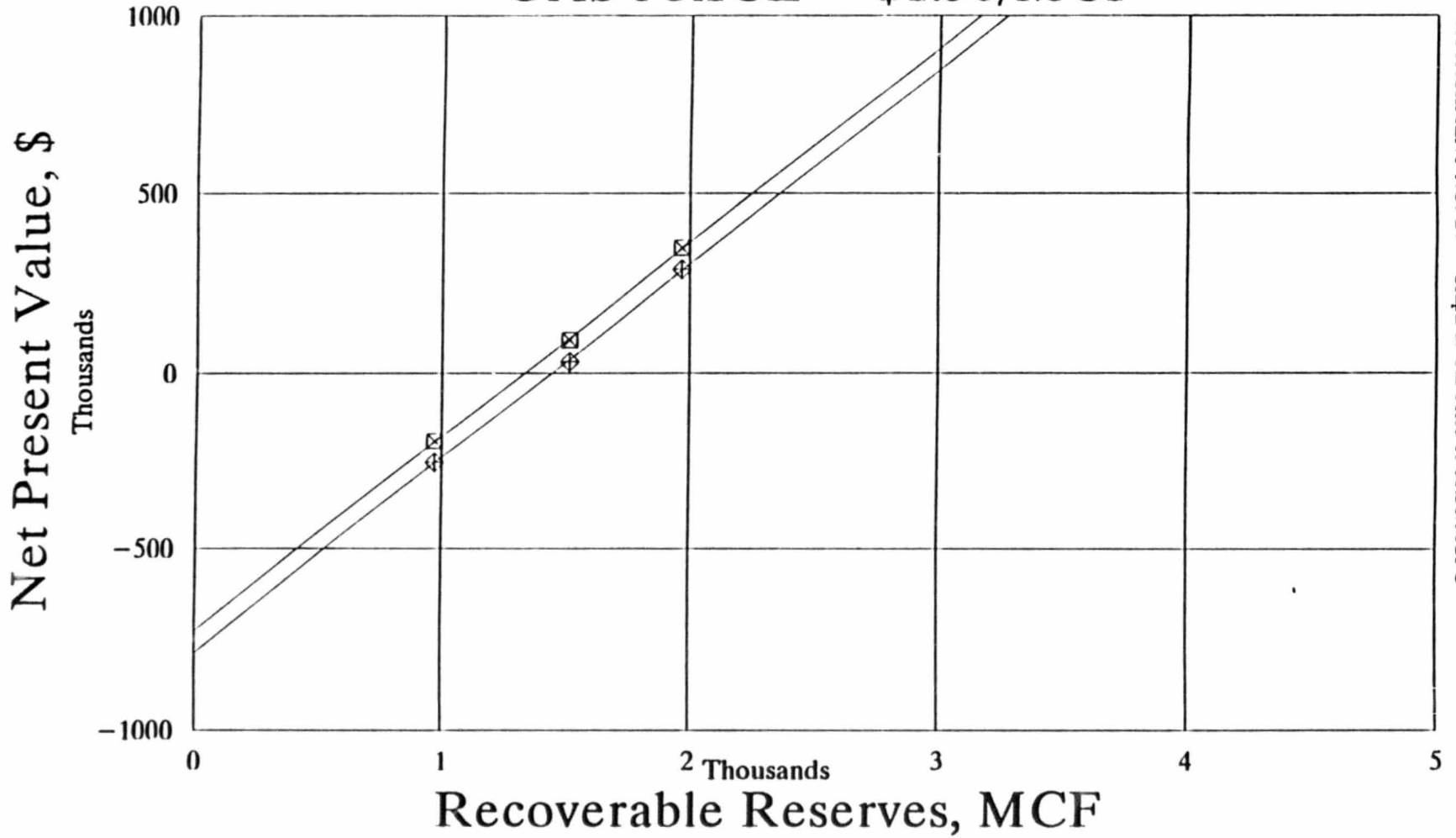
☒ Vertical ⬠ Directional

Traditional

140

LINCOLN ROAD FIELD

GAS PRICE - \$1.50/MCF



ATTACHMENT NO. B7 - Graph at Gas Price of \$1.50/MCFG

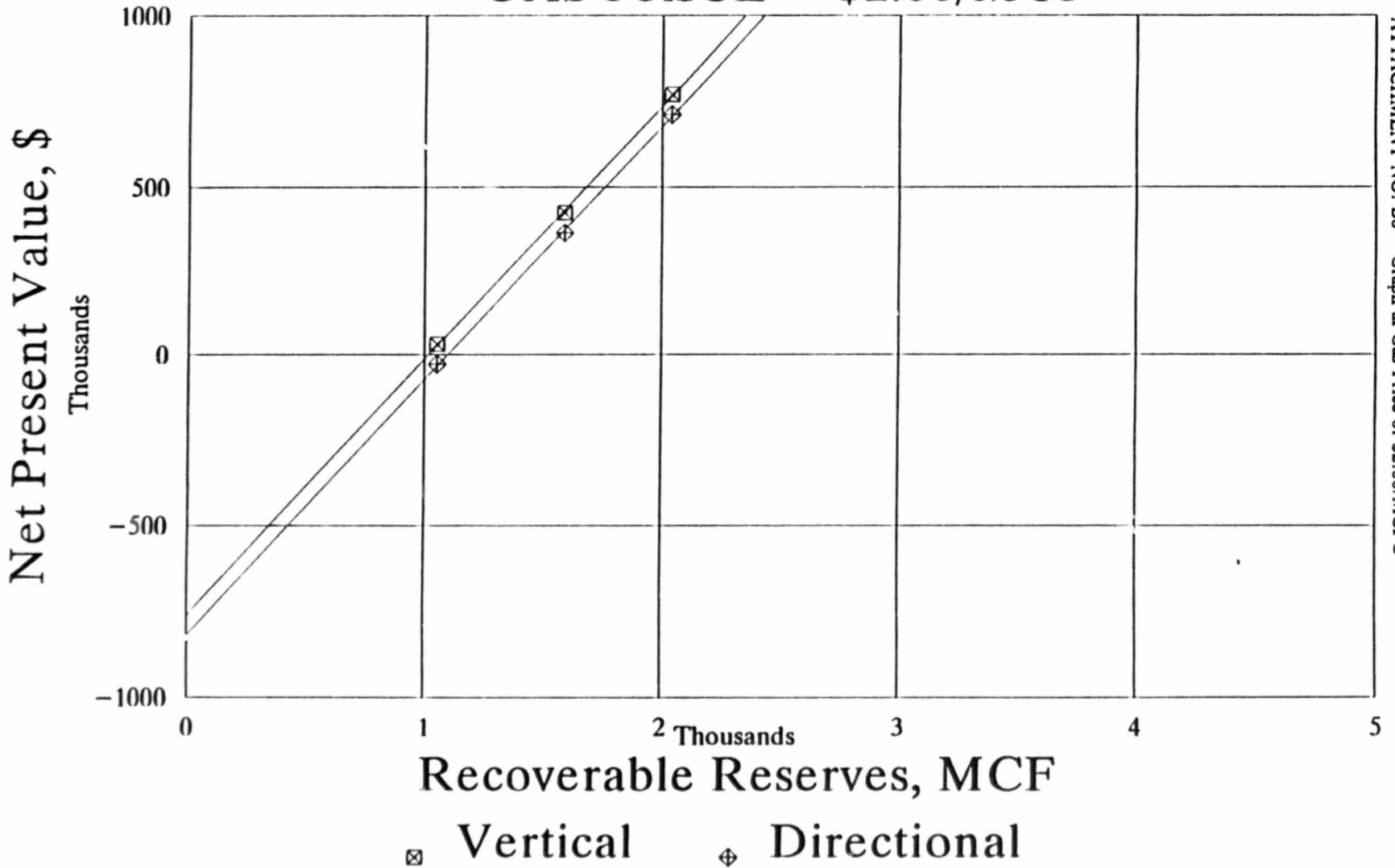
Vertical Directional

Traditional

141

LINCOLN ROAD FIELD

GAS PRICE - \$2.00/MCF



ATTACHMENT NO. B8 - Graph at Gas Price of \$2.00/MCFG

Traditional

**SPOT NATURAL GAS PRICES
NORTHWEST PIPELINE
OPAL, WYOMING**

Month & Year	Date of Oil & Gas Journal	Price (\$/MMBTU)	Month & Year	Date of Oil & Gas Journal	Price (\$/MMBTU)	Month & Year	Date of Oil & Gas Journal	Price (\$/MMBTU)	Month & Year	Date of Oil & Gas Journal	Price (\$/MMBTU)
Jan-86	NA	NA	Jan-89	23-Jan-89	1.35	Jan-92	20-Jan-92	1.35	Jan-95	16-Jan-95	1.40
Feb-86	NA	NA	Feb-89	27-Feb-89	1.35	Feb-92	17-Feb-92	1.00	Feb-95	20-Feb-95	1.10
Mar-86	NA	NA	Mar-89	03-Apr-89	1.25	Mar-92	16-Mar-92	1.15	Mar-95	20-Mar-95	1.05
Apr-86	NA	NA	Apr-89	UNKNOWN	1.15	Apr-92	20-Apr-92	1.15	Apr-95	17-Apr-95	1.05
May-86	NA	NA	May-89	08-May-89	1.15	May-92	18-May-92	1.25	May-95	15-May-95	1.10
Jun-86	NA	NA	Jun-89	12-Jun-89	1.10	Jun-92	15-Jun-92	1.35	Jun-95	19-Jun-95	1.15
Jul-86	21-Jul-86	1.45	Jul-89	17-Jul-89	1.05	Jul-92	20-Jul-92	1.20	Jul-95	17-Jul-95	1.00
Aug-86	18-Aug-86	1.50	Aug-89	14-Aug-89	1.10	Aug-92	17-Aug-92	1.55	Aug-95	21-Aug-95	0.90
Sep-86	15-Sep-86	1.45	Sep-89	11-Sep-89	1.10	Sep-92	21-Sep-92	1.65	Sep-95	18-Sep-95	1.05
Oct-86	20-Oct-86	1.35	Oct-89	09-Oct-89	1.15	Oct-92	19-Oct-92	2.10	Oct-95	16-Oct-95	1.05
Nov-86	17-Nov-86	1.35	Nov-89	13-Nov-89	1.40	Nov-92	16-Nov-92	1.80	Nov-95		
Dec-86	15-Dec-86	1.35	Dec-89	11-Dec-89	1.65	Dec-92	21-Dec-92	1.90	Dec-95		
Average-86	NA	1.41	Average-89	NA	1.23	Average-92	NA	1.45	Average-95	NA	1.09
Jan-87	19-Jan-87	1.35	Jan-90	08-Jan-90	2.05	Jan-93	18-Jan-93	2.25	Jan-96		
Feb-87	UNKNOWN	1.40	Feb-90	12-Feb-90	1.50	Feb-93	15-Feb-93	1.60	Feb-96		
Mar-87	16-Mar-87	1.30	Mar-90	12-Mar-90	1.15	Mar-93	15-Mar-93	1.80	Mar-96		
Apr-87	20-Apr-87	1.25	Apr-90	09-Apr-90	1.10	Apr-93	19-Apr-93	1.80	Apr-96		
May-87	18-May-87	1.20	May-90	14-May-90	1.10	May-93	17-May-93	2.30	May-96		
Jun-87	15-Jun-87	1.20	Jun-90	11-Jun-90	1.10	Jun-93	21-Jun-93	1.70	Jun-96		
Jul-87	20-Jul-87	1.15	Jul-90	16-Jul-90	1.15	Jul-93	19-Jul-93	1.60	Jul-96		
Aug-87	17-Aug-87	1.15	Aug-90	13-Aug-90	1.10	Aug-93	16-Aug-93	1.70	Aug-96		
Sep-87	21-Sep-87	1.15	Sep-90	17-Sep-90	1.15	Sep-93	13-Sep-93	1.90	Sep-96		
Oct-87	19-Oct-87	1.15	Oct-90	15-Oct-90	1.30	Oct-93	18-Oct-93	1.80	Oct-96		
Nov-87	16-Nov-87	1.15	Nov-90	12-Nov-90	1.60	Nov-93	15-Nov-93	1.80	Nov-96		
Dec-87	21-Dec-87	1.15	Dec-90	10-Dec-90	1.60	Dec-93	20-Dec-93	2.40	Dec-96		
Average-87	NA	1.22	Average-90	NA	1.33	Average-93	NA	1.89	Average-96	NA	
Jan-88	25-Jan-88	1.45	Jan-91	14-Jan-91	1.45	Jan-94	17-Jan-94	1.90	Jan-97		
Feb-88	15-Feb-88	1.45	Feb-91	18-Feb-91	1.10	Feb-94	21-Feb-94	1.80	Feb-97		
Mar-88	21-Mar-88	1.35	Mar-91	11-Mar-91	1.05	Mar-94	21-Mar-94	1.95	Mar-97		
Apr-88	18-Apr-88	1.25	Apr-91	08-Apr-91	1.05	Apr-94	18-Apr-94	1.60	Apr-97		
May-88	16-May-88	1.10	May-91	13-May-91	1.00	May-94	16-May-94	1.60	May-97		
Jun-88	20-Jun-88	1.10	Jun-91	10-Jun-91	1.00	Jun-94	20-Jun-94	1.35	Jun-97		
Jul-88	18-Jul-88	1.10	Jul-91	15-Jul-91	0.95	Jul-94	18-Jul-94	1.45	Jul-97		
Aug-88	22-Aug-88	1.15	Aug-91	12-Aug-91	1.00	Aug-94	15-Aug-94	1.45	Aug-97		
Sep-88	19-Sep-88	1.25	Sep-91	09-Sep-91	1.10	Sep-94	19-Sep-94	1.35	Sep-97		
Oct-88	24-Oct-88	1.30	Oct-91	14-Oct-91	1.20	Oct-94	17-Oct-94	1.20	Oct-97		
Nov-88	21-Nov-88	1.30	Nov-91	11-Nov-91	1.25	Nov-94	21-Nov-94	1.50	Nov-97		
Dec-88	19-Dec-88	1.30	Dec-91	16-Dec-91	1.50	Dec-94	19-Dec-94	1.60	Dec-97		
Average-88	NA	1.26	Average-91	NA	1.14	Average-94	NA	1.56	Average-97	NA	

ATTACHMENT NO. B9 - Spot Natural Gas Prices

APPENDIX C
Outline for Wildlife Protection
and
Impact Mitigation Plan

Outline for Wildlife Protection and Impact Mitigation Plan

1.0 Scope of the Plan

The purpose of this plan would be to identify standard environmental protection and mitigation measures which will avoid, minimize or reduce impacts to wildlife associated with implementation of additional infill drilling projects throughout the Fontenelle area. The plan would include the following:

- 1) wildlife protection and mitigation measures described in the Record of Decision prepared for the Fontenelle Infill Drilling Projects;
- 2) any additional opportunities for mitigation subsequently identified by the core team;
- 3) specific locations or situations for the implementation of wildlife protection and impact mitigation measures; and,
- 4) schedules or milestones for the implementation of these measures.

The plan will be developed by a core team consisting of representatives from the DALEN and Lincoln Road Operators, BLM, Wyoming Game and Fish Department, the U.S. Fish and Wildlife Service, and other interested groups such as area livestock operators. The core team will provide advice and recommendations to the BLM Green River Area Manager. The BLM Area Manager retains the ultimate decision making authority for the management of BLM administered lands and resources. The plan and its implementation would be periodically reviewed by the core team. The plan would be updated periodically to reflect changes in the actual level of infill drilling. This is important as actual drilling may vary substantially with market conditions and could be substantially less than the maximum development scenario addressed in the EIS. Similarly, impacts from some unpredictable percentage of new wells could be offset by future abandonment and reclamation of existing well pads and associated roads.

The scope of the plan would be limited as follows.

- o The plan would only apply to the DALEN and Lincoln Road project areas as defined in the EIS.
- o The focus of the plan would be mule deer, pronghorn antelope, raptors, sage grouse, fisheries and Federally listed threatened and endangered species.
- o Protection and mitigation actions would be directed toward avoiding, reducing and mitigating impacts within the DALEN and Lincoln Road project areas described in the EIS; however, with the agreement of the core team a specific action could be implemented outside of a specific mineral lease but within the cumulative impact study area described within the EIS.

2.0 Goals and Strategies

The following goals are suggested by the analysis of impacts found in the EIS. These goals could be modified by the review team in response to changes in resource conditions, changing habitat conditions, level of actual infill drilling and other unforeseen circumstances. Goals could be achieved by a variety of strategies. Only a few possible strategies are suggested here. The strategies suggested below are not meant to be requirements, especially if alternative means of achieving the same goal can be proposed.

2.1 Goal: Avoid unnecessary construction-related disturbance to wildlife habitat.

Strategies for Attaining Goal. Evaluate well pads, access roads and pipeline corridors on a site-by-site basis to identify opportunities to minimize construction-related and long-term, production-related disturbance. Well pad size could be reduced to less than the 2.5 acres assumed in the DEIS depending upon site specific conditions and well pad design. Similarly, pipeline construction rights-of-way could be reduced below that assumed in the DEIS. Use existing roads or two-tracks where available to construct an access road to a new location. Place pipelines outside the backslope of the existing and new roads where feasible. Reduce the size of drill and well pads to the minimum necessary to safely conduct operations. Reclaim areas not needed for production or maintenance operations. Use surface pipeline where feasible. Confine construction-related traffic to staked rights-of-way and project locations.

2.2 Goal: Maximize restoration of wildlife habitat.

Strategies for Attaining Goal. Apply interim reclamation practices following completion of construction activities. Where drilling fluids can be reused, dewater reserve pits to speed reclamation of the drill pad and areas not needed for production operations. Use locally tested reclamation practices. Consult with reclamation contractors and oil and gas operators for reclamation practices (e.g., seed mixtures) successfully applied in the Fontenelle area. BLM should hold an annual one day conference with representatives of oil and gas companies and their contractors operating in the Rock Springs District to review reclamation practices and identify innovative, successful reclamation practices that have been applied in the Fontenelle area. Disturbed areas (well pads, riparian crossings, steep slopes, etc.) may require fencing after seeding if grazing by livestock, wildlife, or wild horses preclude successful reestablishment of vegetation.

2.3 Goal: Offset unavoidable forage loss, to the extent practical, through timely reclamation and/or vegetation treatment projects which improve the quality of existing habitat.

Strategies for Attaining Goal. Use vegetation treatments (e.g., controlled burning, cutting decadent sagebrush to increase vegetative productivity) to improve wildlife habitat quality and partially offset losses due to surface disturbing activities. Evaluate and identify opportunities for replacing wildlife forage lost by ripping and seeding roads, two-tracks and trails not needed for field operations, livestock operations, or other resource users.

2.4 Goal: Protect wetlands and riparian vegetation along the Green River and Big Sandy rivers from degradation.

Strategies for Attaining Goal. As described in the DEIS, locate proposed wells and other surface facilities outside of these areas.

2.5 Goal: Protect fisheries and water quality in the Green River and its tributaries.

Strategies for Attaining Goal. FWS through the BLM should require operators to provide evidence that they have paid the required water depletion fees intended to mitigate potential impacts to threatened and endangered fish species in the Green River basin if water withdrawal exceeds 100 acre feet per year. Implement best management practices, as described in the DEIS (see Section 4.17.5.1), to reduce sediment in runoff from construction sites and production locations.

2.6 Goal: Reduce misunderstanding of survey, protection and monitoring measures that could be required where threatened, endangered or candidate species may be affected.

Strategies for Attaining Goal. Consult with the U.S. Fish & Wildlife Service and the Wyoming Natural Diversity Database to maintain, update or expand the list of Federally listed and candidate species within the Fontenelle area that could, potentially, be affected by oil and gas operations. Based on the Green River Resource Management Plan

Final EIS and Record of Decision, and recent U.S. Fish and Wildlife Service policies on threatened and endangered species, develop a list of standard, species-specific survey, protection or monitoring measures that could be required, depending upon site-specific habitat conditions.

2.7 Goal: Identify important wildlife use areas (e.g., sage grouse leks, active raptor nests, crucial winter range) potentially affected by project activities that should be protected from disturbance.

Strategies for Attaining Goal. Because these areas can change from year to year, oil and gas operators, in accordance with Section 6 of the Lease Terms, should conduct surveys for nesting raptors, sage grouse leks and threatened or endangered species in potential habitat for those species which may be disturbed by their proposed oil and gas activities. Operators should consult with BLM to identify areas of potential habitat prior to conducting surveys and to avoid unnecessary surveys. BLM should maintain a central file of biological survey reports in the Green River Resource Area Office. These files could be used to identify all areas previously surveyed. This information should be incorporated in the BLM geographic information system (GIS) and these files should be open to qualified biologists that may be hired by oil and gas operators to conduct surveys for BLM. Biologists conducting the surveys should be required to file completed biological survey reports with the appropriate Resource Area Offices. BLM and Wildlife management agencies would do the following: 1) provide oil and gas operators with a map showing the boundaries of crucial winter range areas at least six months prior to the implementation seasonal restrictions--i.e., no later than May 15 for the coming winter; 2) notify oil and gas operators of changes in the boundaries of crucial winter range areas within 90 days following the identification of such a change.

2.8 Goal: Monitor wildlife use of the area on a regular basis and systematically record changes in wildlife use.

Strategies for Attaining Goal. BLM should cooperate with the WGFD, FWS, Lincoln Road and DALEN Operators, and wildlife and environmental groups in sponsoring an annual "wildlife count" program conducted by volunteers which would provide long-term, year-to-year assessments of bird and wildlife populations in the Fontenelle area. The program could be modeled on the Audubon Society winter "bird count" program. Observation points and data recording techniques compatible with a geographic information system could be developed by the review team.

2.9 Goal: Monitor the effectiveness of wildlife protection and impact mitigation measures.

Strategies for Attaining Goal. Field check and verify location data on sage grouse habitat suitability and leks. Work with Wyoming Game and Fish Department to improve the usefulness of their surveys for monitoring habitat use. Incorporate such data into BLM's geographic information system.

2.10 Goal: Apply locally appropriate reclamation measures to disturbed areas following abandonment of production locations and associated facilities with the goal of returning these areas to pre-construction habitat conditions.

Strategies for Attaining Goal. Implement BLM policies which already require oil and gas operators to submit an abandonment and reclamation plan. Use native species in seed mixtures. Include shrub species in reclamation seed mixtures. Apply remedial treatments to reclaimed areas not responding to initial reclamation measures.

2.11 Goal: Maintain sufficient habitat over the life of the field to ensure that oil and gas operations do not adversely affect the big game population at the herd unit level.

Strategies for Attaining Goal. Field check and refine locational data on high suitability big game crucial ranges and vegetation conditions. Minimize disturbance in areas with a demonstrated high habitat effectiveness. Close

unneeded roads, two-tracks and trails in these areas. Implement off-road vehicle closures in areas with a demonstrated high habitat effectiveness.

2.12 Goal: Maintain a program to monitor changes in the water quality of the Green and Big Sandy Rivers to detect changes which would indicate the potential for adverse effects on fisheries and wildlife.

Strategies for Attaining Goal. Work with the U.S. Geological Survey to ensure that water quality monitoring stations on the Green River are maintained and data continues to be collected. Develop a cooperative relationship with the U.S. Geological Survey and Wyoming DEQ whereby water quality is systematically sampled and analyzed at additional locations on the Green River and Big Sandy River in the vicinity of oil and gas operations.

3.0 Wildlife Protection and Mitigation Measures

The following measures are already required by BLM within the Green River Resource Area:

- Where they would occur within big game crucial winter range, construction and drilling are prohibited from the period November 15 to April 30 unless otherwise approved by the authorized officer.
- Exceptions to allow drilling and construction to occur in crucial winter range between November 15 to April 30 must be requested in writing and will be considered based on established criteria (e.g., presence/absence of big game animals in the vicinity).
- To minimize unnecessary disturbance, oil and gas operators are responsible for constructing and maintaining roads in accordance with a transportation plan which has been reviewed and approved by BLM.
- All oil and gas operators are required to prepare SPCC plans.
- Carriers hauling bulk oil, diesel and fuels are required to have spill plans.
- Cementing of the casing is required to: 1) restore the original formation isolation between formations that existed prior to the drilling of the well; 2) to provide support for the casing by preventing formation pressures from acting directly on the casing; and 3) to retard corrosion by minimizing contact between the casing and corrosive formation fluids. This is intended to protect aquifers from contamination.
- To protect important, defined big game birthing areas, activities would be prohibited from these areas between May 1 to June 30.
- To protect actively used raptor and/or sage and sharp-tailed grouse nesting habitat, activities or surface use are not be allowed from February 1 to July 31 within actively-used areas. This limitation may or may not apply to extended long-term operation and maintenance of a developed project, pending environmental analysis of any operational or production aspects. This restriction is typically applied to areas within 0.5 mile of raptor nests but may be modified depending on nesting chronology, raptor species (e.g., a one mile buffer may be used for ferruginous hawks), nest site location, and topography. Inactive nests would be exempt. The restriction also applies to areas within 0.25 mile of active sage grouse leks.

The following measures which have implications for wildlife protection and impact mitigation or avoidance were discussed in the DEIS (chapter two) as part of the Proposed Action and/or Resource Protection Alternative or in chapter four of the DEIS as additional mitigation measures. The core team should be cognizant of these measures in the development and implementation of the wildlife protection plan:

- To reduce off-site sedimentation and impacts on water quality, and to prevent soil damage from vehicle and equipment rutting, roads and well sites would be surfaced (e.g., graveled).
- Once drilling and completion is over, the drill pad would be reclaimed as soon as possible (weather permitting) with the production pad limited to 0.7 acres.
- Seeding would be accomplished during the fall (September or October--weather permitting) to take advantage of winter moisture.
- Native species would be required for seed mixtures used in reclamation.

- BLM would require fencing (well pads, riparian crossings, steep slopes, etc.) after seeding if grazing by livestock, wildlife, or wild horses is precluding successful revegetation.
- Dikes would be constructed around condensate, produced water and methanol tanks to contain any potential spill and to protect surface water.
- Upon abandonment of wells on public lands, the operators would be required to contact the BLM for approval of a final reclamation plan.
- Topsoil would be stripped from areas to be disturbed and stockpiled to aid in subsequent reclamation and revegetation.
- Wells would be located outside of wetlands, historic sites, historic trail buffers and steep slopes (25 percent or greater);
- Posting of traffic signs and speed limits could be placed by the operators to help reduce vehicle-animal collisions.
- Heavy truck traffic (e.g., oil, produced water haulers) would not use the road across Fontenelle dam, or use roads within Seedskaadee National Wildlife Refuge (NWR) except for through-traffic on State Highway 28.
- Wells within the Lincoln Road Development Area would be at least 0.25 miles from the boundary of Seedskaadee NWR and would average about 0.75 to 1 mile from the Green River within the refuge.
- Reserve pit liners would be incorporated into the design of wells in the Green River floodplain.
- Solidification of reserve pits could be required in some cases by BLM.
- Water for drilling, construction and road watering would be withdrawn from existing water wells or under existing water rights from the Green River.
- Well pads would be prohibited from steep slopes unless special erosion control and reclamation measures were approved by the authorized officer.
- Well pads would be located at least 100 feet from intermittent drainages to reduce sedimentation and disturbance to saline soils which could affect water quality in the Green River.
- Facilities would be located outside of floodplains in deeply incised canyons.
- Pumps or tank trucks used to withdraw water from the Green River should be located at least 100 feet back from the river bank wherever feasible.
- Portable/free-standing diesel-powered pumps used for water withdrawal would be located within a containment device to minimize the impacts of a pump fuel spill on the Green River.
- Water withdrawal sites would be graveled, unless otherwise specified by the BLM Authorized Officer, and hoses used to withdraw water would be clean and not contaminated with drilling fluids. Water withdrawal sites on federal lands would be approved by BLM and no sites would be located within Seedskaadee National Wildlife Refuge.
- No refueling of vehicles or construction equipment would occur within 100 feet of a wetland, surface water, intermittent or perennial stream or drainage.
- No trucks, vehicles, construction equipment, water trucks or heavy equipment would enter the Green River or any other flowing stream or water body.
- Oil and gas operators would inform their employees, contractors and subcontractors that washing of trucks, vehicles, construction equipment, water trucks or other equipment in the Green River is prohibited and violators will be subject to dismissal.
- Roads or pipelines should cross drainages at a right angle wherever feasible. Crossings should be constructed during periods of low flow or when the stream bed is dry. Stream banks should be returned to a stable contour and banks at the crossing stabilized, if necessary, with rip-rap.
- Well pad designs would incorporate sediment and drainage control structures. (Examples of such structures are discussed in Section 4.17, DEIS).
- Oil and gas operators would inform their employees, contractors and subcontractors that any hauler found to be dumping drilling fluids into surface waters or withdrawing water from the Green River without a permit will be subject to dismissal and their actions reported to the Wyoming Department of Environmental Quality (WDEQ) or Wyoming State Engineers Office (WSEO).
- Trench dewatering and the discharge of hydrostatic test water would be conducted in compliance with WDEQ notification and permit requirements and in a manner which will minimize sedimentation and impacts to surface water. Water would be discharged into areas where it will not flow into perennial or intermittent stream

- channels or prairie dog burrows. Silt barriers, such as hay bales or silt fences, should be incorporated into the discharge plan to intercept runoff and prevent sediment from reaching streams.
- Reduce sediment transport by designing, installing and maintaining instream structures such as rock check dams, rip-rap, drop structures (see DEIS, Section 4.17).
 - As part of maintenance of existing roads, install structures (e.g., sediment traps in road ditches) which would reduce sediment transport from road ditches into drainages.
 - Reclaim and close roads within canyons or adjacent to drainages which are not needed to serve existing oil and gas production sites or for livestock grazing operations.
 - Monitor drainages and sediment control structures to determine whether potential sediment transport in drainages leading to the Green River have been reduced.
 - To protect surface water and shallow groundwater (e.g., the Green River floodplains), reserve pits in the floodplain would be lined and bermed. A closed or semi-closed mud system would be used in these areas. To speed removal of drilling fluids, pits in floodplains would be dewatered upon the completion drilling. (Where affected lands and minerals in the floodplain are privately owned, BLM's authority to require measures on private lands is limited.)
 - Surface pipelines in floodplains would be anchored to prevent their shifting or breaking loose in the event of a flood.
 - Subsurface pipelines in floodplains should be buried below stream scour depth.
 - Surface facilities would be located to avoid playas.
 - Implement erosion control, revegetation and restoration measures described in Section 4.17.5.1 of the DEIS.
 - Riparian areas on Federal land which are undergoing reclamation would be fenced if livestock, wildlife, or wild horses congregate in these areas precluding successful reclamation.
 - BLM may establish study plots and enclosures on reclaimed areas to help determine whether existing levels of livestock, wildlife, or wild horse grazing is having a detrimental effect on reclamation of construction-related disturbance.
 - Well pads would be relocated to avoid impacts to wetlands. Wetland delineations would be required to ensure that well pads are located outside of wetlands.
 - Oil and gas operators should inform their employees, contractors and subcontractors of Federal and State laws, regulations and policies that pertain to protection of threatened and endangered species, candidate species and sensitive species. Failure of employees, contractors and subcontractors to adhere to State and Federal game laws as a condition of employment could be grounds for dismissal.
 - To minimize poaching, oil and gas operators should inform their employees, contractors and subcontractors that firearms should be forbidden at work sites.
 - Similar to other projects in the BLM's Rock Springs District, all operators should adopt a policy of prohibiting dogs at work sites to reduce the potential for harassment of wildlife.
 - As part of their transportation plans, oil and gas operators should identify: 1) roads and two-tracks that would not be needed for oil and gas development and that could be considered for reclamation and closure in coordination with BLM; and 2) roads that would be closed to limit access to habitat utilized by wintering bald eagles.
 - As part of their transportation plans, oil and gas operators should, in cooperation with BLM, identify roads that would be closed to the public, especially during winter and spring. Wildlife habitat models for mule deer winter range habitat and sage grouse nesting habitat could be utilized to identify areas that would most benefit by road closure during the respective seasons.
 - Where project sites would be located in potentially suitable habitat, surveys should be conducted to determine whether the area is being used for nesting by ferruginous hawks, burrowing owls and loggerhead shrikes. Unless otherwise approved by the BLM authorized officer, if nesting loggerhead shrikes or burrowing owls are found, no activities should occur in the utilized habitat during the reproductive period--mid-April through July; no surface disturbing activities should occur within one mile of an occupied ferruginous hawk nest site from mid-March through early July; and no project component should be located within 820 feet of any nest structure actively used by ferruginous hawks.

- Surveys to locate bald eagle roost trees, perch sites, and feeding areas along the Green River should be conducted by the BLM, WGFD, and/or FWS to ensure that appropriate mitigation measures (buffer areas, scheduling, etc.) are being implemented.
- No potential nest trees for bald eagles or other raptors in the Green River floodplain should be removed.
- If plovers are found to be nesting or rearing broods on a site planned for development, the project component should be moved to avoid impacts to mountain plovers. If necessary, operators should minimize impacts to nesting plovers by scheduling activities to avoid the late March through July nesting period.
- Companies, with the cooperation and assistance of the BLM, WGFD, and FWS, would provide all project-related personnel with information about State and Federal game laws.
- Companies should work with WGFD on a program to offer a reward for information leading to the arrest of poachers.
- Identify unnecessary roads constructed and used by the companies within their project area that could be reclaimed and where abandoned well pads and other well-field facilities have not been adequately reclaimed. Wildlife habitat models (pronghorn summer habitat, mule deer winter habitat, sage grouse nesting habitat) could be used to identify and prioritize areas that would most benefit by renewed reclamation.
- Identify where newly constructed and existing roads within their transportation network will intersect two-track roads and provide barriers where these two-track roads intersect existing and proposed roads.
- Evaluate existing BLM administered stock ponds within the project area and make improvements, where necessary, so they will retain water for use by livestock, wildlife, and wild horses. Improvements would include reconstruction of dams and installing snow fences within stock pond drainages to increase potential water source. Wildlife habitat models (pronghorn summer habitat, sage grouse nesting habitat) could be used to identify and prioritize areas where stock pond improvements would most benefit.
- Consideration could be given to the construction of improved water sources for wildlife (e.g., guzzlers) within key sage grouse nesting habitats and key pronghorn summer range habitats that would be fenced to prevent livestock use. Wildlife habitat models (pronghorn summer habitat, sage grouse nesting habitat) could be used to identify and prioritize areas that would most benefit from new water sources.
- Consideration could be given to drilling water wells for wildlife use. Wells should have the capability for seasonal shutdown so they do not retain wildlife on inappropriate seasonal ranges. Wildlife habitat models (pronghorn summer habitat, sage grouse nesting habitat) could be used to identify and prioritize areas that would most benefit from new water sources.
- Within demonstrated, high suitability big game crucial winter ranges, limit well site visits to mid-day (10 am to 4 pm) during winter (November 15 to April 30) to avoid disrupting big game during principal feeding periods.
- Place roads and well pads to avoid sage grouse leks and demonstrated, high suitability nesting habitat.
- Consideration could be given to constructing artificial nesting structures for use by ferruginous hawks and golden eagles in areas where no suitable nesting substrates are present and in which no proposed construction activities would occur.
- Flag reserve pits between completion of drilling and dewatering of the pit. In situations and at locations to be specified by BLM, reserve pits should be covered with netting.

4.0 Implementation Schedule

BLM would establish a review team within 2 months following implementation of a BLM Record of Decision. A draft plan would be completed within four months following the decision and a final plan would be approved within eight months following implementation of the BLM decision.

APPENDIX D
Road Development Plan

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LINCOLN ROAD OPERATORS

**ROAD DEVELOPMENT PLAN
FOR THE
LINCOLN ROAD AREA**

Prepared By:
D.R. Griffin and Associates, Inc.
in consultation with the
Bureau of Land Management, Rock Springs District
(April 10, 1996)

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ROAD DEVELOPMENT PLAN
FOR THE
LINCOLN ROAD AREA

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LINCOLN ROAD OPERATORS

ROAD DEVELOPMENT PLAN
FOR THE
LINCOLN ROAD AREA

PURPOSE

This document is intended by the Lincoln Road Operators as a commitment to a quality assurance/quality control program for the location, design, construction and maintenance of roads required for expansion of their operations on public lands within the Lincoln Road Area. The contents of the following sections will detail the procedures by which transportation planning, road design, road construction and road maintenance will be conducted by Lincoln Road Operators to meet their operational needs and Bureau of Land Management requirements for roading standards, safety and resource protection.

GENERAL

Lincoln Road Operators utilize an extensive road network in the Lincoln Road Area, much of which is shared with other road users. Planned expansion of operations, when implemented, will result in the need for additional road construction.

Present Bureau of Land Management requirements for transportation planning and the location, design and construction of roads are intended to provide an adequate road system for development and use of natural resources. Protection of the environment and user safety are also considered in the design of the roads.

To achieve these objectives in the course of conducting their operations, Lincoln Road Operators propose to implement a quality control and assurance program for roads. This program will allow Lincoln Road Operators to determine the road construction they will need for their operations in the foreseeable future, set up the standards and parameters necessary for the location, design and construction of these roads, and provide for post-construction compliance monitoring.

The construction of safe and environmentally acceptable roads will be one of the Lincoln Road Operators' priorities within the Lincoln Road Area. Lincoln Road Operators will make every effort to provide for the safe and environmentally sound location, survey, design and construction of roads on public lands within the Lincoln Road Area. Company personnel, the BLM and the affected counties, with the involvement of registered engineers and land surveyors, will ensure all plans and construction meet safety and environmental requirements.

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TRANSPORTATION PLANNING

The Lincoln Road Operators propose to implement a three-tiered process for transportation planning, with appropriate levels of planning, implementation and quality assurance included within the three tiers

The three levels of transportation planning will be as follow:

LEVEL 1 - TRANSPORTATION PLAN

The Transportation Plan for the Lincoln Road Area will consist of Transportation Plan Maps (with supplemental narratives), and this Road Development Plan. These documents, plus the Annual Road Plans and Project Plans explained below, will guide the overall long term development of a road network to serve the operations of the Lincoln Road Operators in the Lincoln Road Area.

Planning

Transportation issues relating to the Lincoln Road Area are also addressed in Chapter 2 of the Fontenelle Natural Gas Infill Drilling Projects Environmental Impact Statement. That chapter, which is broad in scope and recognizes the overall needs and effects of the Lincoln Road Operators' proposed operations within the Lincoln Road Area, addresses major arterial routes (state and county routes) which will be used to reach the area. It discusses some BLM administered Collector and Local (BLM functional classification) roads which will be used to reach areas of the field, as well as the environmental effects of the construction and surface disturbances related to roads in the field(s). An estimate of traffic associated with the development of the Lincoln Road Area which will use these routes is also included in the environmental effects discussion.

The general "Existing Transportation System" map (see page 9) displays existing main routes (state, county and BLM administered roads) presently used for access in or near the Lincoln Road Area. These, as well as other field roads and proposed roads needed for field development, will be studied by the Lincoln Road Operators to determine which routes should be designated as Collector, Local and Resource (BLM functional classification) routes to form a useable transportation system for field development and access to the area. Transportation Plan Maps (with supplemental narratives) will then be prepared. The supplemental narratives will address projected traffic for each route, realignment and reconstruction necessary for safety or environmental reasons, and planned new road construction.

There is a possibility that the present and future development of a road network associated with the fields will lead to development of recreational or home sites on private land parcels near or within the Lincoln Road Area. While this is a remote possibility because the Lincoln Road Area is comprised mainly of public lands, acquired or withdrawn lands under Bureau of Reclamation jurisdiction and state owned lands, there are some private lands adjacent to the area. If they were to be developed for recreational or home sites, short segments of field roads on public lands could become the primary access. Coordination between the BLM and counties concerning jurisdiction and improvement responsibility for these routes may be needed to avoid subdivisions or other developments served by BLM roads.

This Road Development Plan describes the process by which route planning, location, design, construction, quality control, maintenance and road abandonment will be accomplished by the Lincoln Road Operators during the expansion of their operations within the Lincoln Road Area. Other information relating to engineering design such as soils, drainage, grades, problem areas on existing or proposed roads, anticipated

traffic volume and vehicle weights, the need for gravel or other treatment to stabilize road surfaces, and coordination required to meet county/state requirements will be addressed on a case-by-case basis for each road and during the annual review process.

Implementation

This Road Development Plan will be used to guide the Lincoln Road Operators' road system planning and development process. The Transportation Plan will be further refined to keep it current and to provide project specific information as described in Level 2 and Level 3 which follow.

LEVEL 2 - ANNUAL ROAD PLAN

Planning

An Annual Road Plan which will address road needs on a quadrangle by quadrangle basis within the Lincoln Road Area will be prepared each year in conjunction with the Lincoln Road Operators' annual drilling programs.

The Annual Road Plan will show roads which have been constructed, existing routes to be improved as local and collector roads, and new roads to be constructed in the specific region(s) of the Lincoln Road Area where operations are planned for the following year. Roads scheduled for abandonment within the Lincoln Road Area will also be shown on the plan. Changes in access routes (both proposed and already constructed) necessitated by terrain, environmental factors and for other reasons, will also be shown on the Annual Road Plan.

Proposed roads shown on the Annual Road Plan will be located and designed to meet the standards for the appropriate BLM functional classification.

The Annual Road Plan will be updated and submitted to the BLM for review each year, before development of the roads included in it is begun.

LEVEL 3 - PROJECT PLANS

Planning

Each Project Plan will include one or more USGS quadrangles as appropriate to display the Lincoln Road Operators' planned road construction program for the area(s) where development is occurring.

It will show existing and planned roads by functional classification within each quadrangle and will be prepared as needed while the company drilling program is being implemented. When an APD (Application for Permit to Drill), NOS (Notice of Staking) or application for a right-of-way is submitted, a copy of the Project Plan will be included to show other wells and access roads proposed in the area. Road construction plans for one or more roads may be submitted with each project plan as part of the NOS, APD or right-of-way application.

DESIGN AND ROUTE LOCATION

Implementation

Before routes are selected and road plans are prepared, Lincoln Road Operator(s) personnel and their surveying/engineering consultants will review this road development plan and any available resource and land use data from BLM or other sources specific to the project area. A joint BLM (engineer, resource specialist), operator, and consultant field review will then be scheduled and conducted. Depending upon the number of roads or complexity of a single road, the joint review team will determine the most feasible access route(s) based on the resource conflicts, soils, drainage considerations, and the terrain and engineering standards for the type of route planned. During the field review, the degree and scope of engineering and construction control required will be specifically defined.

New Roads

"New" roads, as referred to in this plan, are roads to be constructed where no "crowned and ditched" road has previously been built, except in the case where one may have been built and later obliterated or rehabilitated. Roads to be constructed on routes which follow existing "seismic" or "two-track" trails will still be considered "new" roads.

Location, design and construction of all new roads in the Lincoln Road Area will be to the standards derived from BLM Manual 9113. The Lincoln Road Operators will use the road standards shown on the following page in the Lincoln Road Area unless conditions dictate otherwise.

Existing Roads

A road referred to in this Road Development Plan as an "existing" road is one which has previously been constructed to a standard which required a crowned travelled way and borrow and drainage ditches (except for some roads in the fields which were built without ditches, but met BLM requirements at the time they were constructed). "Seismic trails" and existing "two-track trails" are not considered existing roads.

Existing roads which are classified as resource roads in the Annual Road Plan will not normally be upgraded or reconstructed, unless it is determined they were not constructed as directed by the BLM at the time they were built.

Existing roads which are identified in the Transportation Plan and/or Annual Road Plan as being part of a local or collector route will be reconstructed or upgraded (improved) as necessary to meet the current standards for the appropriate functional classification.

ROAD STANDARDS FOR THE LINCOLN ROAD AREA

DESIGN ELEMENT	FUNCTIONAL CLASSIFICATION		
	Resource Road	Local Road	Collector Road
Design Speed	20 MPH (max.)	30 MPH	40 MPH
Width (travelled way)	14 ft.*	20 ft. (min.)	24 ft. (min.)
Width (subgrade)	18 ft.	24 ft. (min.)	28 ft. (min.)
Minimum Hor. Curve Rad.	220 ft.	460 ft.	820 ft.
Maximum Grade	8%	8%	8%
Minimum Grade	0.5%	0.5%	0.5%
Minimum Stopping Sight Distance	135 ft.	225 ft.	325 ft.
Minimum Intersection Sight Distance	200 ft.	300 ft.	400 ft.
Minimum R/W Width Needed (construction on steep slopes will increase the R/W width needed)	40 ft.	55 ft.	60 ft.
Design Structural Loading	H-20	H-20	H-20

*With turnouts

Route Location

During the joint field review, routes will be selected that avoid unnecessary resource conflicts whenever possible. The placement of the road relative to migration corridors, ridge lines, and other areas known to be used by big game animals will be considered. Routes should be located to avoid adverse effects to threatened, endangered and other plant and animal species of interest.

During the location of roads, particular attention will be given to meeting or exceeding the minimum vertical and horizontal sight distances required. Route locators/surveyors will also select horizontal curves to ensure that the minimum radius requirements for the planned design speed are met or exceeded.

Geometric combinations of vertical and/or horizontal curves (such as reverse horizontal curves, broken back curves and horizontal curves superimposed over vertical curves), which create dangerous situations for road users, will be avoided.* When the terrain is such that these combinations cannot be completely eliminated, signs to warn motorists or other mitigation measures will be incorporated into the road plans.

The centerline and locations of structures will be staked, color coded and clearly marked for all new roads, including those designed and constructed on steep, broken or mountainous terrain.

Construction staking will be done for roads or segments of roads where the engineer/surveyor determines that slope staking for the control of construction is necessary because of terrain, grade and earthwork conditions and/or special construction needs (structures and other features).

Road Plans

All new roads and appurtenances (such as culverts, cattle guards, fences, etc.) will be constructed to the dimensions, slopes and details shown on the attached templates, unless agreed otherwise because of conditions or circumstances (see Exhibits, pages 13 through 19).

Surfacing specifications and depths shown on the attached templates may be adjusted because of local soil conditions, or graveling of roads may be waived (with BLM agreement) in instances where gravel is not available or is not considered necessary. Dust abatement mitigation with soil treatment additives will be considered on a case by case basis and at the annual review.

Plans for all roads will show the horizontal and vertical alignment of the road and the locations of culverts and other features. Typical sections needed to show the road template, culvert installations, and other features will also be attached. Cross-sections of the roadway and other drawings for special design features will be included as needed.

Road designs submitted by a registered civil engineer will bear the stamp and signature of the engineer when submitted to the BLM for review.

Road plats and plans prepared by a registered land surveyor (these will require the participation of a BLM engineer during the route selection phase) will bear the stamp and signature of the land surveyor, and a statement that the alignment, grade and other features shown on the plans accurately depict the field conditions surveyed, including the route and features as actually staked in the field. Roads designed by a registered engineer and surveyed by a registered land surveyor will bear the stamp and signature of the engineer, and may bear the stamp and signature of the surveyor when necessary.

Plans for construction of all roads will be submitted to the BLM for review and acceptance by the District Engineer.

*Refer to the BLM Pocket Field Guide "Road Standards - Excerpts from BLM Manual Section 9113."

CONSTRUCTION/QUALITY CONTROL

All roads constructed or reconstructed by Lincoln Road Operators within the Lincoln Road Area will be built to the approved plans, and will comply with all other applicable requirements and stipulations. The construction will be monitored by Lincoln Road Operators company representatives, their consultants, or an independent construction inspector as required.

Any changes which may become necessary during construction will be jointly agreed to by the BLM, the designer, affected private landowners, and the involved Lincoln Road Operators company representative before construction of the changes commences. The agreed to changes and the reasons they are necessary will be documented in writing with copies distributed to all parties.

Within five days after construction of each road is completed, it will be inspected by company personnel, the contractor who performed the construction, and the BLM (at their option). This inspection will be documented on a "Post Construction Inspection Record" form (see exhibit, page 10) and signed by those performing the inspection. Any work which does not comply with the approved plans will be immediately corrected by the contractor.

A registered civil engineer's certification that the construction was completed according to the approved road plans will generally be furnished for those roads that were designed by a registered professional engineer.

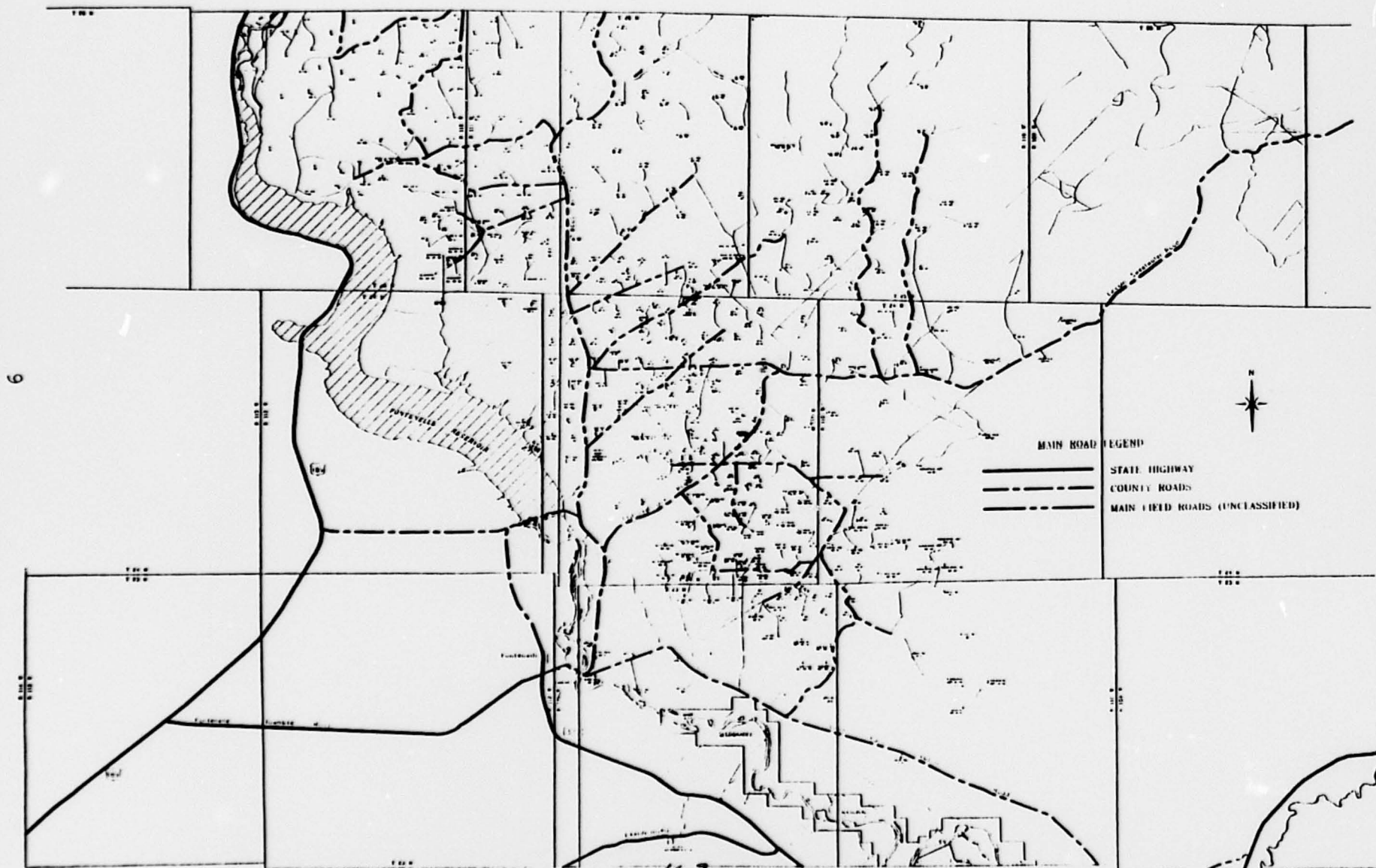
MAINTENANCE

Road maintenance will be conducted as required by existing and future grants and permits. Joint use maintenance agreements among operators in each field within the Lincoln Road Area will remain in effect. If needed, changes in the agreements may be negotiated at the option of the involved parties.

ROAD DENSITY MANAGEMENT

Road abandonment and rehabilitation will be performed as required by the BLM in cases where constructed roads are determined to be no longer needed. Roads slated for abandonment will be shown on the Annual Road Plan. Roads that are determined by the BLM to be of substantial value for access to other resources, for administrative access or for county access needs, will be identified for placement on the BLM or county road system. These roads will be shown on the Annual Road Plan with their appropriate new designation as soon as it is known.

EXISTING TRANSPORTATION SYSTEM



LINCOLN ROAD OPERATORS

POST CONSTRUCTION INSPECTION RECORD
for
Road Construction

Company: _____
 Project Name: _____
 Date: _____ Time: _____ Weather: _____
 Contractor: _____
 Construction Superintendent: _____

CONSTRUCTION CHECKLIST

<u>General</u>	YES	NO	N/A
Does the project look good?	—	—	—
Are sight distances to standards shown on plans?	—	—	—
Is it comfortable to drive at design speed?	—	—	—
Will drainage system take all water away from road?	—	—	—
Are curves constructed as shown on plans?	—	—	—
Has topsoil been replaced on slopes?	—	—	—
Have disturbed/work areas been rehabbed/cleaned up?	—	—	—
<u>Roadway Template</u>			
Are these features as shown on plans?:			
Cut and fill slopes	—	—	—
Shoulder slopes	—	—	—
Subgrade width	—	—	—
Gravel surface width	—	—	—
Gravel surface depth	—	—	—
Borrow ditch depth	—	—	—

<u>Drainage</u>	YES	NO	N/A
Are culverts damaged or obstructed?	—	—	—
Are these as shown on plans?:			
Culvert locations	—	—	—
Culvert lengths and diameters	—	—	—
Inlet basins and ditch blocks	—	—	—
Wing and drain ditches	—	—	—
Riprap	—	—	—
Borrow ditch	—	—	—

<u>Other</u>	YES	NO	N/A
Are these built or installed as designed?:			
Turnouts	—	—	—
Cattleguards	—	—	—
Cattleguard drainage	—	—	—
Fences and gates	—	—	—
Signs	—	—	—
Bridges	—	—	—
Low water crossings	—	—	—
Pipeline or utility crossings	—	—	—

Have shoulder, fill and/or cut slopes been flattened to allow access to sheep wagon or other "two-track" trails? — — —

<u>Permits</u>	YES	NO	N/A
Does construction of the highway approach meet all state highway department permit requirements?	—	—	—
Does construction of the county road intersection meet all county and/or permit requirements?	—	—	—

Comments or additional work needed

Horizontal lines for handwritten comments.

I have inspected this project and attest that the construction complies with the road plans, all permit requirements, the surface use plan, and the approved APD and/or right-of-way grant stipulations.

Company's Representative _____ (Signature and Title)

I have supervised the construction of this project, and attest that all of the construction is in conformance with the plans, specifications and all other permit requirements which apply.

Contractor's Representative _____ (Signature and Title)

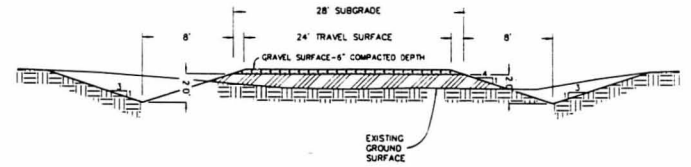
[] I have inspected this project, and find that it was constructed in conformance with the approved plans and all other BLM requirements and stipulations which apply.

[] I waive the requirement for a BLM representative to be present during the post construction inspection of this project.

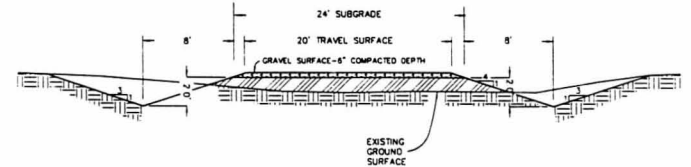
BLM Representative _____ (Signature and Title)

Others (Specify) _____

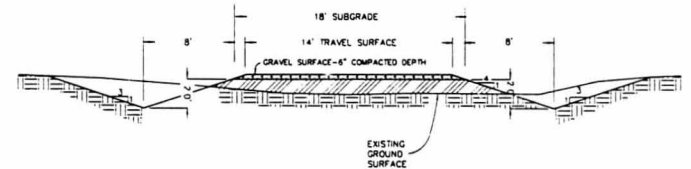
Copies to: Company Contractor BLM Other _____ Date _____



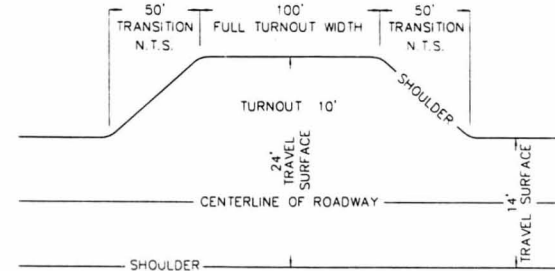
TYPICAL ROADWAY DETAIL COLLECTOR ROADS



TYPICAL ROADWAY DETAIL LOCAL ROADS

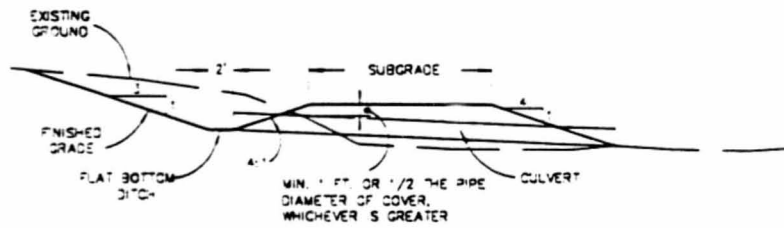
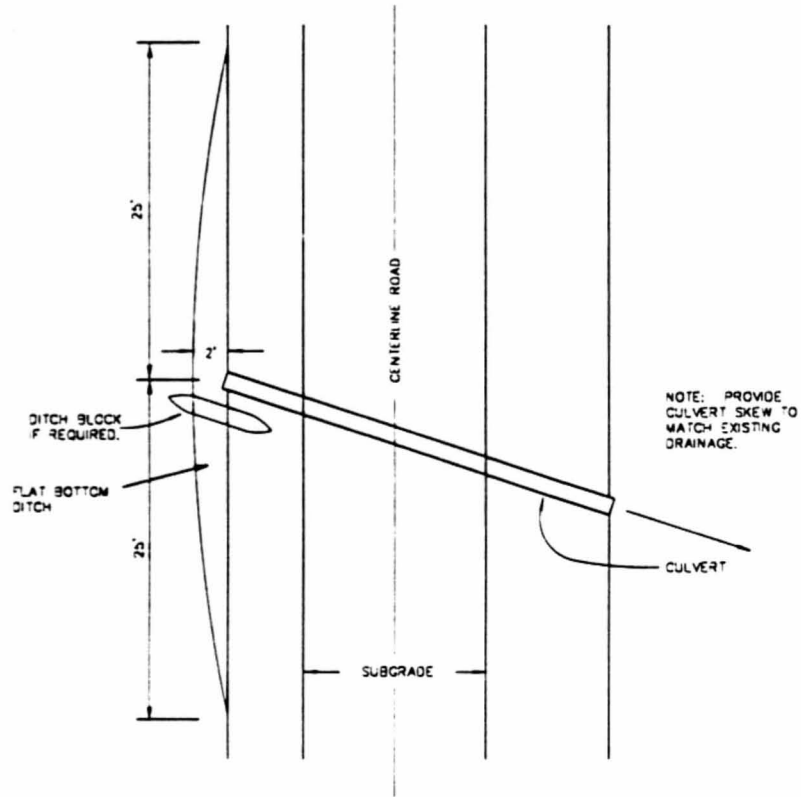


TYPICAL ROADWAY DETAIL RESOURCE ROADS

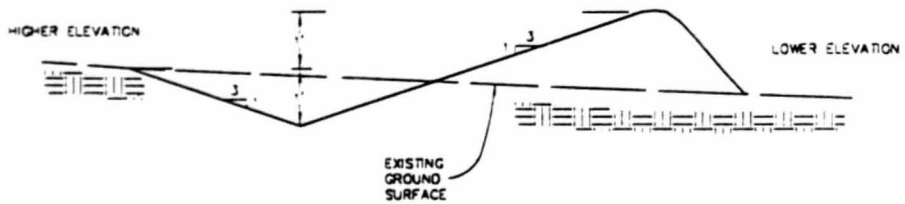


TYPICAL TURNOUT DETAIL

TYPICAL ROADWAY DETAILS



TYPICAL CULVERT DETAIL

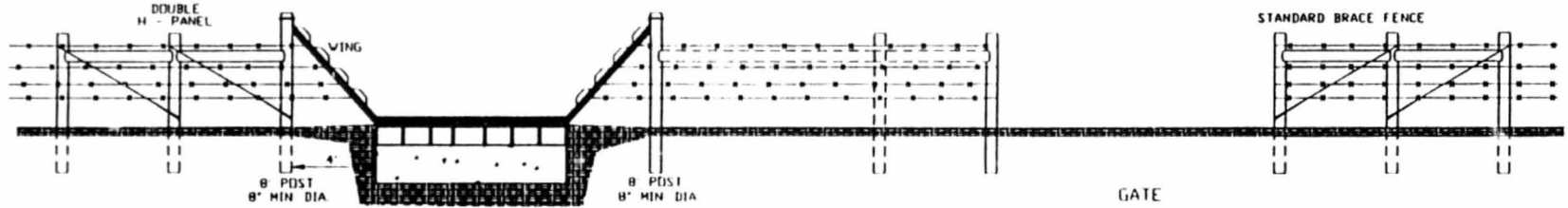


TYPICAL WING DITCH DETAIL

TYPICAL DRAINAGE DETAILS

NOTE:
ELEVATION OF CATTLEGUARD SET TO SAME GRADE AS ROAD

AN H PANEL WILL BE USED WHEN DISTANCES EXCEED ONE ROD.
A WOODEN BRACE BETWEEN CATTLEGUARD AND GATE POST WILL
BE USED FOR DISTANCES LESS THAN ONE ROD



IF ROADSIDE DITCH EXISTS, DOUBLE H PANEL
SHALL BE LOCATED OUTSIDE OF DITCH AREA

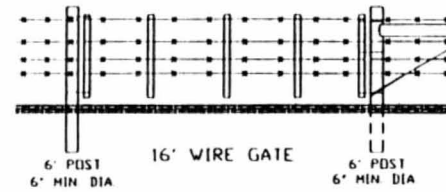
CATTLEGUARD

GATE

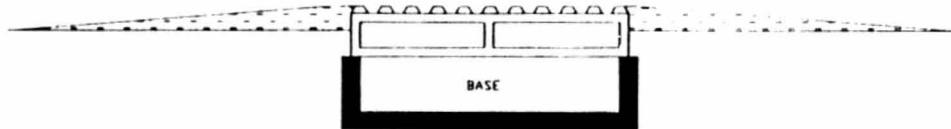
STANDARD BRACE FENCE

NOTE:
FENCE CONSTRUCTION RELATED WITH EACH CATTLEGUARD
INSTALLATION SHALL BE THE SAME AS EXISTING FENCE

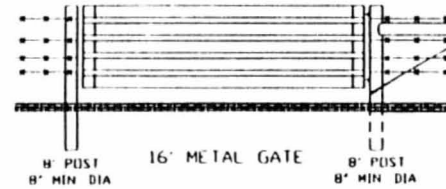
5 - 3" DIA WOOD STAYS EVENLY SPACED



16" WIRE GATE



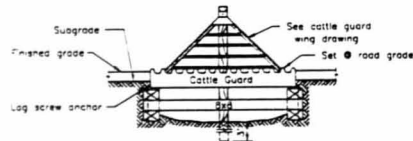
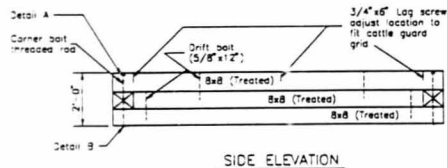
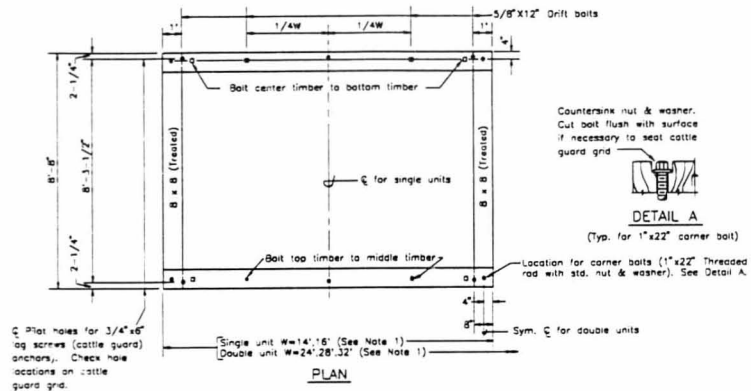
SIDE FRAME



16" METAL GATE

TYPICAL CATTLEGUARD AND GATE INSTALLATION

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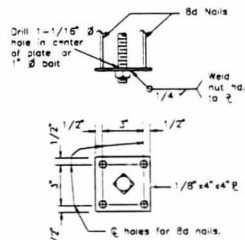
NOTES:

- See specifications for width (W).
- Cattle guard anchor angles with 3/4" x 6" log screw with standard washer to be furnished with each single grid.
- On earth-surfaced roads, set top of cattle guard eight inches above subgrade unless plans or stakes indicate another elevation. Taper fill back from cattle guard approx. 50 ft. in both directions.
- Dimensions for lumber are nominal unless otherwise noted.

ALWAYS THINK SAFETY

WELDING SYMBOL LEGEND

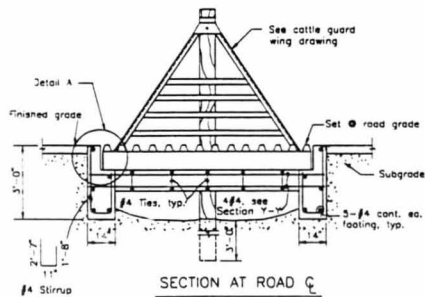
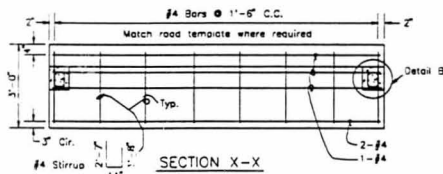
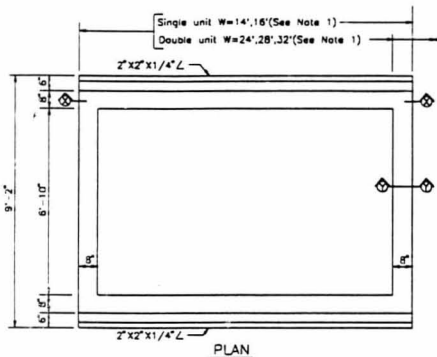
- Weld all around
- Weld this side
- Weld other side



UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
DIVISION OF TECHNICAL SERVICES SERVICE CENTER

CATTLE GUARD FOUNDATION
(Timber)

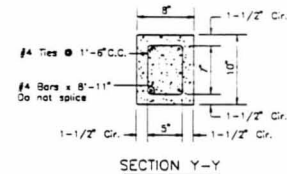
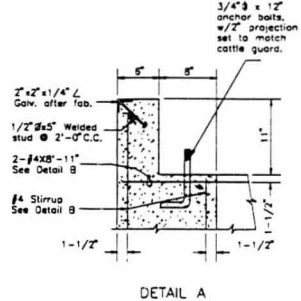
DESIGNED	by others
REVIEWED	
APPROVED	
DRAWN	SCALE NONE
DATE AUGUST 27, 1990	SHEET OF
DRAWING NO. 02881-3	



ESTIMATED QUANTITIES FOR REINFORCED CONCRETE FOUNDATION

DESCRIPTION	QUANTITIES				
	14'	16'	24'	28'	32'
CONCRETE	3.3c.y.	3.7c.y.	5.4c.y.	6.3c.y.	7.1c.y.
#4 REINFORCING STEEL	324 L.F.	355 L.F.	486 L.F.	547 L.F.	618 L.F.
L 2' x 2' x 1/4"	28 L.F.	32 L.F.	48 L.F.	56 L.F.	64 L.F.

ALWAYS THINK SAFETY



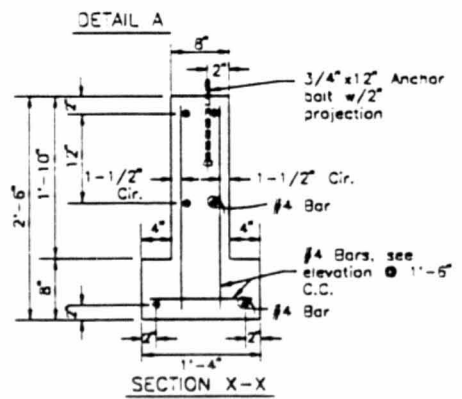
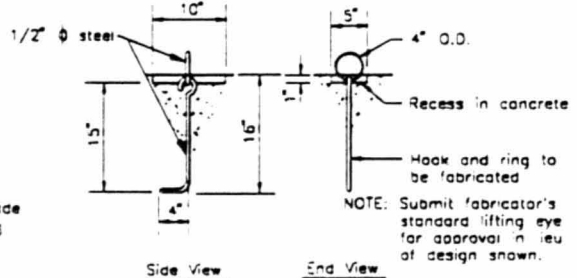
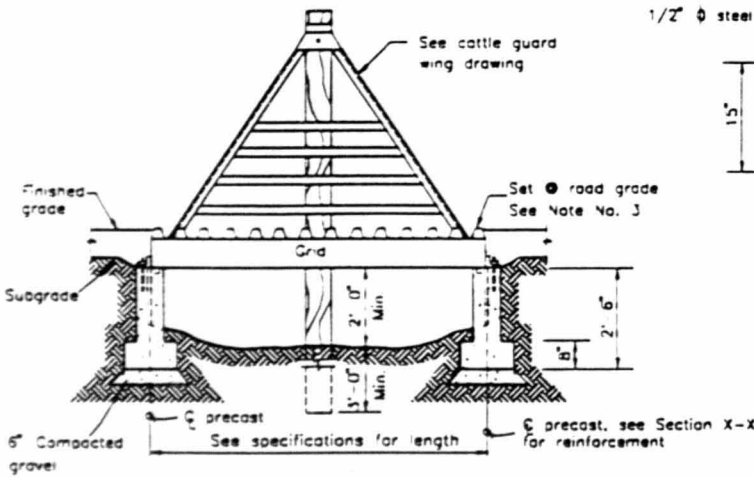
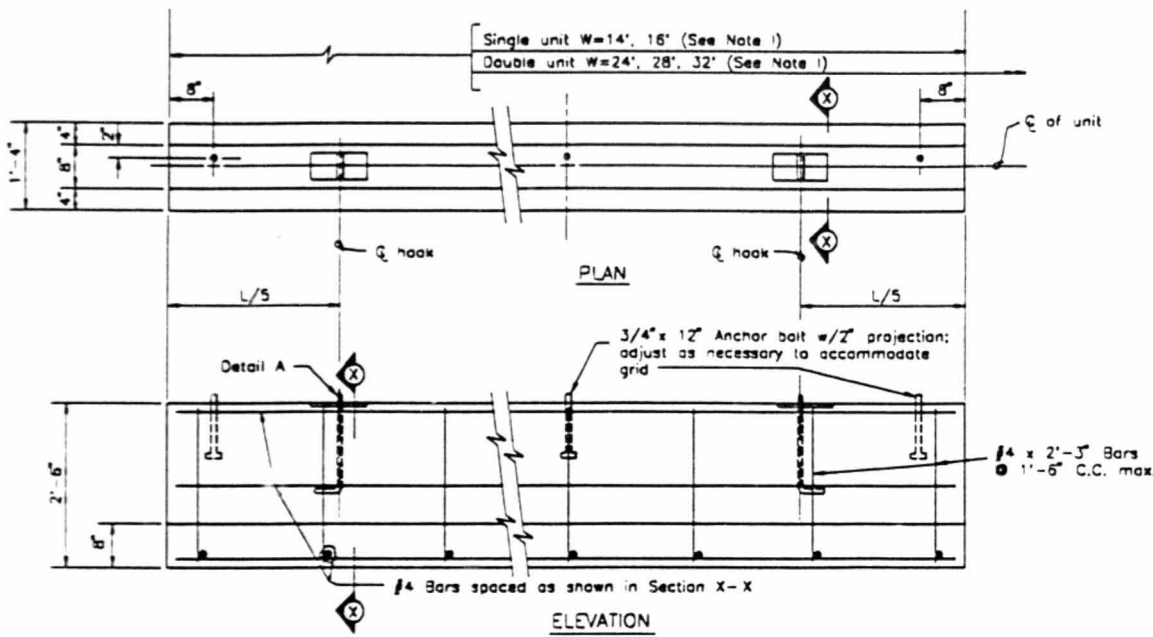
NOTES:

- See specifications for width (W).
- Cattle guard grid dimensions shall be verified prior to construction.
- On earth-surfaced roads, set top of cattle guard foundation eight inches above subgrade unless plans or stakes indicate another elevation. Taper fill back from cattle guard approx. 50 ft. in both directions.
- #4 Reinforcement may be spliced with 24" lap unless prohibited.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
DIVISION OF TECHNICAL SERVICES SERVICE CENTER

CATTLE GUARD FOUNDATION
(Cast-in-Place Concrete)

DESIGNED	by others
REVIEWED	
APPROVED	
DRAWN	SCALE NONE
DATE AUGUST 24, 1990	SHEET OF
DRAWING NO. 02881-6	



NOTES:

1. See specifications for width (W).
2. Standard nuts & washers shall be furnished with each foundation unit including anchor angles. Weld or bolt anchor angles to cattle guard.
3. On earth-surfaced roads, set top of cattle guard eight inches above subgrade unless plans or stakes indicate another elevation. Taper fill back from cattle guard approx. 50' in both directions.
4. #4 Reinforcement may be spliced with 24\"/>

DESCRIPTION	QUANTITIES				
	14'	16'	24'	28'	32'
CONCRETE	2.2 C.Y.	2.5 C.Y.	3.8 C.Y.	4.4 C.Y.	5.0 C.Y.
#4 REINFORCING STEEL	275 L.F.	311 L.F.	471 L.F.	543 L.F.	624 L.F.

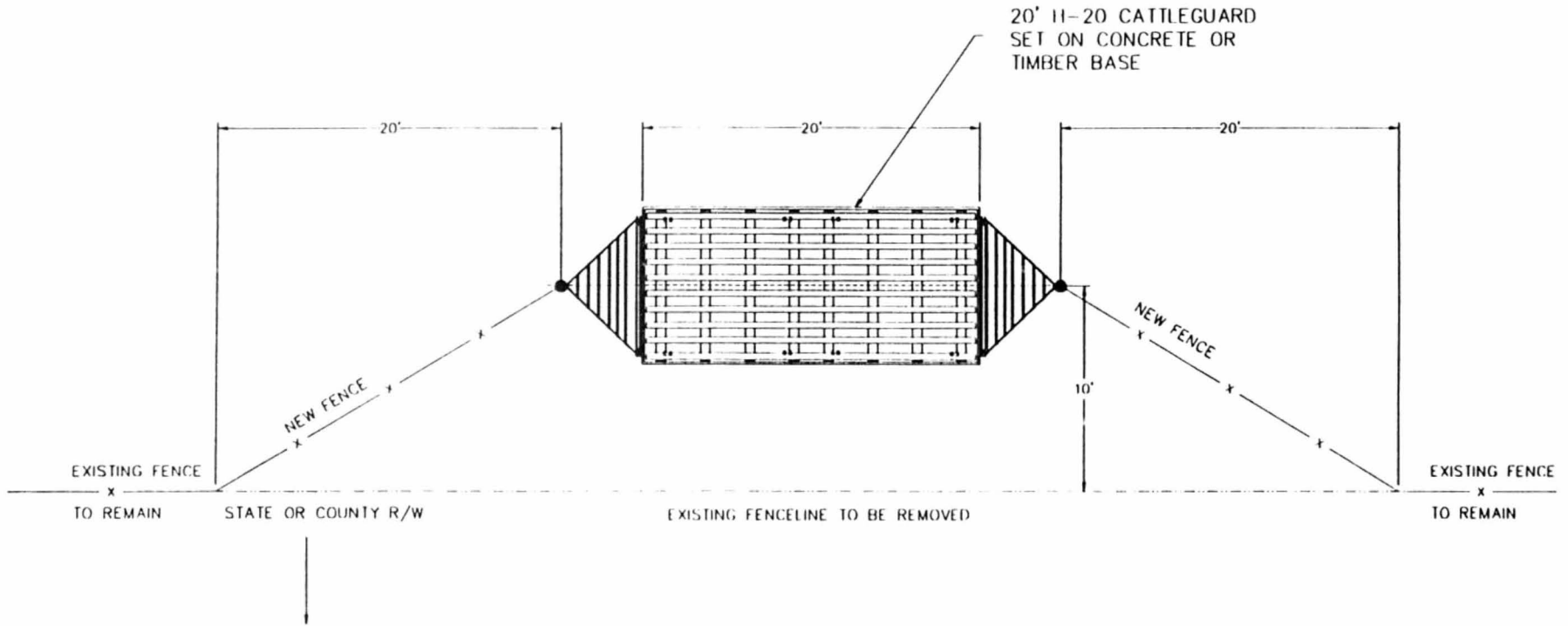
UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
DIVISION OF TECHNICAL SERVICES SERVICE CENTER

CATTLE GUARD FOUNDATION
(Precast Concrete)

DESIGNED by others _____
REVIEWED _____
APPROVED _____

DRAWN _____ SCALE NONE
DATE AUGUST 23, 1990 SHEET OF
DRAWING NO. 02881-7

ALWAYS THINK SAFETY

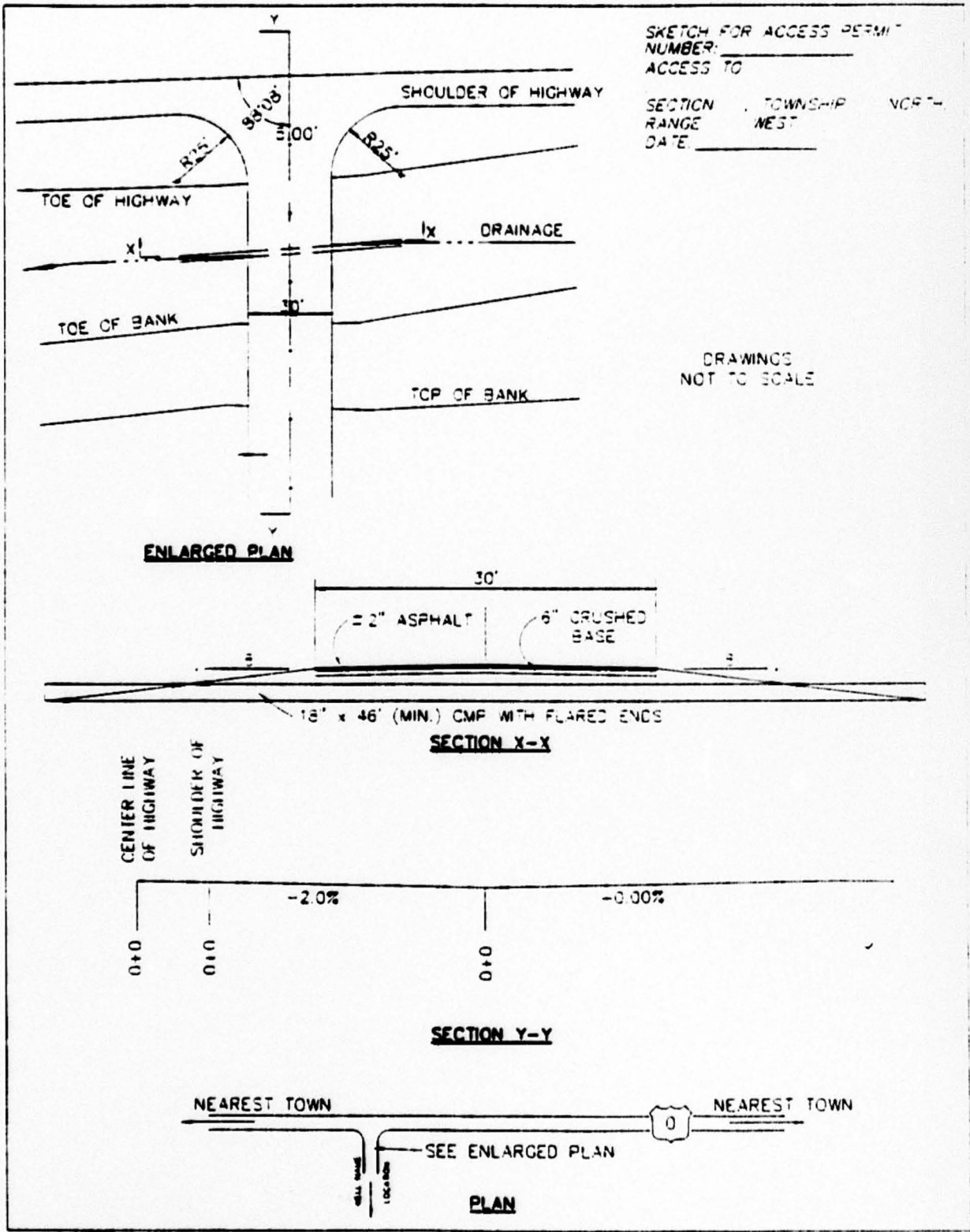


TYPICAL PLAN VIEW
CATTLEGUARD INSTALLATION FOR R/W FENCE

NOT TO SCALE

1 > 2





DRIVEWAY ACCESS PERMIT APPLICATION



(FOR OFFICE USE)

PERMIT NUMBER:	_____
APPLICANT:	_____
FIN:	_____
DATE RECEIVED:	_____
DATE APPROVED:	_____
DATE AMENDED:	_____

1. AFFLICANT/BUILDER NAMES

AFFLICANT: _____	BUILDER: _____
ADDRESS: _____	ADDRESS: _____
PHONE: _____	PHONE: _____

2. PERMIT INFORMATION. PLEASE ANSWER THE FOLLOWING QUESTIONS

A. Name of County Road on which driveway connects: _____

B. Location of driveway (Section, Township, and Range): _____

C. Driveway width: _____ Driveway radius: _____

D. List base material and depth of base: _____ List depth of gravel surface: _____
 (8" coarse gravel, min.) (4" crushed gravel, min.)

3. SITE PLAN AND CONSTRUCTION STANDARDS

A. Please complete and attach a site plan of the proposed driveway. Please follow the format illustrated in the attached drawing. Be sure your driveway conforms to the standards shown in the drawing and as outlined below:

B. Driveway Access Specifications:
 (1) No driveway shall be constructed so that there will be parking or loading of vehicles on the County road. (2) Where excessive cuts are made for the driveway in such a manner that erosion will be a problem, revegetation or retaining walls will be required. (3) In no case shall a driveway be graded or maintained in such a way that water will drain onto the County road surface. (4) 16-gauge corrugated metal pipe culvert of at least 18 inches in diameter shall be used on all driveways adjacent to County roads. The Road and Bridge Foreman may require larger culverts, alternative culvert material, and/or alternative driveway widths. (5) Driveways shall not exceed an 8 percent grade. (6) Portions of driveways built within the road easement or right-of-way shall be constructed of the same material as required for County roads. (7) Design driveway to avoid safety hazards.

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4. PERMIT CONDITIONS

The approval of this permit shall constitute the issuance of a Lincoln County Driveway Access Permit. Approval is based on the aforementioned information and site plan submitted, and is subject to Section 3.1 and 7.9 of the Permit System. Material omissions, fraudulent representation and/or false or inaccurate information used by an applicant to secure compliance with the Resolution shall be reason to deny or revoke any application or permit. This permit shall lapse and become null and void one year from the date of issuance unless a renewal application has been submitted and approved. The permit is subject to the conditions placed on the plan sheet.

5. RIGHT OF INGRESS/APPLICANT CERTIFICATION

I hereby grant authorized County personnel the right of ingress and egress from said lands for any and all inspection purposes necessary to the exercise of this permit. I certify, to the best of my knowledge, that the aforementioned information and material is true and correct.

AFFLICANT'S SIGNATURE: _____

DATE: _____

OWNER'S SIGNATURE: _____

(The person who holds the recorded warranty deed.)

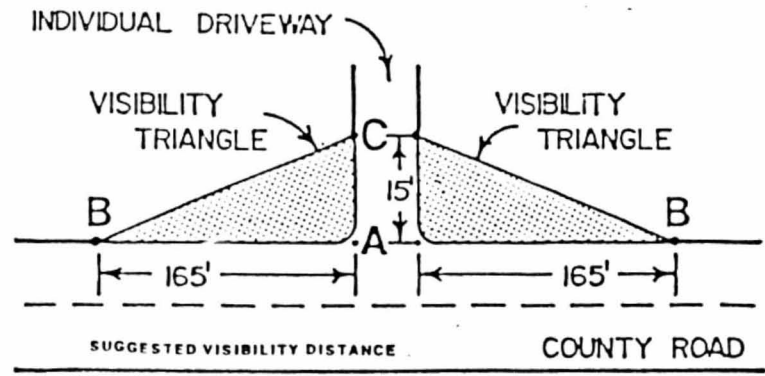
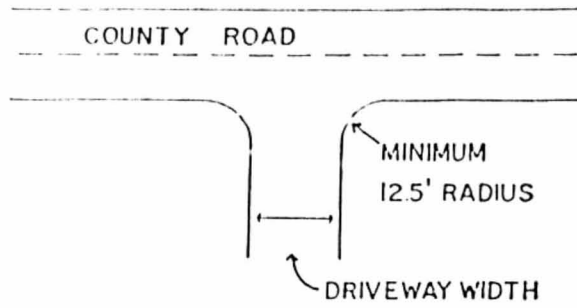
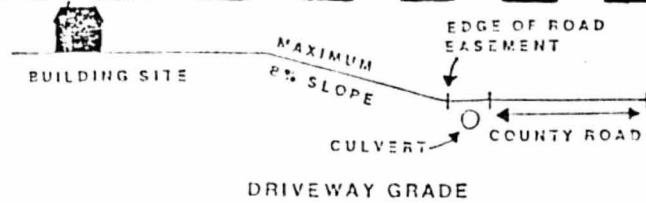
DATE: _____

APPROVAL BY ADMINISTRATOR: _____

DATE: _____

INSPECTED BY: _____

DATE: _____



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PERMIT CONDITIONS/COMMENTS (This permit is approved subject to the following conditions:

SITE PLAN

Approved by:

Title:

Date of Approval:

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SWEETWATER COUNTY
LICENSE

DATE OF APPLICATION _____

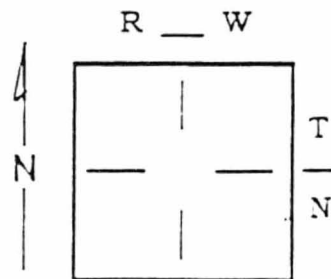
The undersigned hereby makes application for permission to conduct operations described below.

APPLICANT:

Name _____ Firm Name _____
Address _____ City _____
State _____ Phone No. _____

GENERAL LOCATION OF OPERATIONS:

County Road (s) _____
Located in Section (s) _____
Approximately _____ from _____
(miles) (city or well defined point)
for the purpose of _____



The Licensee hereby acknowledges and agrees as follows:

1. The utility facility will be placed in a manner to conform with recognized standards applicable Federal, State, or local laws, codes and ordinances and as directed by the County Engineer.
2. Any future alteration or modification of the Facility within the existing right of way, required and requested by the County, shall be completed without delay and cost to the County.
3. The alignment and grade, clearance, materials, pressures, land ties and mile post ties are shown on the plan sheet dated _____.
4. The License will not be modified, transferred or assigned without the consent of the County.
5. The Licensee agrees to conform to the standards for traffic control as outlined in the Manual of Uniform Traffic Control Devices (MUTCD). The Licensee must cease all operations if the traffic control standards are not met.
6. To the extent of the licensee's negligence, therefore, the Licensee agrees to forever indemnify the County and save it harmless from all liability for damage to property or injury to or death of persons, including all costs and expenses relating thereto, arising wholly or in part or in connection with the existence of construction, alterations, repairs, renewals, or uses or removals of the Facility as pertain to any County Road.
7. _____

FIELD INSPECTED AND CHECKED BY _____ AND RECOMMENDED FOR APPROVAL

The undersigned, the Licensee, hereby accepts this License subject to the terms and conditions contained herein. Effective date of this License is _____ 19 _____

LICENSEE: _____

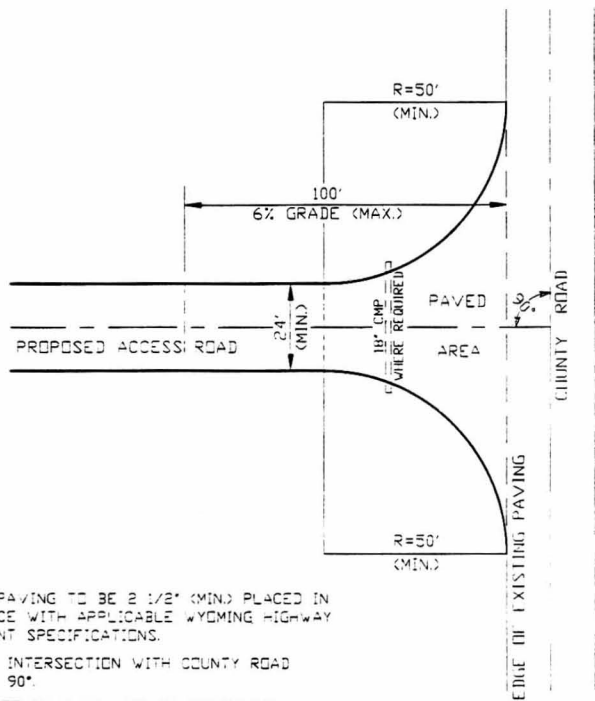
BOARD OF COMMISSIONERS

BY: _____

Chairman

County Engineer

Verbal approval given to Utility Company on _____



ASPHALT PAVING TO BE 2 1/2" (MIN.) PLACED IN ACCORDANCE WITH APPLICABLE WYOMING HIGHWAY DEPARTMENT SPECIFICATIONS.

ANGLE OF INTERSECTION WITH COUNTY ROAD SHALL BE 90°.

CULVERT TO BE INSTALLED AS NECESSARY FOR DRAINAGE.

FILL SLOPES ON ACCESS ROAD SHALL BE MINIMUM OF 4:1 IN APPROACH AREA. FILL TO BE COMPACTED TO 95% (CP).

CRUSHED GRAVEL BASE ON APPROACH AREA SHALL BE MINIMUM 4' THICK, AND COMPACTED TO 95% (CP).

NOTE
FOR UNPAVED COUNTY ROADS, GRAVEL BASE ONLY IS REQUIRED.

DETAIL OF
ACCESS ROAD APPROACH
SWEETWATER COUNTY

NOV. 17, 1980
REV. 12-8-80
5-19-81

1"=30'

FORM R-1
UINTA COUNTY RIGHT-OF-WAY ENCROACHMENT LICENSE

UINTA COUNTY, hereinafter called the "County," hereby grants a license to _____, hereinafter called the "Applicant," for the installation of:

located in:

Section _____ Township _____ Range _____
Section _____ Township _____ Range _____
Section _____ Township _____ Range _____
County Road No. _____ Maintenance Section _____
Mile Post _____
ACCESS CONTROLLED: YES _____ NO _____

Upon the property of Uinta County, acquired for and utilized in the operation and maintenance of a county road. The Applicant hereby acknowledges and agrees to the following:

- 1) The District Road Foreman will be notified at least twenty-four (24) hours prior to commencing construction and twenty-four (24) hours after completion on construction.
- 2) The Applicant's facility will be placed in a manner to conform with recognized standards, applicable federal, state, of local laws, codes and ordinances, and as directed by the County.
- 3) Any future alteration or modification of the facility within the existing right-of-way required and requested by the County shall be completed without delay and without cost to the County.
- 4) The maintenance, use, inspection and access to the facility shall be accomplished and secured from locations outside of the lines of no access or access control. Ingress and egress to and from any part of the facility from the through travelways is expressly forbidden (applicable to access controlled facilities only).
- 5) The alignment and grade, clearance, materials, pressures, land ties and mile post ties (if applicable) are shown and marked on Exhibit "A," attached hereto and by this reference made a part hereof.
- 6) The license will not be modified, transferred, or assigned without the consent of the County.
- 7) The Applicant agrees to conform to the standards for traffic control outlined in the Wyoming Highway Department Roadway Work Operations Manual. Standards developed by the Applicant may be substituted for the Roadway Work Operations Manual. Applicant must cease all operations if the traffic control standards are not met.
- 8) The applicant agrees to forever indemnify the County and save it harmless from all liability for damage to property or injury to or death of persons, including all costs and expenses related thereto arising wholly or in part or in connection with the assistance of construction, alterations, repairs, renewals, uses or removals of the facility as they pertain to any county road.
- 9) This permit becomes VOID if construction is not completed within 365 days after the approval to construct date below.
- 10) Uinta County does not warrant title to the property covered by this license nor does this license grant an easement within the road right-of-way.

UINTA COUNTY ROAD ACCESS PERMIT APPLICATION

APPLICANT:

Property Owner Name: _____ Mailing Address: _____
 City: _____ State: _____ Zip: _____ Phone: _____
 Authorized Agent Name & Address (if applicable): _____

LOCATION OF PROPERTY:

County Road: _____ Rural Address: _____
 Located in Section _____ Township _____ North, Range _____ West OR
 Subdivision: _____ Lot _____ Block _____

ACCESS:

Access to be used for ingress and egress to a _____ (subdivision, residence, business, etc.)

Access surface: _____ Access width (see item 3 below): _____
 (gravel, asphalt, etc.)

Drainage structure (if required): size (dia.) _____ length _____ type _____

NOTE: Show access location on reverse side of this sheet.

AGREEMENT

I, the undersigned property owner or authorized agent, request authorization to construct an access onto a county right-of-way at the location described above and shown on the reverse side of this application, subject to the restrictions contained in the "Uinta County Road Access Encroachment Regulations". In consideration of these regulations, the applicant agrees to the following:

1. Construct and maintain access in a safe manner so as not to interfere with or endanger public travel and to perform all work in a neat and workmanlike manner, using materials per County Road Standards and that the right-of-way will be returned and left in a condition equal to or better than the original condition. The applicant will fully protect traffic on the County Road during construction covered hereunder by proper barricades, flagmen and/or lights, and to hold harmless Uinta County, its officers and employees from all damages, expenses, claims or liability arising out of any alleged damages of any nature to any person or property, due to the construction, performance or non-performance of work, or existence of said access.
2. No access shall be constructed such that there will be parking or stopping of vehicles on the county road right-of-way.
3. The maximum width of the proposed access shall be 20 feet for agricultural or residential and 30 feet for commercial, industrial or a subdivision road-way.
4. This permit becomes VOID if construction is not completed within 365 days from the approval date below.
5. The County Road Foreman shall be notified 24 hours prior to construction and within 30 days after construction is completed (783-1055 Extension: 782-3254 Bridge Valley).
6. Additional requirements: _____

I, being the Applicant or representative thereof, have read this application and fully know the contents and statements contained herein to be true and correct to the best of my knowledge.
 Applicant or Representative _____ Date _____

THIS SECTION FOR COUNTY USE ONLY

UINTA COUNTY SURVEYING/PLANNING

This application is approved for construction subject to the stipulations as indicated above.

Uinta County: _____ Date: _____

FINAL INSPECTION AND APPROVAL:

I have inspected the access as described on this application and have found it to be constructed in the manner prescribed on the application and attached drawings, said access is hereby approved as constructed.

County Road Foreman _____ Date _____

PERMIT NO. _____

THE FOLLOWING INFORMATION TO BE COMPLETED BY THE APPLICANT

NAME _____ CONSTRUCTION FIRM NAME _____
 MAILING ADDRESS _____
 CITY _____ STATE _____ ZIP CODE _____
 SITE ADDRESS _____
 TELEPHONE NO. _____

Applicant _____ (Date) _____

THE FOLLOWING INFORMATION TO BE COMPLETED BY THE COUNTY

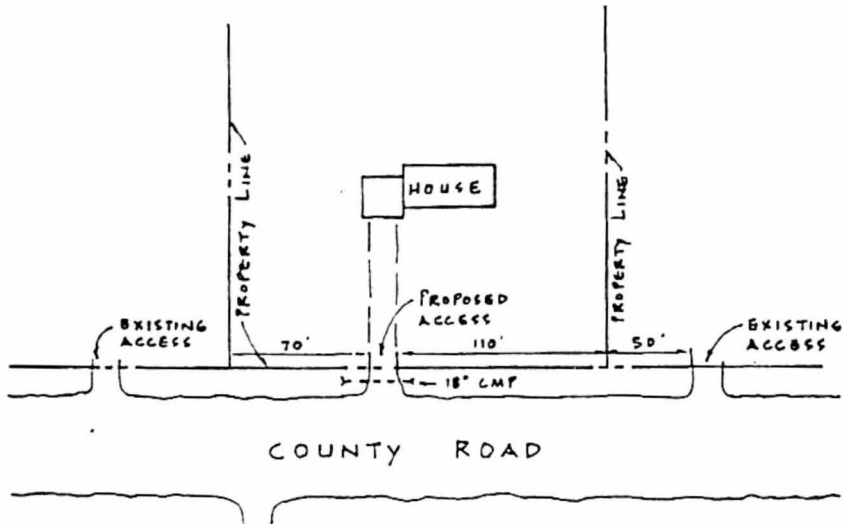
This application is approved for construction subject to the stipulations checked on the attached Form R-1A.

BY: _____ (Date) _____
 Uinta County Engineering & Surveying Rep.

I have inspected the installation described on this application and the attached drawing(s) and having found the installation to be constructed in the manner as prescribed on this application and the attached drawing(s), with any changes indicated on this application and the attached drawing(s), and hereby approve the construction of the previously mentioned installation as being complete.

District Road Foreman _____ (Date) _____

LICENSE NO. _____ DATED: _____ BY: _____



EXAMPLE PLOT PLAN

DRAW YOUR PLOT PLAN BELOW