McMurry Oil Company Jonah Prospect Field Natural Gas Development Environmental Assessment

United States Department of the Interior Bureau of Land Management

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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.
Dear Reader:

Enclosed is the Environmental Assessment (EA) for McMurry Oil Company’s proposed Jonah Prospect Field natural gas development project for your review and comment. Comments should be received by the BLM no later than July 5, 1994. Comments should be sent to:

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

Your comments will be evaluated and fully considered prior to making a finding of either no significant impact or significant impact. Should a finding of no significant impact be made, a decision record will be prepared, signed, and issued.

Should you have questions, please feel free to call either Tom Curry in the Pinedale Resource Area office at (307) 367-4358 or Terri Deakins in the Rock Springs District office at (307) 382-5350.

Sincerely,

[Signature]
Area Manager
MCMURRY OIL COMPANY
JONAH PROSPECT FIELD NATURAL GAS DEVELOPMENT
ENVIRONMENTAL ASSESSMENT

by
Bureau of Land Management
Rock Springs District

WY-046-EA-94-049

May 1994
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CHAPTER I • INTRODUCTION

The U. S. Department of Interior, Bureau of Land Management (BLM), prepared this Environmental Assessment (EA) to evaluate and disclose potential environmental impacts of development of a new natural gas field known as the Jonah Prospect Field (Jonah Field, project area). McMurry Oil Company (McMurry) proposes to drill 40 natural gas wells and construct associated well pads, access roads, gathering and sales pipeline systems; expand an existing compressor station; and include a yard at their existing office site.

The Jonah Field contains 17 mineral leases issued to McMurry Oil Company by the federal government for the purpose of exploring for and developing natural gas reserves. The Jonah Field project area contains 15,554 federal mineral/federal surface acres, 640 federal mineral/private surface acres, and 640 state acres. The project area is located in the northwest portion of the southeast quadrant of Sublette County, Wyoming. Federal surface and federal minerals are administered by the BLM, Rock Springs District, by the Pine Ridge Resource Areas (see General Location Map).

Development of the Jonah Field is new, there being no other oil or gas developments within the vicinity. Extensive natural gas development occurs approximately 15 miles southwest in the Blue Forest field and 24 miles west in the East Lajurge field.

The Proposed Action consists of the following:

- Drilling, completing, testing, and producing 40 natural gas wells within the Jonah Field project area;
- Construction of 40 well pads and approximately 24 miles of access roads to well sites;
- Construction of approximately 24 miles of gathering pipeline (3- to 4-inch O.D.); and
- Construction of two 4- to 8-inch O.D. sales pipelines: 7.6 miles of the Jonah-North, and 21.2 miles of the Jonah-West; and
- Additional facilities including a yard at the existing office area and possible expansion of the existing compressor station.

Currently, seven wells have been drilled. These wells represent discovery, confirmation, and field delineation wells. Proposed drilling activities are expected through 1998 with approximately eight wells drilled each year.

This EA was prepared pursuant to the National Environmental Policy Act (NEPA) of 1969 and subsequent regulation adopted by the Council on Environmental Quality (40 CFR 1500) and the BLM. This EA is intended to be a concise public document that analyses the probable and known environmental impacts of the Proposed Action and project alternatives upon the human environment and reaches a conclusion of their significance. This EA, following public review and comment, will provide sufficient documentation and analysis to allow the BLM to determine whether the impacts are significant (thereby requiring an Environmental Impact Statement will be prepared) or a Finding of No Significant Impact (FONSI) can be supported.

This EA will guide implementation of the Proposed Action or the alternative and will facilitate preparation of subsequent site-specific EAs within the project area. Site-specific EAs will be required for each well and access road/pipeline corridor, sale pipelines, and other associated facilities on public lands administered by the BLM.
PURPOSE AND NEED


The purpose of McMurry’s Proposed Action is to allow for the efficient recovery of natural gas reserves in the Jonah Field project area.

SCOPING, CONSULTATION, AND COORDINATION

On November 9, 1993, the BLM issued a scoping notice to government agencies, environmental organizations, industry representatives, interested individuals, affected interest holders, and grazing permittees. The scoping notice described McMurry’s proposal and requested comments and/or concerns about the Proposed Action and the extent of this document. A copy of the scoping notice is provided in Appendix A. The comment period closed December 10, 1993.


Several letters endorsed the Proposed Action. Others letters endorsed the proposal but identified specific concerns on specific resources. These concerns, in addition to those issues raised internally by BLM’s resource specialists, are summarized in Table 1.

The U.S. Fish and Wildlife Service (USFWS), in response to scoping, provided a list of federally endangered, threatened, proposed, and candidate species which may occur in the vicinity of the Jonah Field project area; their response is included as Appendix B. In addition, information on state plant species of concern was obtained from the Wyoming Natural Diversity Data Base (WNDDDB), and is available for review in the Pinedale and Green River Resource Area offices and in the Rock Springs District office.

The USFWS listed several “sensitive” species that may occur in the area and requested review of BLM’s determination document. This EA will serve as the biological assessment for the project and USFWS will be provided an opportunity to comment on the adequacy of the impact assessment.

AUTHORIZING ACTIONS AND RELATIONSHIP TO STATUTES AND REGULATIONS

A list of permits, approvals, and authorizing actions necessary to construct, operate, maintain, and abandon McMurry’s Proposed Action and alternatives (except the No Action Alternative) is listed in Table 2. This list is intended to provide only an overview of key regulatory requirements that would govern project implementation. Additional approvals, permits, and authorizing actions could be necessary.

Federal Permits

Federal drilling permits are issued in accordance with BLM’s Onshore Oil and Gas Order No. 1 (43 CFR 3164). McMurry’s program would require BLM approval for each well prior to commencement of drilling.
activities. Federal review of the drilling program would be accomplished through the Application for Permit to Drill (APD) process. BLM Onshore Orders No. 1 and 2 requires an applicant to comply with various permitting and drilling requirements including:

- Operations must result in the diligent development and efficient recovery of resources;
- All activities must comply 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 federal leases;
- All activities must contain adequate safeguards to protect the environment;
- Disturbed lands must be properly reclaimed;
- Underground sources of fresh water must be protected from fluid injection operations and commingling of aquifers; and
- All activities must protect public health and safety.

Onshore Order No. 1 specifically states that "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."

Pipelines down-stream of sales meters, road rights-of-way (ROWs) and temporary use permits on BLM-managed public lands outside lease boundaries would be issued under the authority of the Mineral Leasing Act of 1920, as amended, or the Federal Land Policy and Management Act of 1976 (FLPMA), as amended. Roads within the lease boundary would be authorized during the APD process. Pipelines up-stream of the sale meter would be authorized by a Sundry Notice associated with lease rights.

Two Executive Orders (EO 11988 and EO 11990) could apply to the Proposed Action and Full Development alternative in that construction of buried pipelines could cross intermittent/ephemeral drainages. These Executive Orders place restrictions on governmental approval of construction activities in floodplains and wetlands. The Executive Orders require consideration of floodplain and wetland impacts in all NEPA documents.

Any area affected by surface disturbing activities that may contain cultural resources or provide habitat for federal threatened or endangered species are protected by the National Historic Preservation Act of 1966 and the Endangered Species Act of 1973, respectively. EO 11987 restricts the introduction of exotic (non-native) plant and animal species into natural ecosystems.

Section 405 of the Water Quality Act of 1987 added Section 402(p) to the Clean Water Act and requires the EPA to develop a phased approach to regulating storm water discharges under the National Pollutant Discharge Elimination System program. EPA published final regulations on November 16, 1990 (40 CFR 122.26) establishing permit application requirements for storm water discharge. On August 16, 1991 (56 FR 40948), EPA published draft regulations that established best management practices for controlling off-site sedimentation from construction activities. These practices are designed to protect soils by removing sediment and pollutants from run-off before the run-off is discharged from the site. The August 16, 1991 proposed rule provided options for controlling pollutants and/or sediment leaving a construction site. These options include: diverting water from up-slopes around the disturbed areas of the site, limiting exposure of disturbed areas to the shortest duration, and removing of sediment from storm water before it leaves the site.

The State of Wyoming has developed a general storm water permit for construction activities. McMurry has prepared a pollution prevention plan and has received a general storm water permit (WYR 100203) from the Wyoming Department of Environmental Quality. McMurry's pollution prevention plan includes a description of erosion and sediment controls (stabilization and structural measures) that would be installed and storm water management practices that would be implemented. Implementation of the pollution prevention plan requires inspection reports on pollution control structures.
<table>
<thead>
<tr>
<th>ISSUING AGENCY/PERMIT NAME</th>
<th>NATURE OF PERMIT</th>
<th>AUTHORITY</th>
<th>APPLICABLE PROJECT COMPONENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permit to Drill, Deepen, or Plug Back (APD process)</td>
<td>Regulates flaring and venting of natural gas</td>
<td>Mineral Leasing Act of 1920 (30 U.S.C. 181 et seq.)</td>
<td>Well testing and evaluation.</td>
</tr>
<tr>
<td>Plugging and Abandonment of a Well</td>
<td>Issue antiquities and cultural resources use permit to excavate or remove cultural resources from BLM-managed lands</td>
<td>Antiquities Act of 1906 (16 U.S.C. 431-433); Archaeological Resources Public Protection Act of 1979 (16 U.S.C. 470aa - 47011); 43 CFR 3</td>
<td>Proposed Action and alternative project components.</td>
</tr>
<tr>
<td>Bureau of Land Management</td>
<td>Controls off-site runoff from construction activities</td>
<td>Section 405 of the Clean Water Act (40 CFR 122 - 124); WDEQ Rules and Regulations, Chapter 18</td>
<td>All construction activities.</td>
</tr>
<tr>
<td>Antiquities and Cultural Resource Permits</td>
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<td></td>
</tr>
<tr>
<td>Bureau of Land Management</td>
<td>Approval to Dispose of Produced Water</td>
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<td>U.S. Fish and Wildlife Service</td>
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<td>Consultation Process, Endangered and Threatened Species</td>
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<td>Wyoming Department of Environmental Quality</td>
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<tr>
<td>Notice of Intent - Storm Water Discharge Permit</td>
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</tr>
<tr>
<td>ISSUING AGENCY/PERMIT NAME</td>
<td>NATURE OF PERMIT</td>
<td>AUTHORITY</td>
<td>APPLICABLE PROJECT COMPONENT</td>
</tr>
<tr>
<td>---------------------------</td>
<td>------------------</td>
<td>-----------</td>
<td>-----------------------------</td>
</tr>
</tbody>
</table>
| Wyoming Department of Transportation  
Oversize and Overlength Load Permits | Permits for oversize, overlength, and overweight loads | Chapters 17 and 20 of the Wyoming Highway Department Rules and Regulations | Transportation of equipment and materials on state and federal highways. |
| Wyoming Oil and Gas Conservation Commission  
Permit to Drill, Deepen, or Plug Back (APD process) | Regulates drilling of all wells in the state | Wyoming Oil and Gas Conservation Commission Regulations (Section III; Rule 305) | Wells. |
| Wyoming Oil and Gas Conservation Commission  
Application for Permit to Use Earthen Pit | Regulates reserve pits on drilling locations | Wyoming Oil and Gas Conservation Commission Regulations (Section III; Rule 326) | Wells. |
| Wyoming Oil and Gas Conservation Commission  
Authorization for Flaring or Venting of Gas | Regulates flaring and venting of gas | Wyoming Oil and Gas Conservation Commission Regulations (Section III; Rule 346) | Well testing and evaluation. |
| Wyoming Oil and Gas Conservation Commission  
Permit for Class II Wells | Implements federal regulation governing underground injection wells for produced water and water flood projects | 40 CFR 146; 40 CFR 147.2551 | Injection wells. |
| Wyoming Oil and Gas Conservation Commission  
Plugging and Abandonment of a Well | Establishes procedures for permanently abandoning a well | Wyoming Oil and Gas Conservation Commission Regulations (Section III; Rule 315) | Abandonment of wells. |
| Wyoming Oil and Gas Conservation Commission  
Change in Depletion Plans | Regulates drilling of additional wells | Wyoming Oil and Gas Act (W.S. 30-5-110) | Drilling and completion activities. |
| Wyoming State Engineer's Office  
Water Well Permit | Grant permit to appropriate groundwater | W.S. 41-121 through 147 | Water supply wells. |

NOTE: This list is intended to provide only an overview of key regulatory requirements that would govern project implementation. Additional approvals, permits, and authorizing actions could be necessary.
The BLM Pinedale and Green River Resource Areas have adopted a standard set of Stipulations and Conditions of Approval that apply to construction and operation of wells, pipelines, and roads (Appendix C). These stipulations/conditions encompass all aspects of environmental mitigation and would apply to the Proposed Action and the Full Development alternatives.

The BLM has adopted management actions for oil and gas activities to protect resources and land uses in the Pinedale and Green River Resource Areas. These management actions are listed in the Pinedale Resource Management Plan (1988) and the Big Sandy/Salt Wells Oil and Gas EA (1981). Since 1981, several of the management actions listed in the Big Sandy/Salt Wells Oil and Gas EA have been modified. Additionally, the Green River Resource Area is in the process of completing the Green River Resource Management Plan. Management actions as described under the No Action Alternative (current management practices) would apply to this project.

State and Local Permits

In addition to the Wyoming Storm Water Discharge permit, numerous other permits are required from state and local governmental entities before McMurry can proceed with the project (Table 2).

OVERVIEW OF CURRENT DEVELOPMENT

McMurry acquired leases in the past few years containing three existing wells. In conformance with the provisions of their leases, McMurry drilled an off-set well in early 1993. Three delineation wells were drilled in the latter part of 1993. Drilling of these wells has helped define the economic potential of the Jonah Field. McMurry is now ready to proceed with efficient development of their leases. At the present time, the Jonah Field is not a unit.

In addition to well equipment, existing related facilities include: seven well pads and access roads, gathering pipelines, a centralized compressor station, and a 9.6-mile, 4-inch O.D. surface sale pipeline that terminates at Williams Field Services’ pipeline system located in Section 25, T. 30 N., R. 108 W.

CHAPTER II - PROPOSED ACTION AND ALTERNATIVES

The purpose of this section is to describe McMurry’s Proposed Action including design, construction techniques, operating practices, abandonment, and reclamation procedures that would be used in the Jonah Field. This section also describes Full Development and No Action alternatives.

Some of the information provided in this section is preliminary and may change slightly. It is possible that decisions regarding design, construction, and operating practices may be modified by McMurry as more detailed economic and engineering information becomes available. Regardless, more detailed, site-specific analysis will be required prior to construction activities and any changes would be addressed in the subsequent NEPA analysis.

No electric powerlines would be required to operate the field under the Proposed Action or Full Development alternatives.

PROPOSED ACTION

McMurry proposes to drill 40 wells in addition to the seven existing wells. These wells would be drilled at the rate of eight wells per year by one drilling rig over a five-year period. The drilling rig would require three crews consisting of four individuals each. All construction and drilling activities would be in conformance with the lease stipulations described in Table 3 and the standard stipulations and Conditions of Approval adopted by the BLM Rock Springs District (see Appendix C). The proposed field would incorporate approximately 16,834 acres. The Wyoming Oil and Gas Conservation Commission approved spacing for the project area is 160 acres. Distribution of wells within the project area would equate to one well per 358 acres or 1.79 wells per 640 acres. Drilling would take place to the depth of 10,500 feet into the Lance Formation. Potential exists to drill deeper wells to access the Erickson, Blair, Baxter, Frontier, and/or Dakota formations. Formations could be tested at depths ranging to 21,000 feet. Appendix D provides a sample of an application for permit to drill.

Project Components

The Proposed Action would involve the construction of 40 well pads, associated access roads, natural gas gathering pipelines, two sale pipelines, expansion of the existing compressor station, and the addition of a wareyard adjacent to the existing office area.

Total new disturbance would be approximately 124 acres for well pads, 165 acres for access road/gathering pipeline corridors, 192 acres for sale pipelines, and 20 acres for office/wareyard area. Expansion of the compressor station would not require additional acreage.

Total disturbance under the Proposed Action, if fully implemented, would be approximately 500 acres. Thirty percent of the acres disturbed for well pads (37 acres) and 36 percent of the acres disturbed access road/pipeline corridors (59 acres), or approximately 96 acres, would be reclaimed shortly after construction is completed. In addition, 100 percent or 192 acres for sale pipelines would be reclaimed shortly after disturbance. Thus, a total of approximately 212 acres would remain disturbed for the life of the project.
TABLE 3
LEASE INFORMATION SUMMARY

<table>
<thead>
<tr>
<th>LEASE</th>
<th>OPERATOR</th>
<th>LEGAL DESCRIPTION</th>
<th>ACRES 1</th>
<th>STIPULATION</th>
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<td>WYW-5627 B</td>
<td>McMurry</td>
<td>T. 28 N., R. 108 W., Sec. 9</td>
<td>640</td>
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<td>WYW-57521</td>
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<td>T. 28 N., R. 108 W., Sec. 16</td>
<td>640</td>
<td></td>
</tr>
</tbody>
</table>

1 Acres are for project area only. Some lease acreage extends beyond the project area boundary and includes approximately 3,900 acres.

2 See code definitions below:
- 2B = ripar and sage grouse nesting habitat, restriction 2/1-7/31
- 2C = N10, sage grouse stirring ground, exceptions may apply
- 2D = sheep use 5/1-6/15
- 2F = 0.25-mile buffer to protect potential dwellings
- SD = standard surface disturbance stipulations/COAs
- MM = multiple mineral development
- SD = standard surface disturbance stipulations/COAs

Well Pads

The location of the 40 proposed wells are shown on Map 1 and the lease stipulations are summarized in Table 3.

Stipulations mandated in the lease or standard stipulations adopted by the BLM during the APD process would be applied to McMurry’s drilling program. However, exceptions may be granted depending upon site-specific conditions found during on-site inspections. On-site inspections would be performed prior to approval of the APD. Additional Conditions of Approval or slight relocation of the well pad could be warranted depending upon conditions found during site inspection.

Each well pad would require disturbance of approximately 3.1 acres. The location would include a 150 x 75 foot reserve pit. The reserve pit would be 10 feet deep. The remainder of the site would be used to house the drill rig, equipment, drill string, and stockpiled topsoil and subsoils. The layout of a typical drilling location is provided in Figure 1. Construction of a well pad includes clearing vegetation, removing 6 inches of topsoil, and grading the area level. The reserve pit would be constructed on the location prior to starting drilling activities. Need for pit liners would be determined on a case-by-case basis depending upon soil permeability, toxicity of the drilling fluid or additives, proximity to shallow groundwater, and the ability of the pit to hold water.

Those reserve pits that will be lined would be required to meet certain specifications such as burst strength of not less than 300 pounds per square inch (PSI) depending on conditions found during pit construction (i.e., sand, gravel). Once drilling is completed, fluids would be evaporated or solidified, and the pit would be reclaimed (i.e., pit liner is required, it may be buried during reclamation). The reserve pit would be fenced on the three non-working sides during drilling activities. Once drilling activities are completed and equipment removed, the fourth side of the pit would be fenced until the pit is reclaimed. All reserve pits would be flagged to help prevent migratory birds from utilizing the reserve pits until the reserve pit is reclaimed. In some cases, netting of reserve pits may be required. Should a well pad be constructed but the well not drilled, McMurry would be required to reclaim the well pad and access road in accordance with BLM requirements.

McMurry would implement erosion control and pollution control measures during well pad construction. In some cases, McMurry may gravel access roads and the working area of well pads. Trash cages would be used for disposal of trash.

Well Drilling and Completion

Drilling and completion activities involve many steps including assembly of the equipment and crews, drilling, casing (installation of pipe), cementing, perforation, stimulation, and installation of the production string. Once the well pad is constructed, the drilling equipment would be brought to the site. The drilling rig would be powered by diesel engines. Diesel fuel would be supplied by tanker truck and temporarily stored in bermed tanks on-site. McMurry has prepared a Spill Prevention Control and Countermeasures (SPCC) Plan as required by regulation (40 CFR 112). The plan specifies spill control measures to be applied during drilling and production phases of the project.

Water for mixing drilling fluids would be piped via a flexible, plastic, temporary surface pipeline from the water well at the existing Jonah Federal 1-4 gas well (see Map 1). When necessary, drilling fluids could be trucked to the drill site. Other equipment needed during drilling activities include pipe racks, pumps, and air compressors. Dumpsters would be provided for all trash and all trash would be disposed of properly (no burning of trash allowed). Portable chemical toilets would be provided for sewage. All sewage would be disposed of in accordance with state and county requirements.
Map 1
JONAH PROSPECT
Proposed Action

FIGURE 1
TYPICAL WELL PAD - DRILLING
Drilling and casing for each well should be accomplished in 20 to 65 days depending upon well depth. At that time, the drilling rig would be moved to a new location and other equipment would be brought onto the well pad for performing, stimulation, and final completion operations. Final completion of the well may require up to two months after drilling and casing activities are completed since different producing zones in the reservoir would be tested separately.

Surface casing would be set to approximately 2,500 feet. The entire length of the surface casing would be cemented in place. The surface casing would be cemented in order to isolate the varying formations, support the casing by preventing formation pressures from acting directly on the casing, and to retard corrosion by minimizing contact between the casing and corrosive formation fluids. This process would also protect shallow aquifers.

Once the well is drilled to target depth, the hole would be cleaned out and casing would be set. The long-string casing would be cemented from total depth to 400 feet above any hydrocarbon bearing zone. After the casing cement has adequately hardened, the producing zone would be perforated. Perforating is a process of piercing the casing into the producing zone. Once this is done, the well would be fractured. Fracturing a well improves the flow of natural gas.

Interim Well Pad Reclamation

After backfilling the pit, that portion of the well pad not needed for production purposes would be recontoured, ripped, topsoil replaced, plant debris scattered over the area, and seeded with the following seed mix:

- 6 lbs PLS/acre Rosana western wheatgrass
- 6 lbs PLS/acre Cirtina thistlke wheatgrass
- 2 lbs PLS/acre Indian ricegrass
- 2 lbs PLS/acre Winterfat

Seeding would be accomplished during early fall (September or October) as long as the ground is not frozen, or as directed by the BLM.

If a drilled well proves to be a dry hole or non-producer, the well would be plugged and abandoned in accordance with the Wyoming Oil and Gas Conservation Commission and BLM abandonment procedures. The entire well pad and related access road would then be reclaimed in accordance with the above procedures or as directed by the BLM authorized officer.

Well Operation and Maintenance

Once the drilling and completion activities are completed, production facilities would be installed, and the well pad recontoured. Approximately 2.2 acres of each individual well pad would remain disturbed for the life of the well. Figure 2 shows a typical layout of a producing well. Production facilities would be placed on the well pad in a manner that would maximize the area that can be reseeded. Production facilities include: dehydration unit, separator, buried pipelines, and meter-run. A tank would be installed and bermed to hold any produced condensate removed from the raw natural gas by the separator and dehydration equipment.

Condensate would be trucked from the site to a processing facility. Once the natural gas has been processed on-site, it would be metered and then flow into a gathering system pipeline.

Produced water removed from raw gas and separated from the condensate would be stored in fiberglass tanks (production pit) authorized as lined pits under the guidelines stated in the "Onshore Oil and Gas Order No. 7.

The fiberglass tanks would be placed in the ground with an operable leak detection system. A wire mesh covering would be placed over each tank. Produced water would be evaporated on-site; however, produced

McMURRY OIL COMPANY
FIGURE 2
TYPICAL WELLPAD - PRODUCTION
TYPICAL FIBERGLASS TANK DESIGN

TANK DIMENSIONS

12' x 8'

PERFORATED PVC PIPE

LEAK DETECTION PIPE

COVER, METAL SCREEN

HATCH

McMURRY OIL COMPANY

FIGURE 3

TYPICAL PRODUCTION TANK
water not evaporated could be hauled off-site and disposed at a Wyoming DEQ approved disposal facility. Figure 3 shows a typical production facility (pit).

All above-ground production facilities would be painted an earth-tone color, Carlsbad Canyon (2.5Y 6/2, Munsell Soil Color Chart) or other color as specified by the BLM.

Access Roads

McMurry would need to construct approximately 24 miles of access roads within the project area or an estimated 0.60 miles per well. All gathering pipelines would be buried adjacent to these new access roads. Approximately 165 acres of new disturbance would be caused by the access road/gathering pipeline corridor. The locations of proposed access road/pipeline corridors are provided in Map 1. McMurry would employ standard cut and fill construction methods. Depending upon type of soils, access roads would be gravels as required. Figure 4 shows typical cut and fill road construction techniques.

All access roads constructed on public lands would be built in accordance with BLM standards. A road design and transportation plan will be submitted by McMurry to the BLM for approval. Road and pad engineering design will be approved by a certified engineer. The road design would include minimum BLM road construction standards and would comply with the Standard stipulations and conditions listed in Appendix C.

Once the road is staked and the APD approved, 4 to 6 inches of topsoil would be stripped and windrowed apart from other soil materials. After the roadway is graded, crowned, and ditched, the topsoil would be spread on the road out-slopes and seeded. Approximately 35 percent of the access road/gathering pipe line would be reclaimed, leaving an estimated 2.6 acres per access road disturbed over the life of the well. Total long-term disturbance for access roads would be approximately 106 acres.

Well Pad and Access Road Abandonment

McMurry would follow the procedures of the BLM and the Wyoming Oil and Gas Conservation Commission for plugging and abandoning each well. Upon abandonment, McMurry would be required to contact the BLM for approval of a final reclamation plan. All surface production equipment would be removed from the site. The production area and access road would be recontoured, ripped, topsoil replaced, and seeded in the fall or as directed by the BLM.

When the access road is no longer needed, the access road would be recontoured, ripped, topsoil replaced, and seeded (see Interim Well Pad Reclamation section for proposed seed mix) as directed by the BLM. Any culverts would be removed prior to contouring. The BLM would determine the success of reclamation and may require additional seeding efforts.

Pipelines

McMurry's proposal includes approximately 24 miles of gathering pipeline which would parallel access roads and approximately 29 miles of sale pipeline. Location of the proposed gathering pipelines are shown on Map 1. The proposed sale pipelines are reflected on Map 2. The sale pipelines would require a 55-foot wide construction ROW; permanent ROW width would be 45 feet. In addition to the ROW application, McMurry would submit a plan of development that describes construction and operational techniques. The Two sale pipelines would be constructed close to existing roads but would be off-set from the road approximately 35 feet.
The 7.6-mile Jonah-North sales pipeline would be constructed adjacent to McMurry’s existing surface pipeline to a termination point in Section 25, T. 30 N., R. 108 W. Approximately 51 acres would be disturbed by construction. The Jonah-West sales pipeline would follow existing roads approximately 21 miles west to the termination point in Section 4, T. 27 N., R. 111 W. Approximately 141 acres would be disturbed by construction.

All pipelines would be buried at least 3 feet below the surface and the pipe diameter would range from 2 to 4 inches outside diameter for gathering pipelines; sales pipelines would range from 4 to 8 inches outside diameter.

Pipeline construction would include standard construction procedures. Figure 4 shows a typical cross-section of sale and gathering pipeline construction. Should construction activities result in breaks or destruction of natural or human-made barriers used for livestock control, gaps would be temporarily fenced to prevent passage of livestock. Fences would be reconstructed according to BLM standards.

Fences, cattleguards, or gates damaged during construction would be repaired to a condition equal to or better than the original condition. All gates would be left as found. Construction would consist of scalping of vegetation, stripping of 6 inches of topsoil, digging the trench, stringing pipeline, welding, placement of pipeline in the trench, pressure testing, back-filling trench, and reclamation.

Pipelines would be tested for leaks or weak spots and would comply with DOT requirements (49 CFR 192). McMurry would use compressed natural gas to test pipelines. The pipelines would be tested at 1.25 times the maximum anticipated operating pressure. Pipelines would be operated and maintained in accordance with DOT regulations (49 CFR 192.551-629) and applicable industry standards. Field personnel would monitor the system on a daily basis.

**Pipeline Abandonment**

At the end of the project, McMurry would be required to contact the BLM and develop an abandonment plan in accordance with standards and practices employed at the time.

**Hazardous Materials**

McMurry and its contractors have reviewed the EPA’s Consolidated List of Chemicals Subject to Reporting Under Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986 (as amended) for hazardous substances proposed for use during this project. Also considered are substances listed in the List of Extremely Hazardous Substances and Their Threshold Planning Quantities as defined in 40 CFR 355, as amended. No extremely hazardous substances, as described in 40 CFR 355, will be used. Construction of project components will require use of some of the substances listed in the aforementioned EPA Title III document. Table 4 lists these substances along with all chemicals McMurry proposes to use during development. This inventory is for materials used on an annual basis.

It is McMurry’s policy that any leftover materials brought on location by drilling and stimulation contractors, would be kept in cr returned to their original containers and taken back by that company. When the service company’s trucks are on location, personnel will use absorbent pads for any small leaks that might occur while working. The pads will then be disposed of in accordance with state and federal regulations.

McMurry and its contractors shall comply with all applicable federal, state, and local laws and regulations existing or hereafter enacted or promulgated. Materials that are used regularly during operations will be used, stored, and disposed of in an environmentally safe manner according to state and federal regulations. McMurry will also locate, handle, store, and dispose of hazardous materials in a manner that will prevent them from contaminating soil and water resources or other sensitive environments. Any release of hazardous substances
### TABLE 4

<table>
<thead>
<tr>
<th>Product or Chemical</th>
<th>Use of Product or Chemical</th>
<th>Quantity Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methanol**</td>
<td>Eliminates Hydrates from flow line</td>
<td>2,500 gals</td>
</tr>
<tr>
<td>Ethylene Glycol**</td>
<td>Separator, heat gas lines</td>
<td>3,000 gals</td>
</tr>
<tr>
<td>Natural Gas Condensate</td>
<td>Product of producing natural gas</td>
<td>31,000 bbls</td>
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<tr>
<td>Diesel Fuel</td>
<td>Construction/Drilling</td>
<td>120,000 gals</td>
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<tr>
<td>Barite**</td>
<td>Drilling fluid additive</td>
<td>982,000 lbs</td>
</tr>
<tr>
<td>Benzoic</td>
<td>Drilling fluid additive</td>
<td>241,000 lbs</td>
</tr>
<tr>
<td>Line</td>
<td>Drilling fluid additive</td>
<td>4,900 lbs</td>
</tr>
<tr>
<td>Lignite</td>
<td>Drilling fluid additive</td>
<td>750 lbs</td>
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<tr>
<td>Soda Ash</td>
<td>Drilling fluid additive</td>
<td>500 lbs</td>
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<tr>
<td>Caustic Soda**</td>
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<tr>
<td>Sodium Bicarbonate</td>
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<tr>
<td>SDF 1500 (Sodium Acrylate)</td>
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<tr>
<td>Drilipac (Cellulose Ether)</td>
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<td>1,150 lbs</td>
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<tr>
<td>LGC-VI (Hydrocarbon Gel)</td>
<td>Fracturing fluid</td>
<td>2,388 lbs</td>
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<tr>
<td>KCL (Clay Stabilizer)</td>
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<td>68,000 lbs</td>
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<tr>
<td>CLA-STA XP (Clay Stabilizer)</td>
<td>Fracturing fluid</td>
<td>1,400 gals</td>
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<tr>
<td>AQF-2 (Foaming Agent)</td>
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<td>1,900 gals</td>
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<tr>
<td>CL-23 (Zirconium X-Linker)</td>
<td>Fracturing fluid</td>
<td>218 gals</td>
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<td>BE-5 (Bactericide)</td>
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<td>Ecolprop (Propellant)</td>
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<td>Nitrogen</td>
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<tr>
<td>Lubricating Oil</td>
<td>All phases of development</td>
<td>100 gals</td>
</tr>
</tbody>
</table>

*Quantity used in a one-year period.

**Substances listed under Title III, SARA.

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(e.g., leaks, spills) in excess of the reportable quantity as established by 40 CFR 117 shall be reported as required by the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended. With release of a hazardous substance in a reportable quantity, copies of the report shall be furnished to the compliance officers of the appropriate federal, state, and local agencies.

### ALTERNATIVES

Federal agencies are required to analyze reasonable alternatives to a Proposed Action. The BLM has chosen to evaluate a full development scenario; in this case, a four-well-per-section development alternative. The No Action Alternative will also be discussed.

### Full Development Alternative

The Full Development alternative would authorize drilling of 92 wells in addition to the existing seven wells for a total of 99 wells, related access roads, gathering pipelines, office/warehouse complex, expanded compressor site, and sale pipelines. Development would entail drilling four wells per section. Project components and location of these components (sale pipelines) would be essentially the same as described under the Proposed Action.

Approximately 285 acres for well pads, 20 acres for a warehouse, 377 acres (52 miles) of access road/gathering pipeline corridors, and 192 acres (approximately 29 miles) of sale pipelines would be required. Total disturbance would be approximately 874 acres. Of these acres, approximately 414 acres (30 percent of well pads, 36 percent of access roads, and 100 percent of gathering and sale pipelines) would be reclaimed, leaving approximately 460 acres disturbed for the life of the project. Map 3 reflects a full four-well-per-section development scenario.

McMurry would drill 8 wells per year over an 11-year period. Construction practices and abandonment would be the same as described under the Proposed Action and will not be described again under this section.

There could be potential to disturb a riparian area located on private surface (federal minerals) under this alternative. However, the federal lease contains a stipulation that mandates no surface disturbance within 500 feet of any riparian area unless specific requirements are met.

Use of hazardous substances would be the same as the Proposed Action but use would occur over a longer period of time. Table 4 describes substances that would be used on a yearly basis.

### No Action Alternative

The No Action alternative would deny McMurry’s proposal; thus, no additional surface disturbing activities would occur. This decision would preclude additional natural gas development within the Jonah Field.

The U.S. Department of the Interior has the authority to deny an APD under certain conditions. A decision to select this alternative could be supported by one of three findings: 1) the level or rate of development is no longer in the best interest of the public, 2) endangered or threatened species and/or their habitat would be affected, or 3) the environmental impact of the Proposed Action or alternative(s) are unacceptable. This EA will help determine whether McMurry’s Proposed Action meets any of these criteria.

The Tenth Circuit Court of Appeals in Sierra Club vs. Peterson (717 F. 2d 1409, 1983) found that "on land leased without a No Surface Occupancy stipulation, the Department cannot deny the permit to drill... once the land is leased the Department no longer has the authority to preclude surface disturbing activity even if the
environmental impact of such activity is significant. The Department can only impose mitigation measures upon a lessee who pursues surface disturbing exploration and/or drilling activities." The court went on to say "not withstanding the assurance that a later site-specific environmental analysis will be made, in issuing these leases, the Department has made an irrevocable commitment to allow some surface disturbing activities, including drilling and road building."

None of McMurry’s leases contain a No Surface Occupancy stipulation. Therefore, any restrictions based on oil and gas lease operations must be reasonable. If the BLM were to deny McMurry’s Proposed Action, McMurry could have a valid claim for breach of contract. In order to resolve any such claim, it would be possible that the BLM would have to buy back all, or some, of McMurry’s leases.

ALTERNATIVES CONSIDERED BUT DROPPED FROM FURTHER CONSIDERATION

Directional Drilling

A directional drilling option was considered but dropped from further analysis. This option would allow 40 wells to be drilled from fewer well-pad sites than proposed under the Proposed Action. Directional drilling from a central well pad, served by one access road and one pipeline would yield less overall surface disturbance. However, the cost of directional drilling would be approximately 30 percent higher than conventional drilling methods. Lack of serious resource conflicts and increased costs associated with directional drilling render this alternative unnecessary and therefore, unreasonable.
CHAPTER III • AFFECTED ENVIRONMENT

The following critical resource elements have been considered and the BLM has determined they are not affected by the Proposed Action, the Full Development, or the No Action alternatives. Thus, these resource values will not be addressed in this document:

- Areas of Critical Environmental Concern
- Prime or Unique Farm Lands
- Wilderness/Wilderness Study Areas
- Wild or Scenic Rivers
- Wetlands
- Noise

GENERAL SETTING

The project area is located in the northwest portion of the southeast quadrant of Sublette County, Wyoming. The Jonah Field is located approximately 32 miles southeast of Pinedale and 28 miles northwest of Farson. The area is accessed via Highway 191, by turning west at milepost 670 onto what is known as the Luman Road, travelling approximately 7 miles to reach the project area.

The Jonah Field project area is approximately 28 square miles or 16,834 acres. There are seven existing natural gas wells, approximately 7.3 miles of improved road, 10.0 miles of unimproved road, and 2.1 miles of two-track jeep trail. Acreage disturbed includes 23, 15, and 1 respectively. In addition to access roads and well pads, there are 3.1 miles of buried pipeline and 9.6 miles of surface sale pipeline. Thus, existing facilities initially disturbed approximately 70 acres, but 30 acres have been reclaimed leaving 40 acres unreclamed. Approximately 6.2 miles of boundary fence between the Pinedale and Green River Resource Areas is located within the project area (Map 4).

Other existing improvements include two water wells, several water pipelines, and water troughs used by livestock and wildlife. Several stock reservoirs are distributed throughout the project area although some are in disrepair. One section of private surface estate (federal mineral estate) exists within the field that contains a human-made stock pond, creating an associated riparian area. One section within the project area is owned and managed by the State of Wyoming. Several gravel sources are located near the project area with the closest being in T. 30 N., R. 108 W.

Topographically, the area is relatively flat with elevations ranging from 6,900 to 7,400 feet. The area receives approximately 7 to 9 inches of precipitation annually either in the form of snow or late spring and summer storms.

LAND USE

The project area is located in Sublette County and is zoned RC (Resource Conservation), which allows for land uses such as grazing, agriculture, and energy production (Haehn 1994). Approximately 92.4 percent (15,554 acres) of the project area is federal surface/federal minerals administered by the BLM, 3.8 percent (640 acres) is private surface/federal minerals, and 3.8 percent (640 acres) is controlled by the State of Wyoming. Current land uses include livestock grazing, natural gas production, and a small amount of recreational use, primarily hunting.
HAZARDOUS MATERIALS

There are no known preexisting hazardous waste sites within the project area.

Socioeconomics

Sublette County is a major center for oil and gas activity. In 1990, Sublette County led the State in natural gas production. Oil and gas production accounted for the largest percentage of personal income in the county.

Oil and gas activity supplies a substantial contribution to the local government revenues. In 1991, 86 percent of all property assessed for taxation in Sublette County came from activities associated with oil and gas production. Up to 19 percent of the sales and use tax revenues earned by the county come from oil and gas production.

Companies with natural gas wells that produce federally-owned minerals pay a 12.5 percent royalty on gas sales. Fifty percent of the royalty collected is returned to the State of Wyoming. This money is used for road and bridge construction or for educational purposes that benefit local communities.

Concern over lack of available temporary housing has been raised by Sublette County and Sweetwater County Planners (Hahn and Koi 1994) about similar projects in the southwest Wyoming area. Few rentals are available to house temporary workers, particularly workers outside of the region (western Wyoming) although mobile home-trailer facilities are available in Farson, Big Piney, LaBarge, Rock Springs, and Green River areas.

Currently, project workers are temporarily housed in Farson.

Travel to the job site would be via existing federal and state highways, and an upgraded existing access road leading to the project area. The primary highway used to access the project area is Highway 191 by turning off the paved highway onto an upgraded dirt road at milepost 67. Between 1989 and 1993, there were 120 accidents between Farson and Pinedale. Of these accidents, four proved fatal, killing five individuals.

On an average day, approximately 690 cars, trucks, and commercial vehicles travel on Highway 191. During the summer months, travel on the highway increases since it provides access to national parks located to the north.

RECREATION

Other than hunting, little recreational activity occurs in the project area. It is possible that some sightseeing during off-road vehicle use occurs. No historic trails exist within the project area.

VISUAL RESOURCES

The project area is located in a Class IV visual resource management classification area. The Class IV rating allows for modification of the landscape to accommodate natural gas production but advocates that surface facilities be painted an environmental color to lessen the visual impact. The Jonah Field is not visible from Highway 191 which is a major tourist corridor.

AIR QUALITY

Specific information on air quality is provided in the Pinedale RMP (see pages 119-129). Generally speaking, air quality in the Resource Area is considered excellent with background ambient levels of pollutants well below established standards. Visibility is often in excess of 70 miles. Thus, it can be concluded that air quality in the project area is considered excellent. The often, blowing winds generally travel from west to east dispersing pollutants produced by industrial or personal activities located throughout western Wyoming.

Panorama of Jonah Field

The U.S. Forest Service manages the Bridger and Popo Agie Wilderness areas located approximately 25 and 30 miles northeast of the project area. The Fitzpatrick Wilderness is located approximately 30 miles to the north-northeast of the project area. The Pinedale RMP states: "...new sources of air pollution in Wyoming must not cause ambient concentrations of sulfur dioxide or total suspended particulate (TSP) to rise beyond the level of the appropriate Class I or II prevention of significant deterioration increment." Thus, the BLM could not permit any activity that would cause significant deterioration of the Class I air quality rating for these wilderness areas.

The Scab Creek Wilderness Study Area, managed by the BLM, is located approximately 30 miles north of the project area.

CULTURAL RESOURCES

Cultural inventories conducted in recent years have identified archaeological materials in the project area. Ancient human occupation of and adaptation to the northern Little Colorado Desert spans 10,000 years of prehistory. Archaic-aged (8,000 to 1,800 years ago) sites are abundant while sites dating to the late prehistoric period (1,800 to 200 years ago) may be the most common. Prehistoric site density is high. Site types include base camps, hunting camps, and special resource extraction locales used by nomadic foragers, hunters, and collectors. Unusual and important finds include a prehistoric ceramic site in the general area as well as Paleoindian occupation in the northern Little Colorado Desert.

Native American traditional religious or cultural sites may be located in the overall project area but none are currently identified. The BLM has contacted the Shoshone Tribe directly and plans to submit this document to additional Tribes (i.e., Arapaho and Ute) for sensitive site screening. A field review with Native American elders to the project area is planned in the spring of 1994. This field review will address potential traditional religious and cultural concerns and/or sites.

Historic period resources are not as abundant, but are known to exist. Cow camps, sheepherder camps, and stock raising facilities such as historic water developments occur in the area. A historic building known as "the castle" is located approximately 1 mile to the east of the Jonah North pipeline route, north of the project area. This building is associated with early ranching activity. No historic trails or wagon roads are currently known to exist in the project area.

Sandy soils located in the project area have an increased potential to contain buried cultural materials when compared to other types of soils located in the area.

PALEONTOLOGY

According to an inventory prepared for the BLM, there are no known fossil localities in the vicinity of the project area, but there is potential for recovering fossils representing a variety of life forms. The Laney Member of the Green River Formation is found on the surface in the project area. The Green River Formation is well known for its abundance of fish fossils contained within it. The Laney Member is especially fossiliferous. Reptile (alligators, snakes, lizards, crocodiles), amphibian (frogs, salamanders), bird (grouse, shorebirds, pheasants) and insect and invertebrate fossils are abundant. Many types of mammalian fossils have also been recovered, including marsupials, primates, rodents, carnivores, and condylarthurs. Fossil flora within the Laney Formation include sycamore, horsetail, and lily-pads.
VEGETATION

Appendix E describes vegetation types likely to be found at the proposed individual well locations, access road/pipeline corridors, and sale pipelines.

Vegetation in the project area is predominately Wyoming big sagebrush (Artemisia tridentata var. wyomingensis) grasslands found on rolling terrain that lies between 7,000 and 7,500 feet in elevation. Sites occupied by this vegetation type generally receive between 7 and 9 inches of precipitation annually. Important plant species associated Wyoming big sagebrush are thickspike wheatgrass (Pseudoroegneria spicata), Indian ricegrass (Oryzopsis hymenoides), Sandberg bluegrass (Poa secunda var. pendula), and rabbitbrush (Chrysothamnus spp.). Green needlegrass (Stipa viridula) grows in sandy soils in stabilized drainages in the southern portion of the project area. Needle and thread grass (Sporobolus comatus) comprises a large portion of the vegetation community on sandy soils.

A second vegetation type dominated by cushion plant, is restricted to barren slopes of higher ridges. The dominant species in this community are squarestem phlox (Phlox moschata), spoonleaf milkvetch (Astragalus), goldenweed (Haplopappus spp.), and Hooker sedge (Carex hookeri). This community is characterized by the near absence of sagebrush and by the overall low (25 percent or less) vegetative cover (Fertig 1993).

Species able to tolerate clay soils and those high in salt or exchangeable sodium are found in the low lying areas of alluvial out-washes and colluvial deposits. These species include Gardner’s saltbush (Atriplex gardneri var. gardneri), winterfat (Krascheninnikovia lanata), Indian ricegrass, and thickspike wheatgrass.

LIVESTOCK GRAZING

Map 5 shows the livestock grazing allotments in relation to the project area. The project area would affect parts of five grazing systems. Table 5 lists the allotments, size, class of livestock, and period of use.

**TABLE 5
GRAZING ALLOTMENTS AFFECTED BY MCMURRY PROJECT**

<table>
<thead>
<tr>
<th>ALLOTMENT NAME</th>
<th>ALLOTMENT ACRES</th>
<th>AUMS PER ALLOTMENT</th>
<th>AVERAGE ACRES PER AUM</th>
<th>CLASS OF LIVESTOCK</th>
<th>PERIOD OF USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure Four</td>
<td>114,425</td>
<td>6,644</td>
<td>17.2</td>
<td>Cattle</td>
<td>May-Jun</td>
</tr>
<tr>
<td>Sublette</td>
<td>66,000</td>
<td>6,004</td>
<td>10.9</td>
<td>Cattle/Sheep</td>
<td>May-Nov</td>
</tr>
<tr>
<td>Boundary</td>
<td>30,000</td>
<td>2,996</td>
<td>10.0</td>
<td>Cattle/Sheep</td>
<td>May-Nov</td>
</tr>
<tr>
<td>Desert Common</td>
<td>135,917</td>
<td>10,804</td>
<td>12.6</td>
<td>Cattle/Sheep</td>
<td>May-Jun</td>
</tr>
<tr>
<td>Stud Horse Common</td>
<td>15,455</td>
<td>2,386</td>
<td>6.5</td>
<td>Cattle</td>
<td>May-Jun</td>
</tr>
</tbody>
</table>

Forage is allocated for use by livestock on the basis of range surveys conducted by the BLM in the 1960s. The allocation of forage must be adjusted if substantial long-term disturbance of vegetation occurs. Table 5 lists the average carrying capacity of each allotment and will be used to estimate forage lost in each allotment by implementation of the Proposed Action and Full Development alternatives. Present forage availability is
commensurate with allocated forage. Forage availability for livestock AUMs have been averaged at approximately 11 acres per AUM within the affected allotments in the project area. Thus, the project area contains approximately 1,471 AUMs.

SOILS

Soil information for this document is derived from the Burma Road Soil Survey (BLM 1988) (Map 6). This Order 3 survey is not site-specific and prior to construction, each well site, access road/pipeline corridor, and sale pipeline would require inspection to determine soil type and to determine best reclamation techniques.

Upland areas (units 114, 122, 127) within this development field are dominated by soils that are shallow (less than 20 inches) or moderately deep (20 to 40 inches) to fractured bedrock of sandstone, shale, or siltstone of the Wasatch Formation. Also present but not consistent within these soils are lenses of hard mudstone and sandstone, 6 to 18 inches thick, about 12 to 36 inches below the surface. Textures are generally loam, sandy loam, sandy clay loam, clay, or clay loam. Gravels and small rock chips are common on the surface and in the matrix of many of the shallow soils. Some of these soils will have horizons of rock fragments about 12 to 18 inches below the surface. Topsoil depth ranges from 6 to 12 inches. Slopes generally range from 0 to 8 percent.

Slopes breaks are usually shallow sandy loams and loams over interbedded shale, siltstone, and sandstone from the Green River or Wasatch Formations (unit 116). These soils usually have rock chips on the surface. Topsoil depth ranges from 3 to 6 inches. Slopes range from 6 to 30 percent.

Soils of the fans and drainages are commonly deep (>60° bedrock) loams, fine sandy loams, and sandy clay loams (units 106, 110). To a smaller extent, sections 4 and 33, are deep, stratified silt loams, clay loams, and loams (unit 108). In the northwest part of the field, adjacent to Sand Draw, are deep sandy loams with sand and/or gravel usually at least 12 inches below the surface (unit 125). Topsoil depth ranges from 6 to 12 inches. Slopes range from 6 to 6 percent.

The southeast part of the field has areas of sand dunes overlying residual Laney shale uplands (unit 126) and areas of moderately deep and deep sandy clay loams (unit 110). The dunes, which are a loamy sand, are 6 to 10 feet high. Between these dunes are shallow clays. Topsoil depth ranges from 6 to 12 inches. Slopes range from 1 to 6 percent.

Appendix E describes the soil types likely to be found at well locations, access road/pipeline corridors, and sales pipelines. None of the wells proposed under the Proposed Action would be located on slopes greater than 5 percent. Map 5 reflects soil types found in the project area.

WATERSHED

The project area lies within the Green River basin. Yellow Point Ridge transects the project area. Thus, the project area lies in the center point of six watersheds (Map 7). For the purpose of this document, the six watersheds are referred to as: the Bull Draw, the Long Draw, the Jonah Gulch, the East Buckhorn Draw, the West Buckhorn Draw, and the Sand Draw. See Table 6 for a description of acreage and disturbance by watershed. Approximately 6.5 percent of the drainage from the project area flows into Bull Draw, 9.2 percent into Long Draw, 28.6 percent into Jonah Gulch, 16.9 percent into East Buckhorn Draw, 19.5 percent into the West Buckhorn Draw, and 19.3 percent into Sand Draw. Average annual precipitation is approximately 7 to 9 inches. Precipitation occurs in two forms: winter snows, and last spring and summer thunderstorms. The slow release of water from melting winter snows may not produce significant runoff while thunderstorms can produce localized high intensity flows. Such high intensity flows can cause rapid changes in water quality and channel morphology, especially if the ground has been disturbed in such a way as to concentrate overland flow.
Map 6b
JONAH PROSPECT
Soils

Map 6c
JONAH PROSPECT
Soils

Key Map

Key Map
**Table 6**

<table>
<thead>
<tr>
<th>NAME</th>
<th>ORDER</th>
<th>DRAINS INTO</th>
<th>TOTAL ACRES</th>
<th>ACRES DISTURBED</th>
<th>% DISTURBED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bull Draw</td>
<td>4</td>
<td>Big Sandy River</td>
<td>12,800</td>
<td>68</td>
<td>0.5</td>
</tr>
<tr>
<td>Long Draw</td>
<td>5</td>
<td>Big Sandy River</td>
<td>18,000</td>
<td>95</td>
<td>0.5</td>
</tr>
<tr>
<td>Jonah Gulch</td>
<td>5</td>
<td>Sublettes Flat</td>
<td>56,320</td>
<td>179</td>
<td>0.3</td>
</tr>
<tr>
<td>E. Buckhorn Draw</td>
<td>5</td>
<td>Eighteen Mile Canyon</td>
<td>33,280</td>
<td>112</td>
<td>0.3</td>
</tr>
<tr>
<td>W. Buckhorn Draw</td>
<td>5</td>
<td>Eighteen Mile Canyon</td>
<td>38,400</td>
<td>141</td>
<td>0.4</td>
</tr>
<tr>
<td>Sand Draw</td>
<td>5</td>
<td>Alkali Creek</td>
<td>38,000</td>
<td>152</td>
<td>0.4</td>
</tr>
</tbody>
</table>

1. Order # refers to the number of breaches within a drainage system.

Table 7 reflects existing miles and acres of disturbance in each watershed by type of road.

**Table 7**

<table>
<thead>
<tr>
<th>NAME</th>
<th>UNIMPROVED1 Miles</th>
<th>IMPROVED2 Miles</th>
<th>TRAIL3 Miles</th>
<th>HIGHWAY4 Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bull Draw</td>
<td>20.0</td>
<td>13.7</td>
<td>2.2</td>
<td>2.5</td>
</tr>
<tr>
<td>Long Draw</td>
<td>30.0</td>
<td>23.5</td>
<td>1.1</td>
<td>5.3</td>
</tr>
<tr>
<td>Jonah Gulch</td>
<td>81.0</td>
<td>45.0</td>
<td>18.7</td>
<td>81.7</td>
</tr>
<tr>
<td>East Buckhorn Draw</td>
<td>54.0</td>
<td>15.0</td>
<td>29.3</td>
<td>54.0</td>
</tr>
<tr>
<td>West Buckhorn Draw</td>
<td>57.7</td>
<td>11.4</td>
<td>32.8</td>
<td>57.7</td>
</tr>
<tr>
<td>Sand Draw</td>
<td>54.0</td>
<td>19.8</td>
<td>21.0</td>
<td>54.0</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>296.7</strong></td>
<td><strong>60.9</strong></td>
<td><strong>104.0</strong></td>
<td><strong>296.7</strong></td>
</tr>
</tbody>
</table>

1. 12.5-foot wide
2. 27.0-foot wide
3. 4.0-foot wide
4. 39.0-foot wide paved surface

Current disturbance within all affected watersheds is approximately 747 acres out of 196,800 acres, or 0.004 percent.
WATER QUALITY

There are no perennial streams that flow in the project area. Several intermittent/ephemeral creeks do occur. One intermittent riparian area associated with the stock pond exists within the project area and is located in Section 32, T. 29 N., R. 108 W. It is located on private land although the mineral estate is federally controlled.

Groundwater occurs in the sandstones of the Green River and Wasatch Formations. Fresh to slightly brackish groundwater total dissolved solids (TDS) ranging from 500 to 3,000 milligrams per liter (mg/l) occurs in the sandstones of the Green River and Wasatch formations. These formations can be found from the surface down to a depth of approximately 3,700 feet with sandstones occurring as discrete, discontinuous units located at random throughout the area. Below 3,700 feet lies the Fort Union Formation which also contains discrete water-bearing sandstones with water quality ranging from brackish to saline (TDS range from 3,000 to over 10,000 mg/l). Fresh water (water containing less than 1,000 TDS) does not occur below 2,500 feet (the depth to which the proposed surface casing is set).

In general, water quality tends to become more saline at deeper depths. However, at depths of 7,500 to 8,000 feet, water quality improves and TDS values range from 650 to 2,600 mg/l. In addition, water quality tends to vary greatly in sands at various depths. Water-bearing sands with water measuring approximately 13,000 to 15,000 TDS are found between sands containing water measuring 4,000 to 5,000 TDS. These fluctuations appear to be typical within the section below surface casing down to approximately 7,000 feet.

The TDS values presented here were obtained using calculations from resistivity logs of previously drilled gas wells. This method of calculation is fairly reliable, especially if logs from several closely spaced wells can be used. The values presented here were taken from three different Jonah Field gas wells. TDS values did fluctuate as much as 50 percent for sands that were correlated between wells. Although fluctuating, it is difficult to say whether the higher TDS values (greater than 10,000 TDS) are present. If they are, they appear to be present in some of the sands, but are not prevalent.

According to the U.S. Geological Survey (USGS) data, the Green River and Wasatch Formations probably contain ground water under water-table conditions (as opposed to confined) from near surface to depths possibly as much as 300 feet. This indicates that these shallower aquifers might connect to perennial streams such as the Big Sandy and Green Rivers. This connection is most likely to occur within a few miles of these streams, but the distance from the project area makes this connection doubtful.

Depth to water-bearing sands in the four existing water wells within the project area ranges from 105 to 290 feet. Water quality in these wells ranges from approximately 500 mg/l TDS to 3,000 mg/l TDS (these TDS values from USGS data). One water well is located on private surface (Section 32, T. 29 N., R. 108 W. and two livestock water wells are located on public lands (Section 5, T. 28 N., R. 108 W., and Section 12, T. 28 N., R. 109 W.). McMurry has a water well located at the JF-1-4 water well site (Section 4, T. 28 N., R. 108 W.). This well will be used to supply fresh water during drilling activities. Map 3 shows existing facilities located within the project area.

WILDLIFE

The project area provides summer range and transitional migration range for antelope during the spring and fall. Antelope sightings have been reported between the project area and Highway 191.

Four sage grouse leks have been documented (survey conducted by the BLM and WGFD during the spring of 1994) within the project area or within 1 mile of the project area. The majority of sage grouse associated with

a lek nest within a 2-mile radius of the lek with the highest densities within 0.25 miles of the lek. Sage grouse also winter in the general area. Winning sage grouse tend to band together in groups of 100 or more.

Other wildlife found in the area include ground squirrels, badgers, coyotes and avian species adapted to the sagebrush vegetative community.

Raptor nesting sites are not documented in the project area; however, recent raptor inventories are lacking. It is known that the Big Sandy River, located approximately 8 to 10 miles east of the project area, provides nesting habitat to a wide range of raptor species.

WILD HORSES

That portion of the project area within the boundary of the Green River Resource Area is part of the proposed Little Colorado Desert Wild Horses Management Area. Currently, 143 horses inhabit the management area and 34 horses presently have their home range within and around the project area.

THREATENED, ENDANGERED, CANDIDATE, AND SPECIAL STATUS SPECIES

The USFS has provided to the BLM, by Memorandum dated November 17, 1993 (Appendix B), a list of threatened, endangered, and candidate species of mammals, fish, birds, and plants that either occur or have the potential to occur within the general area and therefore, could potentially be impacted by the Proposed Action or Full Development alternatives.

Threatened and Endangered Species

Black-Footed Ferret - The last known wild ferret population was found near Meeteetse, Wyoming and a population was introduced into Shierly Basin in 1992. The likelihood of finding wild ferrets is considered almost non-existent. The occurrence of ferrets within their historic range must still be considered possible (USFS 1992).

Black-footed ferrets depend upon prairie dogs for both food and shelter. They have never been found outside of prairie dog habitat. Existing survey data and recent field inspections have not documented any prairie dog towns in the project area nor along the two sales pipeline routes.

Bald Eagle - On February 7, 1990, the USFWS published a Notice of Intent (55 FR 4209) to inform the public of its intent to reclassify the bald eagle from endangered to threatened throughout all or portions of its range. In 43 states, the bald eagle is classified as endangered. To date however, no formal reclassification proposal has been published by the agency.

No populations of bald eagles are documented in the project area. However, bald eagles are known to winter and migrate along the Green River. The Big Sandy River, located approximately 8 to 10 miles east of the project area, provides habitat for a variety of raptors. It is unknown if bald eagles winter or migrate along the Big Sandy river corridor. Bald eagles have been observed in the Fason-Eden area.

 Peregrine Falcon - Peregrine falcons use the Green River as a spring and fall migration corridor. The Green River is located approximately 20 miles west from the project area. The USFWS, U.S. Forest Service (USFS), WGFD, and BLM have been actively involved in a peregrine falcon introduction program in the upper Green River area near Pinedale. Falcons have been introduced by hatching (releasing captive-raised birds from an artificial nest site) since 1991. One site near Fremont Lake was sponsored by USFS and another on the Green River north of Cora was sponsored by the BLM. These efforts should not be affected by the Jonah Field proposal.
Listed Fish Species - The four fish species (Colorado squawfish, humpback chub, bonytail chub, and razorback sucker) considered endangered by the USFWS historically inhabited the Green River drainage but their present distribution is limited to the river downstream from Flaming Gorge Dam. These species are adapted to large, deep, turbid and swift-flowing rivers in the Colorado and Green River drainages. Both Colorado squawfish and humpback chubs prefer to inhabit shaded pools and eddies. On the other hand, bonytail chub and razorback suckers like deep, swift-moving channels.

None of these species is likely to be found in the Green River upstream from Flaming Gorge Dam. Construction of the dam has been cited as the principal cause of decreased numbers of these species in Wyoming (Joseph, et al. 1977). The presence of dams and reservoirs in the Colorado River system reduced flows and turbidity that the species had adapted to and altered water temperatures, conditions to which introduced species were better adapted (Joseph, et al. 1977).

These species, along with other native species, were also affected by in-stream and streamside habitat changes brought about by livestock grazing, mining, forestry, channelization, and water diversion projects (Joseph, et al. 1977). The USFWS has determined that projects involving water withdrawals and/or depredations within the Colorado River system has jeopardized these species.

Candidate Species

Ferruginous Hawk - The ferruginous hawk is a common resident found throughout the Rock Springs District, including in and around the project area. These hawks could be found in riparian-cottonwood and in basin-shrubland habitats located within and outside the project area. Ferruginous hawks prefer to nest on low rocky outcrops but may nest on the ground, on cut banks, in small groves of trees, or on artificial platforms. Food consists primarily of ground squirrels, pocket gophers, and rabbits, all of which are found within the project area.

Mountain Plover - The mountain plover is a common summer resident and has been observed throughout the Rock Springs District. It prefers sagebrush-grassland areas that provide open areas of shortgrass and midgrass of which is found in and around the project area. The plover nests on the ground, somewhat exposed and feeds upon insects, especially grasshoppers.

Long-Billed Curlew - The curlew is a less common summer resident that migrates out of the District during the winter. It is associated mostly with wet-moist meadow grasslands and irrigated native meadow with aquatic areas nearby. The project area does not contain this type of habitat; however, there is potential for the bird to visit the Faron area located approximately 28 miles southeast of the project area.

Loggerhead Shrike - The shrike is a common summer resident in the Rock Springs District and prefers pinyon-juniper, woodland, basin-prairie, and mountain foothills shrublands. It nests in trees, shrubs, or large sagebrush where it can hide its nest and feeds upon insects, small vertebrates, and carrion.

Candidate Fish Species - The flannelmouth sucker and the roundtail chub are classified as Category 2 (C2); they inhabit the Green River drainage. Both species exhibit adaptation to strong currents associated with the Colorado and Green Rivers but both may occur in tributary streams.

Adult flannelmouth suckers prefer pools and eddies in main river channels although young are common in backwaters of main channels (Joseph, et al. 1977). Adult roundtail chubs are mostly associated with pools and eddies while juveniles are most common in riffles of lower stream reaches (Joseph, et al. 1977). One roundtail chub was collected in the LaBarge area in 1979 and a flannelmouth sucker was collected in the Green River near LaBarge in 1979.

Special Status Plants

Plant species which are federal candidates for listing as threatened or endangered are known to occur in the project area. These species are not protected under the Endangered Species Act (1973), but are provided protection by the BLM under the guidelines of BLM Manual 6840. Under these regulations, the BLM is directed to ensure that actions authorized, funded, or carried-out do not contribute to the need to list Category 1 and 2 (C1, C2) species as threatened or endangered. In order to comply with this directive, the BLM requires site-specific surveys for special status plants in areas of known populations or potential populations (based on presence of characteristic habitat) prior to authorizing surface disturbing activities.

Two candidate species, Cedar Rim thistle (Cirsium griseum) and contracted Indian ricegrass (Oryzopsis contracta) were found in the project area during a survey of Yellow Point Ridge (a portion of the project area) in the summer of 1993 (Fertig 1993).

Bastard Draba Milkvetch - Bastard Draba milkvetch (Astragalus drabaeformis), listed by the USFWS as potentially occurring in the project area was not found during the survey. Bastard Draba milkvetch grows in open sites associated with sagebrush and/or cushion plants. Soil types include sandstone, stony clay, badlands, and barren clay slopes.

Cedar Rim Thistle - Based on survey information, Cedar Rim thistle is found in sandy washes or eroding slopes on the edges of benches and on barren sandy or clayey sites. These sites tend to coincide with soils unit 116 described in the Burma Soil Survey.

Contracted Indian Ricegrass - The USFWS has been petitioned to down-list Contracted Indian ricegrass to a Category 3 (3C) status based on the growing number of documented occurrences and the widespread variety of habitats. Although this species is still officially listed as a C2 species, the Wyoming Natural Diversity Data Base, in agreement with USFWS, has recommended management of the species as a Category 3C (Anderson, et al. BATE7). A 3C species receives limited management protection from the BLM; occurrences will be documented during site-specific surveys for other species. Contracted Indian ricegrass occurs in basin areas on dry, shallow, or sandy soils at elevation from 4,800 to 7,500 feet.

Other

In addition to the two federal candidate species, two other rare species were found during the 1993 survey. Cereopsis cat's-eye (Cereopsis caespitosa) and Payou's beardtongue (Penstemon payouii) are known to occur in the project area and are of moderate concern due to their restricted geographic range. Site-specific surveys must also indicate the presence of these species, if they are found.
CHAPTER IV - ENVIRONMENTAL IMPACTS

This section describes the impacts of implementing the Proposed Action, Full Development, and No Action alternatives. BLM standard stipulations and Conditions of Approval (Appendix C) have been incorporated into the Proposed Action and Full Development alternatives. This section assumes that these stipulations and conditions will be implemented. Additional mitigation measures may be identified to further minimize residual impacts.

LAND USE

A significant impact to land use would be defined as any use that is not in conformance or allowed by county, state, or federal land use plans. All alternatives are compatible with other uses (i.e., grazing and agriculture) and are allowed and in conformance with applicable county and federal land use plans. Additional construction permits would be required from Sublette County prior to surface disturbing activities.

HAZARDOUS MATERIALS

Proposed Action

Because of the actions taken by McMurry as described under the Proposed Action in Chapter 2, no unacceptable impacts are anticipated due to hazardous materials. Unanticipated events are always possible. However, McMurry would be required to comply with applicable planning efforts and emergency procedures required by local, state, and federal regulations regarding the prevention, reporting, and cleanup should an accidental release of a hazardous material occur.

Full Development Alternative

Potential for impacts would be the same as described under the Proposed Action. However, potential for accidental spills or leaks would continue over a longer period of time.

No Action Alternative

Under this alternative, potential for accidental spills or leaks would not exist since further drilling activities would be denied. Potential for spills or leaks related to current maintenance activities (i.e., gasoline leaks from vehicles) would continue.

Additional Mitigation Measures

No additional measures have been identified.

SOCIODECONOMICS

Proposed Action

Increases in the demand for temporary housing in excess of availability would be considered significant. Either short- or long-term increases in demand for local governmental facilities would also be considered significant.

Assuming all 47 wells are producers; each well produces 1.5 billion cubic feet of gas before being plugged and abandoned; and gas prices remain at $1.50 per thousand cubic feet, expected revenues would be approximately $2.25 million per well over the life of the well. Total revenues generated from the project would be estimated at $106 million over the life of the project. Assuming sales tax remain at four percent, up to $56,400 could be collected by the State of Wyoming (based on $30,000 per well for equipment) of which a part would be returned to Sublette County. In addition, Sublette County would collect a yearly ad valorem tax on well head equipment (minus depreciation) and on yearly production (figures supplied by the State). The State of Wyoming would collect a six percent severance tax in the amount of $6.34 million over the life of the project. In addition, the Wyoming Oil and Gas Conservation Commission would collect a conservation tax at the rate of 0.0006 percent on natural gas production.

Natural gas wells producing federal minerals pay a 12.5 percent royalty on gas sales. Thus, the federal government would collect approximately $13.3 million over the life of the project. One-half of this amount would be returned to the State of Wyoming. These figures are estimates and may either increase or decrease depending upon the rate of production from any single well, fluctuations in natural gas prices, and the stability of tax rates.

County Planners in both Sublette and Sweetwater counties have expressed concerns over the tight housing market and lack of available rentals to house temporary employees hired outside of the local or regional area. Implementation of McMurry's Proposed Action would require three crews consisting of four individuals each to work out drilling rig. One drilling rig would be employed during the drilling phase of the project. McMurry has secured the services of one drilling company where workers have permanent residences in the Riverton, Wyoming, area (Herbert 1994). Thus, these workers would remain with temporary housing while working in McMurry has indicated that the drilling company would provide temporary housing in the form of three mobile homes located in Farson, Wyoming (Herbert 1994). On the basis of these plans, no impacts would occur due to the housing market in Sublette or Sweetwater counties. Other socioeconomic issues, such as impacts on schools, area population levels, per capita income, etc., are negligible because of the small workforce, hired within the region, associated with the Proposed Action and the Full Development alternative.

Since one drilling rig would be employed during the drilling phase, there would be little impact to the average daily traffic currently occurring on Highway 191, as the rig and equipment would be moved from one location to the next within the project area. Two company, one crew, and one pusher vehicle would be expected to make approximately five round-trips from either Pinedale or Farson per day.

Full Development Alternative

Assuming all 99 wells are producers and each well produces 1.5 billion cubic feet of gas before being plugged and abandoned and gas prices remain at $1.50 per thousand cubic feet, expected revenues would be approximately $2.25 million per well. Total revenues generated from the project would be estimated at $222 million. Assuming that sales tax remains at four percent, up to $8.9 could be collected by the State of Wyoming (based on $30,000 per well for equipment) of which a part would be returned to Sublette County. In addition, Sublette County would collect a yearly Ad Valorem tax based on well head equipment (minus depreciation) and yearly production (figures supplied by the State). The State of Wyoming would collect a six percent severance tax in the amount of $13.3 million over the life of the project. In addition, the Wyoming Oil and Gas Conservation Commission would collect a conservation tax at the rate of 0.0006 percent on natural gas production.

Gas wells producing federal minerals pay a 12.5 percent royalty on gas sales. Thus, the federal government would collect approximately $27.8 million over the life of the project of which one-half would be returned to the State of Wyoming. Again, these estimates may change depending upon production of any single well, fluctuations in natural gas prices, and the stability of tax rates.
Since only one drilling rig would be employed over the 11-year period, drilling eight wells per year, no additional impacts would be expected to occur above what is described under the Proposed Action except the impacts would occur over a longer period of time.

**No Action Alternative**

Implementation of this alternative would eliminate additional revenues generated by new well production, collected at the county, state, and federal levels. It would also reduce employment opportunities for local/regional contractors and workers. There would be no change in demand for either temporary or permanent housing nor changes in traffic patterns on Highway 191.

**Additional Mitigation Measures**

No additional measures have been identified.

**RECREATION**

**Proposed Action**

Any activity that would prohibit or interfere with existing developed recreation sites or facilities would be considered significant. No such sites are within or adjacent to the project area; therefore, no impacts would occur. Hunting is considered the primary recreational activity in the area and minor inconveniences to hunters could be expected. The impacts from one drilling rig would be negligible. There would be a slight increase in the potential for poaching by project workers and/or harassment of wildlife and wild horses by dogs brought onto the worksite by project workers. Off-road vehicle use could occur, however, BLM’s policy in this area is “open” to off-road vehicle use. Therefore, impacts from off-road vehicle use would be minimal.

**Full Development Alternative**

Impacts would be expected to remain the same as described under the Proposed Action but would occur over a longer period of time.

**No Action Alternative**

No changes to existing hunting activities would be expected and the likelihood of poaching and/or harassment of wildlife and wild horses would be negligible since additional drilling would not occur.

**Additional Mitigation Measures**

McMurry could adopt a policy where any employee (including contractors) convicted of a major big game wildlife violation would be subject to disciplinary action. This would help to avoid the illegal taking of game.

McMurry could adopt a policy that would prohibit firearms or domestic dogs at the work site. This would eliminate the temptation to shoot wildlife and eliminate the potential for wildlife and/or wild horse harassment by dogs.

McMurry could implement a policy to educate potential employees about laws and regulations protecting wildlife and wild horses.

**VISUAL RESOURCES**

**Proposed Action**

Any construction within a visual resource management (VRM) area classified as Class I would be considered significant. The project area is rated Class IV under VRM guidelines. No significant impact to the visual quality of the area is anticipated since the additions of aboveground facilities would be painted an environmental color to blend into the natural landscape. The project components would not be visible from Highway 191 once drilling equipment is moved off-site. Depending upon the location, drilling rigs may be seen by those traveling on Highway 191.

Construction activity associated with the Jonah North sales pipeline could be visible from Highway 191 since at its closest point, it would be located approximately 2.5 miles west of the highway. Any reclaimed pipeline corridor within 0.25 to 0.5 miles of a highway is visible. Neither the Jonah North or the Jonah West sale pipelines would be visible from Highway 191.

**Full Development Alternative**

The impacts described under the Proposed Action would be expected to be the same for this alternative except that the visual intrusion of a drilling rig to those individuals travelling on Highway 191 would last over a longer period of time (11 years vs. 5 years).

**No Action Alternative**

Implementation of the No Action Alternative would eliminate temporary visual impacts from Highway 191 during the drilling phase of the project. Nor would there be potential for visual intrusion during construction of the Jonah North sales pipeline to those using Highway 191.

**Additional Mitigation Measures**

No additional measures have been identified.

**AIR QUALITY**

**Proposed Action**

Air pollution is controlled through ambient air quality and emission standards and permit requirements established under the Federal Clean Air Act and is administered by the Wyoming Department of Environmental Quality-Air Quality Department (WDEQ-AQD). Exceeding ambient federal or state air quality standards would be considered significant.

One air contaminant associated with the Proposed Action would be fugitive dust generated during construction and traffic activities. It is estimated that approximately 4.6 tons of fugitive dust could be generated each year by surface disturbing activities (based on 91 lbs/acre soil loss). Generally speaking, most of the heavy particulate matter would settle within a few hundred feet of disturbance. Fugitive dust would be reduced since new roads would be properly constructed and graveled where needed.

Long-term loss of soil via fugitive dust could be estimated as high as 9.6 tons of TSP per year (91 lbs/acre, 212 acres). However, once initial reclamation is completed, this number would be expected to drop to...
approximately 1 to 1.7 tons per year of fugitive dust since compaction of long-term disturbance areas would occur due to moisture, vehicle traffic, and lack of further soil disturbance.

Air pollutants produced by drilling rigs utilizing diesel-powered engines would be expected to produce approximately one ton of TSP per well drilled. Therefore, if eight wells are drilled per year, it is expected that eight tons of TSP could be produced each year. In addition to TSP, 104 tons of nitrous oxides, 29 tons of sulfur dioxide, and 22 tons of carbon monoxide (EPA 1979, section 3.3-1) could be produced with implementation of the Proposed Action. Other common sources of pollutants would come from diesel-powered, earthmoving equipment and vehicles, and gasoline-powered vehicles and trucks. These air pollutants do not exceed Wyoming air quality standards and therefore, would not cause significant adverse impact.

Particulate emissions vary substantially from day to day depending on the level of activity, specific operations, and weather conditions. Overall, implementation of the drilling program as proposed would not exceed WDEQ-AQD standards since prevailing westerly winds would disburse airborne particulates. Therefore, wilderness air quality standards should not be impacted for the Bridger, Fitzpatrick, and Popo Agie Wilderness Areas administered by the USFS. Nor would the air quality standards within the BLM Scab Creek Wilderness Study Area be compromised. All of these special management areas are located 30 to 50 miles north and northeast of the project area.

No H2S or SO2 gases have been encountered in the formations drilled thus far and none are anticipated in future drilling operations.

Volatile Organic Hydrocarbons (VOCs) may be vented into the atmosphere during blow-downs (flaring to clean out the well) activities. Very little water has been produced from the seven existing wells; however, as producing wells age, it is common to begin recovering additional water requiring more frequent blow-downs. When VOCs are vented into the atmosphere, they may combine with other chemicals to produce ozone. Insufficient data currently exists to make any predictions of volumes. However, it is unlikely that these practices would exceed Wyoming standards and therefore, would not cause significant impact.

Full Development Alternative

Since the number of wells drilled in any one year would remain the same (eight wells), impacts would be the same for this alternative except that they would occur over a longer period of time (11-years). Thus, the total amount of emissions (all sources of pollutants) over the life of the project would be expected to reach in excess of 1,844 tons.

No Action Alternative

No additional drilling would take place thus eliminating further release of pollutants. Daily maintenance activity via gasoline- and diesel-powered vehicles would still be required. Thus, current levels of TSP and pollutants would continue but would remain within the limits of Wyoming air quality standards.

Additional Mitigation Measures

A dust abatement program, in addition to proper road construction and graveling requirements, should be included in the required Transportation Plan. The authorized officer should monitor construction and operational activity and if deemed necessary, require McMurry to implement dust-abatement measures.

CULTURAL RESOURCES

Proposed Action

Loss of cultural resources eligible for inclusion in the National Register of Historic Places would be considered significant.

While inventory and avoidance would adequately protect known cultural materials, potential exists to adversely affect unrecognized or buried cultural materials lacking surface expression. BLM requires surveys prior to surface disturbing activities. Based on existing procedures, it is unlikely that implementation of this alternative would lead to significant impacts to cultural resources. Any unanticipated sites or materials uncovered during construction activities would be handled on a case-by-case basis according to procedures set forth by the BLM and in consultation with the Wyoming State Historic Preservation Office and if necessary, with the Advisory Council on Historic Preservation. If it is found during surveys that cultural materials (e.g., arrowheads) are common, potential for illegal collecting of artifacts would increase.

An assessment of impacts on traditional Native American religious or cultural sites will be conducted in the spring of 1994. Any concerns raised will be addressed on a case-by-case basis by coordination and consultation among the BLM, the affected Native American group, McMurry, and the Wyoming State Historic Preservation Office (Native American Specialist).

Full Development Alternative

With implementation of the Full Development alternative, the probability of finding or uncovering cultural materials during construction activities increases. Any sites or materials would be managed according to established BLM procedures.

No Action Alternative

Implementation of this alternative would eliminate further potential impacts to cultural resources.

Additional Mitigation Measures

McMurry could implement a policy to educate potential employees about laws and fines for illegal collecting of artifacts. This would ensure employees are informed and would protect cultural resources from vandalism.

PALEONTOLOGY

Proposed Action

 Destruction of any fossils considered important for scientific purposes would be considered significant. It could be possible to uncover paleontological resources during the construction phase of the proposal. In those areas where bedrock would be disturbed by construction activities, and paleontological resources uncovered, construction would be stopped and a determination of significance made by a qualified paleontologist on a case-by-case basis. A recovery or avoidance plan would be developed in accordance with the significance determination. Therefore, and as long as construction is halted and the site evaluated, there would not be significant impacts to the paleontological resource.
Table 7 summarizes existing vegetation that would be taken out of production if the Proposed Action is implemented. Approximately 874 additional acres of native, existing vegetation would be disturbed. Full Development Alternative would disturb approximately 500 additional acres of native, existing vegetation within the 28-square-mile project area. Approximately 288 acres (30 percent of well pads, 36 percent of access roads, and 100 percent of gathering and sale pipelines) would be reclaimed shortly after disturbance leaving 212 acres disturbed over the life of the project. This would be a necessary and unavoidable impact to the vegetation resource. McMurry would be required to reseed areas where reclamation efforts have failed until a successful stand of native vegetation has been established. Fencing may be necessary in some cases to keep livestock and wild horses off the reseeded areas in order to obtain successful reclamation. This would be determined on a case-by-case basis (e.g., the JF 4-12 location is close enough to livestock water to preclude successful reclamation and would need to be fenced).

Implementation of the Proposed Action would cause a loss of 51.7 AUMs during initial disturbance although within 3 to 5 years, approximately 23.4 AUMs would be restored after reclamation. Over the life of the project, approximately 212 acres would remain disturbed and 28.3 AUMs would be lost until final reclamation is completed following abandonment.

Cumulatively, the Proposed Action, as described under the soils section, affects five allotments. Table 7 summarizes existing acres of vegetation taken out of production due to roads and Table 8 lists additional vegetation that would be taken out of production if the Proposed Action is fully implemented over the life of the project due to well pads, access roads, and wareyard.

Full Development Alternative

Implementation of this alternative would disturb approximately 874 additional acres of native, existing vegetation. Approximately 414 acres would be reclaimed shortly after disturbance leaving 460 acres disturbed over the life of the project. Construction would cause an initial loss of approximately 86.5 AUMs and 50.3 AUMs would be lost over the life of the project.

Cumulatively, the Full Development alternative, as described under the soils section, affects five allotments. Table 7 summarizes existing acres taken out of production due to existing roads and Table 9 lists the additional vegetation that would be taken out of production over the life of the project due to well pads and access roads if this alternative is fully implemented.

No Action Alternative

No additional disturbance to the vegetation resource would occur. Approximately 40 acres would remain disturbed until the existing seven wells are plugged and abandoned and successfully reclaimed.

| Table 8 IMPACTS OF THE PROPOSED ACTION ON LIVESTOCK GRAZING ALLOTMENTS |
|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| ALLOTMENT NAME             | ACRES (ALLOTMENT)           | COMPONENTS PROPOSED ACTION1 | FORAGE LOST AUMS LOST3 | % OF TOTAL ALLOTMENT FORAGE LOST |
|                            |                             |                            | ACRES SHORT OR LONG TERM2 |                             |
| Figure Four                | 114,425                     | 10.5 Mi sale ppins         | 70 short                  | 4.0                          | 0.06                        |
| Sublette                   | 66,000                      |                             | 0 long                    | 0.0                          |                             |
| Boundary                   | 30,000                      | 9 wells                     | 28 short                  | 8.5-short                    | 0.28                        |
|                            |                             | roads/                      | 20 short                  |                             |                             |
|                            |                             | g-ppins                    | 37 short                  |                             |                             |
|                            |                             | wareyard                   | 20 short                  |                             |                             |
| Desert Common              | 135,917                     | 38 wells                    | 118 short                 | 30.6-short                   | 0.28                        |
|                            |                             | roads/                      | 83 short                  |                             |                             |
|                            |                             | g-ppins                    | 159 short                 |                             |                             |
|                            |                             | 16.5 Mi sale ppins         | 100 short                 |                             |                             |
|                            |                             |                            | 110 short                 |                             |                             |
|                            |                             |                            | 0 long                    |                             |                             |
| Stol Horse Common          | 15,455                      | 7.0 main access road        | 48 long                   | 8.6-short                    | 0.36                        |
|                            |                             |                            | 1.3 Mi sale ppin          | 8 short                     | 7.4-long                    |
|                            |                             |                            |                            |                             |                             |

1 Includes seven existing wells, access roads/pipeline corridors. Approximately 0.5 miles of sale pipeline outside affected allotments.

2 Short-term = 3 to 5 years; long-term = life of the natural gas project (20-30 years).

3 AUM = 1 AUM is the amount of forage needed to feed 1 cow and her calf for 1 month.
**Table 9**
IMPAIRS OF FULL DEVELOPMENT ON LIVESTOCK GRAZING BY ALLOTMENT

<table>
<thead>
<tr>
<th>ALLOTMENT NAME</th>
<th>ACRES</th>
<th>COMPONENTS PROPOSED ACTION</th>
<th>FORAGE LOST</th>
<th>AUMS LOST</th>
<th>% OF TOTAL ALLOTMENT FORAGE LOST</th>
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<tr>
<td></td>
<td></td>
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<td>ACRES</td>
<td>SHORT OR LONG TERM</td>
<td>ACRES</td>
</tr>
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<td>Figure Four</td>
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<td>10.5 Mi sale pplin</td>
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<td></td>
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<td>long</td>
<td>0.0</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td>wareyard</td>
<td>161</td>
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<tr>
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<td></td>
<td>103</td>
<td>long</td>
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<td>long</td>
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<tr>
<td></td>
<td></td>
<td>roads/g-pplns</td>
<td>138</td>
<td>short</td>
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<td>244</td>
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<td>156</td>
<td>long</td>
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<td>0</td>
<td>long</td>
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<tr>
<td>Stud Horse Common</td>
<td>15,455</td>
<td>7.0 main access road</td>
<td>48</td>
<td>long</td>
<td>8.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1.3 Mi sale pplin</td>
<td>short</td>
<td>7.4</td>
</tr>
</tbody>
</table>

Additional Mitigation Measures

The BLM should require the addition of two pounds per acre of Needle and Thread (*Sphaeralcea coccinea*) to the seed mix for sandy sites and two pounds per acre of Scarlet Globemallow (*Sphaeralcea coccinea*) to the seed mix on disturbed areas. The addition of these two species would help ensure revegetation of sandy areas and would provide useful forage for livestock, wildlife, and wild horses. The recommended seed mix would be:

- 3.00 lbs/acre Thickspike Wheatgrass
- 3.00 lbs/acre Western Wheatgrass (native)
- 3.00 lbs/acre Bluebunch Wheatgrass
- 2.00 lbs/acre Indian Ricegrass
- 2.00 lbs/acre Winterfat
- 0.25 lbs/acre Scarlet Globemallow (loamy and shallow soils only)
- 2.00 lbs/acre Needle and Thread (sandy soils only)

Reclamation success should be evaluated annually. If grazing by livestock and/or wildlife is determined to be adversely affecting revegetation success, the authorized officer should require McMurtry to take measures to correct the problem, e.g., well pads, problem segments of access roads or pipelines, etc., should be fenced until revegetation and surface (soil) stability are deemed successful. McMurtry should maintain all fencing in good repair.

**LIVESTOCK GRAZING**

**Proposed Action**

A 10 percent or greater reduction in AUMs in any single allotment would be considered significant. The Proposed Action would directly impact four of the five grazing allotments within the project area. The impact would be from vegetation loss due to one or more of the following actions: well pads, access roads, gathering pipelines, or sale pipelines. Table 8 summarizes the impacts as calculated for each allotment.

Based on the data in Table 8, approximately 51.7 AUMs of forage would be lost initially with implementation of the Proposed Action. However approximately 23.4 AUMs would be recovered within 3 to 5 years, leaving 28.3 AUMs lost for the life of the project.

When considering forage loss on an allotment basis, the impact would not be significant. The Desert Common Allotment would be impacted most with an initial loss of 30.6 AUMs and 14.5 AUMs over the long term. In no case would the long-term loss exceed 0.6 percent of the allocated forage. Substantial non-use is being carried by permittees within these allotments. Therefore, no adjustments in forage allocation would be required.

Cumulative impacts from other development within these allotments would not be of concern. The McMurtry development represents the first major surface disturbing development within these allotments since the rangeland forage survey was conducted in the early 1960s.

**Full Development Alternative**

Under this alternative, four of the five allotments would be impacted and to a greater degree. Table 9 summarizes the impact as calculated for each allotment.

Based on the data in Table 9, approximately 86.5 AUMs of forage would be lost initially to livestock use under the Full Development alternative. However, 36.2 AUMs would be recovered within 3 to 5 years following reclamation (pipelines, etc.) and 50.3 AUMs would remain lost for the life of the project.

Initially, the Boundary and Desert Common Allotments would be impacted the most with 30.2 and 42.6 AUMs lost respectively in the short term. This represents 0.01 and 0.39 percent of the allocated use within these allotments. Following reclamation (3 to 5 years) approximately 18.8 AUMs and 23.4 AUMs respectively would be lost for the life of the project within these two allotments. This represents 0.03 and 0.22 percent of the allocated forage. In light of the non-use taken by allottees, and the fact that approximately 30 percent of well pad, 36 percent of access road/gathering pipeline corridors, and 100 percent of sale pipelines would be revegetated within 3 to 5 years, no significant impact would occur to livestock operations. No adjustments in forage allocation would be necessary.

Cumulative impact would be the same as described under the Proposed Action.

**No Action Alternative**

The existing situation would continue and no additional loss of AUMs would occur.
Additional Mitigation Measures

No additional measures have been identified.

SOILS

Proposed Action

Impacts to soils would be considered significant if Wyoming water quality standards are exceeded due to increased erosion and sedimentation. Approximately 500 acres would be disturbed initially over a five-year period (approximately 100 acres per year) from well pads, access roads, and pipelines. Approximately 288 acres would be reclaimed shortly after disturbance (55 to 60 acres per year). All pipelines would be reclaimed as soon as possible after disturbance.

Long-term disturbance from well pads and the traveled on access roads would be approximately 212 acres. No significant adverse impact would be expected with proper implementation of storm water discharge and erosion control measures.

Soils on the slope breaks (unit 116) are subject to water erosion due to texture, carbonate content, and slope. Storm water discharge and required erosion control measures would direct runoff water from disturbed sites away from these slopes.

Most of the soils on fans and drainages (Units 106, 108, 125) are subject to either piping (i.e., soil collapse) or seepage if used for water impoundment. Sandy soils (units 110, 126) are subject to wind erosion and could contain cultural sites.

Soil in the roads and on the pads would become compacted during construction, drilling, and operational activity. If this compaction is not adequately ripped during reclamation, the potential for successful revegetation would be diminished and soil erosion potential could greatly increase. If the roads in the project area are not adequately designed, there would be potential for accelerated erosion due to concentrated runoff.

Implementation of storm water discharge and required erosion control measures would ensure avoidance of degradation caused by increased surface disturbance.

Topsoiling - Topsoiling is a general term that is applied to the stripping depth of soil material that possesses good plant growth supporting characteristics. It may be what is known as "A" horizon, "A" and "B" horizon, or only "B" horizon, and even "C" horizon. Each horizon represents a decrease in the quality of plant growth medium. The stripping, storage, and respraying of topsoil is extremely important to successful reclamation of disturbed lands. Munchower (1994) summarizes the work of a number of researchers (Williams 1991; Power et al. 1979; Barth and Martin 1982) relative to the depth of topsoil necessary to achieve predisturbance plant production and cover. Typically the research showed an increase in plant production with topsoil depths of up to 20 inches. Wayne Cook, Robert Hyde, and Phillip Sims (Range Science Series No. 16 - no date) found the conservation of topsoil as a must where a stand of vegetation is necessary for soil stabilization and beautification. Their findings stated that topsoil should be reapplied evenly:

"... at a depth of six to eight inches over a suitable subsoil material so that a plant growth medium of at least 18 inches in depth is provided. An 18-inch depth is necessary for storage of water to field capacity that is retained during fall and winter. Such moisture is necessary for plants to survive the dry summer months that frequently prevail."

BLM’s standard topsoil stripping practice has been to remove and conserve for reclamation all available topsoil up to 6 inches. Based on research findings, this may not be sufficient to ensure optimum soil stabilization and to achieve predisturbance plant production and cover. Because the Jonah Field area is one of relatively new development, an acceptable reclamation practice has not been fully established for this area. Tests should be established where available topsoil depths of up to 12 inches are stripped on selected road and well pad sites. These sites should be selected on a case-by-case basis within the different soil types that would meet soil depth criteria, the test would compare and evaluate the success of revegetation in relation to varied topsoiling practices.

Cumulative long-term impact to soils as the result of surface disturbance under the Proposed Action would be expected to be negligible assuming continued proper implementation of storm water discharge and erosion control measures. The addition of 40 wells to the existing seven wells would increase soil disturbance by 0.006 percent (Table 10).

<table>
<thead>
<tr>
<th>WATERSHED NAME</th>
<th>EXISTING DISTURBANCE</th>
<th>PROPOSED ACTION</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bull Draw</td>
<td>0.005</td>
<td>0.002</td>
<td>0.007</td>
</tr>
<tr>
<td>Long Draw</td>
<td>0.005</td>
<td>0.004</td>
<td>0.009</td>
</tr>
<tr>
<td>Jonah Gulch</td>
<td>0.003</td>
<td>0.002</td>
<td>0.005</td>
</tr>
<tr>
<td>E. Buckhorn</td>
<td>0.003</td>
<td>0.001</td>
<td>0.004</td>
</tr>
<tr>
<td>W. Buckhorn</td>
<td>0.004</td>
<td>0.000</td>
<td>0.004</td>
</tr>
<tr>
<td>Sand Draw</td>
<td>0.004</td>
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<tr>
<td>Average Change</td>
<td>0.004</td>
<td>0.002</td>
<td>0.006</td>
</tr>
</tbody>
</table>

Full Development Alternative

Under this alternative, 92 additional wells would be drilled for a total of 99 wells over an 11-year period (eight wells per year). Approximately 874 acres would be disturbed over the 11-year period (80 acres per year) from well pads and access roads. Approximately 414 acres would be reclaimed (55 to 60 acres per year) shortly after disturbance. All pipelines would be completely reclaimed shortly after disturbance and stabilized within 3 to 5 years.

Long-term disturbance from well pads and access roads would be approximately 460 acres. No significant impact would be expected with proper implementation of storm water discharge and required erosion control measures. Special measures would be required for the soil types described under the Proposed Action to avoid unnecessary degradation.

Cumulative long-term impacts to soils as a result of the Full Development alternative would be negligible assuming continued implementation of storm water discharge and erosion control measures. The addition of 92 wells to the existing seven wells would increase soil disturbance by 0.007 percent (Table 11).
TABLE II
FULL DEVELOPMENT ALTERNATIVE
CUMULATIVE LONG-TERM IMPACTS TO AFFECTED WATERSHEDS
BY PERCENTAGE OF DISTURBANCE

<table>
<thead>
<tr>
<th>WATERSHED NAME</th>
<th>EXISTING DISTURBANCE</th>
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<th>TOTAL</th>
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<td>0.007</td>
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<tr>
<td>Long Draw</td>
<td>0.005</td>
<td>0.006</td>
<td>0.011</td>
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<tr>
<td>Jonah Gulch</td>
<td>0.003</td>
<td>0.004</td>
<td>0.007</td>
</tr>
<tr>
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<td>0.003</td>
<td>0.001</td>
<td>0.004</td>
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<td>0.007</td>
</tr>
<tr>
<td>Average Change</td>
<td>0.004</td>
<td>0.003</td>
<td>0.007</td>
</tr>
</tbody>
</table>

No Action Alternative
No additional disturbance to soils would occur. Soils in the existing roads and well pads would remain compacted for the life of the wells. Stabilization of the existing wells, once reclaimed, would take from 3 to 5 years.

Additional Mitigation Measures
All impoundments, including reserve pits, that are constructed in soils that are permeable (units 106, 108, 125) should be lined or otherwise self-contained due to seepage and/or piping. The need for lining or other forms of self-containment should be determined on a case-by-case basis.

Topsoiling of selected road and well pad sites should be conducted where available topsoil depths up to 12 inches are stripped and conserved for reclamation. The success of revegetation on these sites should be compare against 6-inch topsoiling in comparable soil types. The results would provide essential data for establishing a topsoiling standard for this area. Fencing should be installed on some control sites and none on others.

Prior to topsoil replacement, the pad or backfilled material should be ripped at least 24 inches to reduce compaction.

The BLM may require certain locations to be fenced if well pad inspections show that reclamation efforts have failed due to overgrazing by livestock and/or wildlife (see additional mitigation under the vegetation section). McMurry would be required to maintain fences in good repair until revegetation and/or site stability are deemed successful.

Soils shown as map unit 116, Burma Road Soil Survey, has a moderate to high potential for excess water erosion due to the texture, carbonate content, and slope. Disturbance of this soil type should be avoided if possible. Avoiding disturbance of this soil type would eliminate potential increased water erosion and would protect Cedar Rim thistle habitat (see special status plants section).

TABLE II
FULL DEVELOPMENT ALTERNATIVE
CUMULATIVE LONG-TERM IMPACTS TO AFFECTED WATERSHEDS
BY PERCENTAGE OF DISTURBANCE

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</tr>
<tr>
<td>Average Change</td>
<td>0.004</td>
<td>0.003</td>
<td>0.007</td>
</tr>
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</table>

No Action Alternative
No additional disturbance to soils would occur. Soils in the existing roads and well pads would remain compacted for the life of the wells. Stabilization of the existing wells, once reclaimed, would take from 3 to 5 years.

Additional Mitigation Measures
All impoundments, including reserve pits, that are constructed in soils that are permeable (units 106, 108, 125) should be lined or otherwise self-contained due to seepage and/or piping. The need for lining or other forms of self-containment should be determined on a case-by-case basis.

Topsoiling of selected road and well pad sites should be conducted where available topsoil depths up to 12 inches are stripped and conserved for reclamation. The success of revegetation on these sites should be compare against 6-inch topsoiling in comparable soil types. The results would provide essential data for establishing a topsoiling standard for this area. Fencing should be installed on some control sites and none on others.

Prior to topsoil replacement, the pad or backfilled material should be ripped at least 24 inches to reduce compaction.

The BLM may require certain locations to be fenced if well pad inspections show that reclamation efforts have failed due to overgrazing by livestock and/or wildlife (see additional mitigation under the vegetation section). McMurry would be required to maintain fences in good repair until revegetation and/or site stability are deemed successful.

Soils shown as map unit 116, Burma Road Soil Survey, has a moderate to high potential for excess water erosion due to the texture, carbonate content, and slope. Disturbance of this soil type should be avoided if possible. Avoiding disturbance of this soil type would eliminate potential increased water erosion and would protect Cedar Rim thistle habitat (see special status plants section).

WATERSHED
Proposed Action
Any activity that would violate Wyoming ambient water quality standards and any violation of ED 11988 (floodplain protection) would be considered significant.

Forty additional wells (plus the seven existing wells) would remove a grand total of 571 acres of vegetation and would cause both short- and long-term impacts to the local watersheds. Following reclamation, a grand total of 276 acres would remain disturbed for the life of the field. Rates of wind and water erosion would increase above natural rates until reclamation of disturbed areas has proved successful. McMurry would comply with Wyoming DEQ storm water discharge requirements which would be expected to reduce potential impacts to the watershed.

Cumulative long-term impacts to the watersheds as a result of surface disturbance would not be expected to be significant. Table 6 lists the six watersheds affected by the Proposed Action (40 proposed wells in addition to the 7 existing wells). Approximately 747 acres of disturbance presently exists within these watersheds. Implementation of the Proposed Action would increase the total long-term soil disturbance by 276 acres or 0.006 (1,023 acres) percent. Table 10 summarizes the cumulative disturbance by watershed (Map 5).

The area of disturbance within each of the delineated watersheds is small in comparison to the total area of each watershed. If the proposed disturbance were evenly dispersed over the entire watershed, there would be little concern over the cumulative impacts. However, because the activity would be concentrated in portions of the affected watersheds, there is potential to have a minor cumulative effect from well pads and roads within sub-watersheds. Based upon the mapped watersheds, sub-watersheds (Order 1 and 2) of Long Draw and Jonah Gulch appear to have the greatest potential for this to occur.

Many of the proposed well sites are located near ephemeral drainages. Although there is little to no flow in these drainage channels for most of the year, they can and do contain substantial flows during runoff events. Therefore, it would be important to adhere to construction guidelines and avoid disturbances within or near a channel’s inner gorge.

Full Development Alternative
Removal of 874 acres of vegetation would increase the potential for impacts to the watershed. The potential for indirect impacts to water quality would increased proportionately.

Cumulative long-term impacts to the watersheds as a result of surface disturbance would not be expected to be significant with implementation of erosion control measures. Table 6 lists the six watersheds affected by the Full Development alternative (92 new wells in addition to the seven existing wells). Approximately 747 acres of disturbance presently exists within the watersheds. Implementation of the Full Development alternative would increase the total soil disturbance by 525 acres or 0.007 percent (1,277 acres). Table 11 summarizes the cumulative disturbance by watershed (Map 5).

WATERSHED
Proposed Action
Any activity that would violate Wyoming ambient water quality standards and any violation of ED 11988 (floodplain protection) would be considered significant.

Forty additional wells (plus the seven existing wells) would remove a grand total of 571 acres of vegetation and would cause both short- and long-term impacts to the local watersheds. Following reclamation, a grand total of 276 acres would remain disturbed for the life of the field. Rates of wind and water erosion would increase above natural rates until reclamation of disturbed areas has proved successful. McMurry would comply with Wyoming DEQ storm water discharge requirements which would be expected to reduce potential impacts to the watershed.

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The area of disturbance within each of the delineated watersheds is small in comparison to the total area of each watershed. If the proposed disturbance were evenly dispersed over the entire watershed, there would be little concern over the cumulative impacts. However, because the activity would be concentrated in portions of the affected watersheds, there is potential to have a minor cumulative effect from well pads and roads within sub-watersheds. Based upon the mapped watersheds, sub-watersheds (Order 1 and 2) of Long Draw and Jonah Gulch appear to have the greatest potential for this to occur.

Many of the proposed well sites are located near ephemeral drainages. Although there is little to no flow in these drainage channels for most of the year, they can and do contain substantial flows during runoff events. Therefore, it would be important to adhere to construction guidelines and avoid disturbances within or near a channel’s inner gorge.

Full Development Alternative
Removal of 874 acres of vegetation would increase the potential for impacts to the watershed. The potential for indirect impacts to water quality would increased proportionately.

Cumulative long-term impacts to the watersheds as a result of surface disturbance would not be expected to be significant with implementation of erosion control measures. Table 6 lists the six watersheds affected by the Full Development alternative (92 new wells in addition to the seven existing wells). Approximately 747 acres of disturbance presently exists within the watersheds. Implementation of the Full Development alternative would increase the total soil disturbance by 525 acres or 0.007 percent (1,277 acres). Table 11 summarizes the cumulative disturbance by watershed (Map 5).

No Action Alternative
Implementation of the alternative would preclude further disturbance to the affected watersheds. Thus, no additional impacts would be expected.
Additional Mitigation Measures

No additional measures have been identified.

WATER QUALITY

Proposed Action
Any activity that would violate Wyoming ambient water quality standards and any violation of EO 11988 (floodplain protection) would be considered significant. Additionally, degradation of usable ground water to the point where it is no longer usable would also be considered significant.

No perennial streams flow through the project area; therefore, the Proposed Action would not cause any direct impact to water quality of a flowing stream. Indirect impacts to water quality could occur due to sedimentation and/or pollutants leaving disturbed areas and flowing into intermittent/ephemeral creek beds. However, McMurry would be required by the state to comply with Wyoming DEQ storm water run-off requirements. Thus, no impacts to surface water quality would be expected as long as Wyoming DEQ requirements are implemented.

The proposed casing and cementing program for the proposed natural gas wells would be designed to protect ground water quality. Surface casing and cement would be set to a depth of 2,500 feet, thereby isolating all fresh water (TDS less than 1,000 mg/l) zones. In addition, surface casing would isolate all fresh water-bearing ground water zones which may have surface water connection from the more saline waters or hydrocarbons. Production casing would be cemented from total depth back to 400 feet above the shallowest natural gas-bearing zone (approximately 7,000 feet for depth of top of cement). This would isolate hydrocarbons from all other water-bearing zones, which as stated in Chapter 2, contain water of varying water quality with TDS concentrations of 1,500 mg/l to possibly as high as 15,000 mg/l. The likelihood of mixing is not fully known although drilling to date has not resulted in any water flows. This is likely due to the low permeability of the Fort Union Formation sandstones found in this area which greatly restrict fluid flow.

Therefore, impact to fresh water would be negligible. These waters would be isolated from more saline waters and hydrocarbons. The higher TDS waters would not receive the same level of isolation and mixing of waters of various TDS concentrations might occur. The impact of this possible mixing is probably not significant.

The waters are deep and fairly brackish, and whether there would be a future need for their development is questionable. It is known that the sands are discrete units with a lateral extent on the order of from less than 0.5 miles to several miles, and the sands containing these waters are believed to be of low permeability, which could restrict or preclude water production.

Full Development Alternative

Impacts to surface water would be the same as described under the Proposed Action.

Provided the casing and cementing program remain the same for the Full Development alternative, no additional impact to fresh ground waters would be expected from this alternative. Impacts to deeper, more brackish waters could be increased as more boreholes would be drilled providing opportunity for increased mixing of deeper ground waters.

No Action Alternative

Implementation of this alternative would eliminate further potential impacts to surface water due to additional surface disturbance. However, existing surface disturbance could generate additional sedimentation to existing intermittent/ephemeral creekbeds if storm water prevention devices currently employed by McMurry fail; an unlikely event since the area is generally flat and existing well pads and access roads are not located adjacent to existing creekbeds. No additional impacts to ground water quality would be expected.

Additional Mitigation Measures

No additional measures have been identified.

WILDLIFE

Proposed Action
Any project-related activity that would result in a decrease in the ability to meet the 1987 antelope population objectives set by the Wyoming Game and Fish Department would be considered significant. Implementation of the Proposed Action would lead to an initial loss of approximately 500 acres of forage and cover over the life of the project. Approximately 280 acres would be reclaimed shortly after disturbance, leaving approximately 212 acres unclaimed for the duration of McMurry’s project if fully implemented.

The project area provides summer range and transitional range between summer and winter ranges for antelope. Antelope may temporarily vary their spring and fall migration to avoid drilling activities within the project area. However, once the drilling phase is completed, antelope should acclimate to operational activities. There could be increased potential for animal-vehicle collisions that could increase antelope mortality. Harassment of antelope by project workers could increase stress-induced mortality. Impacts are expected to be minor since only one drilling rig will be operating and antelope do not use this area year-round in large numbers.

Implementation of the Proposed Action could increase mortality of sage grouse due to potential loss of nesting sites and grouse - vehicle collisions. Also, drilling activities could impact winter range used by grouse although the amount of use during winter is unknown at this time. A survey conducted in the spring of 1994, found four sage grouse leks in and within 1 mile of the project area.

Seasonal restriction between February 1 and July 31 within a 2-mile radius of a lek have been applied to certain leases to protect sage grouse nesting habitat. Some leases also contain a no surface occupancy stipulation for areas within 0.25 miles of a lek to protect breeding activity. However, field experience has shown the exact lek area is subject to change over time and new leks appear on occasion.

During development of the Big Pinney-LaBarge Coordinated Activity Plan (CAP), the Pinedale Resource Area refined sage grouse protective measures. The CAP Decision Record states:

Sage grouse breeding habitat areas (strutting grounds or leks) are avoidance area for surface disturbing activities. That is, surface disturbing activities associated with such actions as well drilling, construction of roads, and other types of rights-of-way, etc., will avoid the areas within a ¼-mile radius of leks, if possible. In cases where it is not possible to avoid these areas, intensive mitigation of the surface disturbing activities will be emphasized.

Also within a ¼-mile radius of leks, permanent high profile structures, such as building, storage tanks, overhead powerlines, etc., will not be allowed.

During the sage grouse mating season, between March 1 and May 15, surface uses and activities will not be allowed between the hours of midnight and 9:00 AM, within a ½-mile radius of active leks (i.e., those leks occupied by mating birds).
Sage grouse nesting and wintering areas will be managed to maintain the improve nesting cover through shrub management practices.

If an occupied nest that would be adversely affected by surface disturbing activities is identified, surface uses and activities will be delayed in the affected area until nesting is completed (usually by June 30).

These measures should be employed in the Jonah Field in place of the standard lease stipulations, as they represent a more reasonable approach to sage grouse protection in developing oil and gas fields. As new leks appear, they will be documented by the BLM and the WGFD and managed under the above-stated mitigation.

Production facilities could act as perches for raptores hunting within the area and could lead to increased mortality of grouse and other small animals used as a food source. However, these impacts would be considered minor and should not cause unnecessary or undue impacts as these facilities will be located a minimum of 0.25 miles from any identified lek.

Some localized damage to small mammal and bird habitat is expected due to destruction of vegetation and surface disturbance. These impacts would be insignificant to the overall habitat available for these species. Localized burrowing animals would be killed during road, well pad, and pipeline construction.

Cumulative impacts to wildlife, particularly game species (i.e., antelope and sage grouse) would result from the addition of the Proposed Action to other direct and indirect impacts of past, present, and reasonable foreseeable developments.

Past developments exist in the form of roads (improved, unimproved, and trails). The closest oil and gas activity is approximately 15 miles southwest. No other development exists within a 15-mile radius of the proposed project area.

Total existing disturbance plus the added disturbance proposed by McMurry would result in 1,023 acres of antelope and sage grouse habitat loss over the life of the project. This represents 0.006 percent of the 196,800 acres within the affected watersheds. This loss would not be significant and population objectives can readily be met.

Reasonably foreseeable development includes the proposed Texaco Stagecoach Natural Gas Development project, south of Highway 28 (T. 24 N., R. 107 W.). This development, if it proceeds, embraces 23,575 acres. The Texaco project, coupled with the McMurry development, is not expected to affect antelope movements to and from crucial winter ranges. The two project areas are separated by 28 miles, and construction and drilling activity would be low (one drilling rig operating in the Jonah Field and most likely a similar level of development in the Texaco Stagecoach Field - although Texaco's final proposal has not yet been submitted to the BLM).

No significant cumulative adverse impact from reasonably foreseeable development is expected. Both the McMurry and Texaco projects are sufficiently removed from each other to not deter antelope movement. Habitat loss in either area would not affect maintenance of antelope population objectives.

Displacement of wildlife is a direct and indirect effect of construction, drilling, and field operations. Migratory herds such as antelope are particularly vulnerable to displacement. Areas of human activity and vehicle traffic cause animals to avoid using these areas when these activities are occurring. When these activities cease for a substantive period (two or more days), use may be reestablished.

Displacement would not be considered a significant concern with the McMurry or the Texaco developments. There is ample high quality habitat for antelope (and sage grouse) to use within the immediate project areas.

However, concern could develop if extensive development were to occur in the future between the Jonah Field, Stagecoach Field, and farther east of the Green River production areas.

Full Development Alternative

Implementation of the Full Development alternative would require total disturbance of 874 acres over the life of the project. Approximately 414 acres (includes 100 percent of pipelines) would be reclaimed shortly after disturbance leaving 460 acres disturbed over the life of the field. Impacts would be essentially the same for this alternative as the Proposed Action but drilling activities would occur over a longer period of time. The additional acres of disturbance could cause increased mortality to small mammal and birds living within construction zones.

Total existing disturbance plus the added disturbance by full development would result in 1,272 acres of antelope and sage grouse habitat loss over the life of the project. This represents 0.007 percent of the 196,800 acres within the affected watersheds.

Cumulative impacts would be expected to remain the same as described under the Proposed Action.

No Action Alternative

The No Action alternative would preclude additional development. Thus, further impacts to wildlife would not be expected. Chances of animal-vehicle collisions would remain at current levels.

Additional Mitigation Measures

Yearly surveys for occurrence of new sage grouse lek locations should be conducted. This survey would also determine if old leks are active.

Sage grouse breeding habitat areas should be avoidance areas for surface disturbing activities within a 0.25-mile radius of lek. Permanent and high profile structures such as buildings or storage tanks should not be allowed. During sage grouse mating season, March 1 and May 15, surface uses and activities should not be allowed between the hours of midnight and 9:00 AM, within 0.50-mile radius of an active lek. Yearly surveys should be conducted to determine active nesting sites and any surface uses and/or activities should be delayed in the affected area until nesting is complete (usually by June 30).

McMurry could set a speed limit policy for those employees working within the project area to prevent unnecessary collision with animals and birds.

The BLM should require the addition of native legumes seed to enhance grouse and antelope forage quality by providing an additional source of protein in their diets. This seed mix is listed under the Vegetation section.

WILD HORSES

Proposed Action

Implementation of the Proposed Action could potentially result in displacement of the existing wild horse bands from the project area during times of human activity. There could also be an increase in wild horse-vehicle collisions and an increase in potential for harassment of wild horses by project workers. Movement of wild horses across the resource area boundary could be of concern if the cattleguard(s) are not kept free of debris.
Full Development Alternative

Potential impacts to wild horses would be the same as the Proposed Action.

No Action Alternative

Potential impacts to wild horses would be the same as the Proposed Action.

Additional Mitigation Measures

McMurry should maintain all cattleguards within their transportation network on a frequent basis. This would ensure that wild horses do not migrate into the Pinedale Resource Area.

McMurry should add scarlet globemallow and needle to the seed mix (see Additional Mitigation Measures section under Vegetation).

THREATENED, ENDANGERED, CANDIDATE, AND SPECIAL STATUS SPECIES

Threatened and Endangered

Proposed Action and Full Development Alternatives

Black-Footed Ferrets - No populations of ferrets are expected to be found since no prairie dog towns occur within the project area. Therefore, a determination has been made that the Proposed Action or Full Development alternatives are not likely to adversely affect black-footed ferret.

Bald Eagles - No known or potential nest sites, diurnal perches, or nocturnal roost sites are within the project area. Wintering bald eagles feed primarily of carrion of big game and other wildlife; it is possible that they could suffer direct mortalities if struck by a vehicle while feeding. Drilling activities would be reduced during the winter months and there are no known wintering bald eagles in the area. Therefore, a determination has been made that the Proposed Action or Full Development alternatives are not likely to adversely affect the bald eagle.

Peregrine Falcon - No suitable nest sites occur in the project area that could be used by peregrine falcons, and the Green River migration corridor is located 20 miles to the west. Therefore, a determination has been made that the Proposed Action or Full Development alternatives are not likely to adversely affect the peregrine falcon.

Endangered Fish - Candidate Fish Species - Potential impacts to wild horses would be the same as the Proposed Action.

Listed Fish Species - Bonnetail chub, humpback chub, Colorado squawfish, and razorback sucker inhabit the Green River and Colorado River drainages in Utah and Colorado, located far downstream from the project area. These species prefer turbid conditions and it is highly unlikely that any of the alternatives would directly affect their habitat or survival.

However, McMurry will be withdrawing water from the Colorado River system which could indirectly impact their survival by depleting water that drains into the river system. To mitigate for water depletion, a one-time assessment of $12.34 per acre-foot of the average annual water used would be paid to the Natural Fish and Wildlife Foundation. The average annual water to be used is approximately 10.82 acre feet. Therefore McMurry would be required to pay $134 to the foundation. In light of this payment, a determination has been made that the Proposed Action or Full Development alternatives are not likely to adversely affect threatened or endangered fish species.

Candidate Species

Proposed Action and Full Development Alternatives

Ferruginous Hawk - The ferruginous hawks could be affected by the Proposed Action and Full Development alternatives as these hawks are common residents throughout the Rock Springs District. On-site evaluations would be necessary during the nesting period to detect occurrence, and seasonal restrictions between February 1 and July 31 would apply. Since on-site evaluations would be required and seasonal restrictions would apply if necessary, the Proposed Action or Full Development alternatives would not be likely to adversely affect ferruginous hawk.

Mountain Plover - Mountain plovers inhabit short grass prairies and where low vegetation has been maintained by grazing. They could use portions of the project area during migration and breeding. On-site evaluations would be necessary during nesting to detect their occurrence. If nests are discovered during on-site evaluations, efforts will be pursued to protect the nesting birds.

Long-Billed Curlew - Since curlews prefer wet-moist meadow grasslands and irrigated native meadows with aquatic areas nearby, there would be little potential for this species to occur in the project area. Therefore, a determination has been made that the Proposed Action or Full Development alternatives are not likely to adversely affect long-billed curlews.

Loggerhead Shrike - Since the shrike prefers to nest in trees or large shrubs, there could be some potential for this species to occur in the project area. On-site evaluations would be necessary during nesting to detect their occurrence. If nests are discovered during on-site evaluations, efforts will be pursued to protect the nesting birds.

Candidate Fish Species - There would be no direct impact on flannelmouth sucker or roundtail chub since the project area is located miles from any live stream or river. However, McMurry will be withdrawing water from the Colorado River system which could indirectly impact their survival by depleting water that drains into the river system. To mitigate for water depletion, McMurry will provide a one-time payment of approximately $134 to the Natural Fish and Wildlife Foundation.

No Action Alternative

The No Action alternative would preclude additional development. Thus, further impacts to threatened, endangered, or candidate species would not be expected. Chances of animal-vehicle collisions would remain at current levels.

Additional Mitigation Measures

The project proponents should cooperate with the BLM on a project area-wide survey during nesting periods to detect the occurrence of raptors, loggerhead shrikes, and mountain plover. Project activities should be scheduled to avoid impacts to nesting candidate species. Data collected should be submitted to USFWS for their review if these species are located during surveys.

To mitigate for water depletion, a one-time assessment of $134 would be paid to the Natural Fish and Wildlife Foundation.
Special Status Plants

Proposed Action and Full Development Alternatives

Destruction of Special Status Plants populations to the extent they become federally listed as threatened, endangered, or their candidate classification is up-listed would be considered significant. Although Cedar Rim thistle and Contracted Indian ricegrass have been located within the project area and some localized plant populations could be destroyed during construction activities, it is unlikely that these populations would be destroyed to the extent they would be listed as threatened, endangered, or the classification up-listed by the USFWS.

Surface disturbance due to construction and associated activities on or near Special Status Plant locations could destroy individual plant populations. Both short- and long-term use of plant habitat could decrease numbers, eliminate existing habitat, and remove potential habitat until final abandonment. Additional activity such as off-road vehicle use could prove detrimental to individual plant populations, especially if crushed repeatedly.

Airborne dust resulting from construction areas near Special Status Plant populations could impact these plants by reducing photosynthetic activity, leading to loss of the local population. Construction that affects drainage patterns could impact Special Status Plant species by altering habitat microenvironments. Application of herbicides to control noxious weeds in areas where Special Status Plant species are located could destroy them.

The increased potential of introducing hazardous materials into Special Status Plant habitat, either through spilling or illegal dumping, could damage and/or lead to the loss of plant populations, especially those populations located close to well pads, roads, other project components, or drainage structures.

Additional floristic inventories will be conducted by the BLM in cooperation with the University of Wyoming, Rocky Mountain Herbarium, and the Wyoming Natural Diversity Data Base during 1994-95 that will provide baseline distribution information for all species located within the project area. Site-specific Special Status Plant surveys often reveal previously unknown occurrences of Special Status Plant species. These clearance surveys will provide beneficial information about these plant species and their habitats. Should any Special Status Plant be found during these surveys, the BLM would coordinate with USFWS to determine appropriate mitigation.

Bastard Draba Milkvetch - This plant was not found during the 1993 Special Status Plant survey (Yellow Point Ridge area) conducted by the Wyoming Natural Diversity Data Base. All future site-specific Special Status Plant surveys would record occurrences of this C2 plant species, if found. Should this plant be found during surveys, avoidance would be the preferred mitigation. Therefore, a determination has been made that the Proposed Action or Full Development alternatives are not likely to adversely affect bastard draba milkvetch.

Cedar Rim Thistle - This plant was found during the 1993 Special Status Plant survey (Yellow Point Ridge area) conducted by the Wyoming Natural Diversity Data Base. It is endemic to the Fremont and Sublette Counties with only four known locations. All future site-specific Special Status Plant surveys would record occurrences of the C2 plant species. Should this plant be found during surveys, avoidance would be the preferred mitigation. Therefore, a determination has been made that the Proposed Action or Full Development alternatives are not likely to adversely affect Cedar Rim thistle.

Contracted Indian Ricegrass - This plant was found during the 1993 Special Status Plant survey conducted by the Wyoming Natural Diversity Data Base. This plant was found to be wide-spread throughout the project area. The USFWS has been petitioned to down-list this species from C2 to C3. In the interim, agreement to manage this plant as a C3 species was reached between Wyoming Natural Diversity Data Base and USFWS. Therefore, a determination has been made that the Proposed Action or Full Development alternatives are not likely to adversely affect contracted Indian ricegrass.

No Action Alternative

The No Action alternative would be the least destructive to Special Status Plant species within the project area. Further destruction of Special Status Plant or their habitats would not occur since construction or drilling activities would not take place. Nor would impacts from industrial related activities such as off-road vehicle use, hazardous material leaks or spills during construction occur. Use of herbicides or illegal dumping of hazardous materials could take place, as could crushing of populations by off-road vehicle use.

Additional Mitigation Measures

Because Cedar Rim thistle is known to occur within the project area and because there is potential for the bastard draba milkvetch to occur, site-specific clearance surveys would be conducted for these species where surface disturbance activities are proposed within their potential habitat. Contracted Indian ricegrass occurrence will be noted during these surveys. C1 and C2 species should be avoided as much as possible during project development. Avoidance may include reducing size of a project component (partial avoidance), or relocation of a project component to the less environmentally sensitive area within reason.

Should Special Status Plant species be located during these surveys on or near surface disturbing projects, the BLM would require implementation of the following mitigation measures as appropriate, to reduce or alleviate the severity of impacts to Special Status Plant species:

- Reasonable relocation of well pads, roads, or pipelines to areas where plants are less abundant;
- Above-ground placement of pipelines to avoid disturbance to plant populations, depending upon species;
- Restriction of construction traffic to existing roads in accordance with the transportation plan;
- On-site monitoring by the survey botanist and authorized BLM officer to avoid or lessen impacts to Special Status Plant populations;
- Fencing or flagging of Special Status Plant populations so they would be avoided during construction or other activity.
- All survey reports and recommendations for avoidance or other mitigation should be evaluated and approved by the BLM botanist or Special Status Plant Coordinator (PRA) prior to construction activity.

RESIDUAL IMPACTS

Proposed Action

Approximately 212 acres would be disturbed over the life of the project. No irreversible or irrevocable commitment of surface resources would occur. Natural gas reserves would be depleted but this would not be considered an adverse impact.

Full Development Alternative

Approximately 460 acres would remain disturbed over the life of the project. Other impacts would be similar to the Proposed Action but to a greater extent.

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No Action Alternative

Revenues collected by federal, state, and local governments would not occur. Natural gas reserves would not be depleted nor would further surface disturbance occur.
CHAPTER V - CONSULTATION AND COORDINATION

In November 1993, the BLM Pinedale Resource Area issued a notice announcing plans to begin an environmental analysis of McMurry Oil Company’s proposed Jonah Prospect Field natural gas development project. Issues and concerns identified by agencies and the general public have been addressed as appropriate in the environmental assessment. Individuals were contacted with the U.S. Fish and Wildlife Service, Environmental Protection Agency, and Wyoming Department of Environmental Quality for information, clarification, or other reasons throughout preparation of the environmental assessment.

This environmental assessment was prepared by specialists from the Pinedale Resource Area, Green River Resource Area, and the Rock Springs District Office (Table 12).

### TABLE 12
**LIST OF PREPARERS AND REVIEWERS**

<table>
<thead>
<tr>
<th>Preparer</th>
<th>Agency/Office</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teresa Deakins</td>
<td>BLM, Rock Springs District</td>
<td>Project Coordination/ Overall Document Preparation</td>
</tr>
<tr>
<td>Bill McMahan</td>
<td>BLM, Rock Springs District</td>
<td>Project Reviewer/ Document Preparation</td>
</tr>
<tr>
<td>Tom Curry</td>
<td>BLM, Pinedale Resource Area</td>
<td>Reclamation/ Document Preparation</td>
</tr>
<tr>
<td>Angelena Pryich</td>
<td>BLM, Rock Springs District</td>
<td>Editing</td>
</tr>
<tr>
<td>John MacDonald</td>
<td>BLM, Rock Springs District</td>
<td>Soils</td>
</tr>
<tr>
<td>Barbara Amidon</td>
<td>BLM, Rock Springs District</td>
<td>Vegetation/Special Status Plants</td>
</tr>
<tr>
<td>Steve Laster</td>
<td>BLM, Pinedale Resource Area</td>
<td>Special Status Plants/Livestock Grazing</td>
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<tr>
<td>Bob McCarty</td>
<td>BLM, Pinedale Resource Area</td>
<td>Wildlife, Threatened/ Endangered Species</td>
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<td>Allen White</td>
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<tr>
<td>Dave Vrcek</td>
<td>BLM, Pinedale Resource Area</td>
<td>Cultural Resources</td>
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<tr>
<td>Ramsey Bentley</td>
<td>BLM, Pinedale Resource Area</td>
<td>Water Quality/ Paleontology</td>
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<tr>
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<td>Drilling/Operations</td>
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<tr>
<td>Don Judice</td>
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<td>Jim Perkins</td>
<td>BLM, Green River Resource Area</td>
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<tr>
<td>Thor Stephenson</td>
<td>BLM, Green River Resource Area</td>
<td>Wild Horses</td>
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<tr>
<td>Dennis Doncaster</td>
<td>BLM, Rock Springs District</td>
<td>Watershed Review</td>
</tr>
<tr>
<td>Arlan Hiner</td>
<td>BLM, Pinedale Resource Area</td>
<td>Area Manager/ Project Coordination</td>
</tr>
<tr>
<td>Bill LeBaron</td>
<td>BLM, Green River Resource Area</td>
<td>Area Manager/ Project Coordination</td>
</tr>
<tr>
<td>Ralph Herbert</td>
<td>McMurry Oil Company</td>
<td>Consultant</td>
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REFERENCES

Amidon, Barbara, et al. April 1994. Personal communication between Barbara Amidon (BLM Botanist), (Steve Brocich, USFWS Biologist), and Walter Fertig (Botanist, WNDDB).


Herbert, Ralph, April 1994, Botanist, WNDDB, personal communication.


Dear Reviewer,

The enclosed document serves as notice of the beginning of the environmental analysis process to fulfill the requirements of the National Environmental Policy Act (NEPA). If you are interested in participating in this process, we request you respond by supplying us with your written comments or concerns by December 10, 1993.

All comments and/or concerns received in response to this scoping notice will aid the Bureau of Land Management in identifying alternatives and assuring all issues are analyzed in the environmental analysis process. If you respond to this request, we will keep you informed of all decisions resulting from the analysis.

Please submit your responses to:

Arian Hiner, Area Manager
Pinedale Resource Area
Bureau of Land Management
P.O. Box 768
432 East Mill Street
Pinedale, WY 82941-0768

If you have any questions concerning the NEPA process, please feel free to contact Arian Hiner or Tom Curry at 307-367-4358.

Sincerely,

[Signature]

Area Manager

Enclosure
**SCOPING NOTICE**

**MCMURRY OIL COMPANY**

**JONAH FEDERAL FIELD DEVELOPMENT PROJECT**

Bureau of Land Management

Rock Springs District

Pinedale Resource Area

**DESCRIPTION OF PROPOSAL**

McMurry Oil Company has notified the Bureau of Land Management (BLM), Pinedale Resource Area, of proposed plans to develop their oil and gas leases within the Jonah Field. The area of proposed development encompasses approximately 16,840 acres. This field has not been utilized.

The Jonah Federal Field is located in the southern portion of Sublette County, Wyoming, approximately 32 miles southeast of Pinedale, 28 miles northwest of Faron, and about 6 miles west of Highway 191 at mile marker 67 (See Map). Drilling is proposed in Townships 28 and 29 North, Ranges 108 and 109 West, 6th Principal Meridian. About 6,000 acres (36%) of the proposed field are located in the District's Green River Resource area (GRR). Access to the field is from U.S. Highway 191 and BLM roads via existing right-of-way.

McMurry's plans include drilling up to 40 natural gas wells to the Cretaceous Lance Formation at depths to 12,000 feet. The field currently consists of seven wells on five leases. Four wells were drilled in 1993 to confirm the discovery of gas in the area. The proposed action will include a drilling program on 160-acre spacing (4 wells per section). Currently, a 9.5-mile, 4-inch surface gas line and compressor station transports gas produced from the existing wells to an existing pipeline operated by Meridian Pipeline Company.

The planned development would include the following associated facilities:

- On each well location - an individual separator, dehydrator, and production tanks.
- To each well location - an access road, and a 3- to 4-inch gas line which parallels the access road.
- Gas transmission pipeline - two supplemental 8-inch natural gas pipelines, one going north paralleling the existing 4-inch surface line and the other going west about 22 miles to tie in to an existing pipeline in Sec. 4, T. 27 N., R. 111 W.
- A larger compressor station.
- A sand or gravel source.
- A field office and yard.

McMurry proposes to drill eight (8) wells per year over five (5) years. The BLM may consider authorizing additional wells while the environmental document is being prepared if there is no potential for significant impacts and BLM's ultimate decision would not be compromised.

**RELATIONSHIP TO LAND USE PLANS AND OTHER ENVIRONMENTAL DOCUMENTS**

Pinedale Resource Management Plan Environmental Impact Statement and Record of Decision (RMP/EIS/ROD) (1988), and Big Sandy Management Framework Plan (MFP) (1982) - McMurry's proposed project would take place within the area covered by the Pinedale RMP/EIS/ROD and the Big Sandy MFP. The Pinedale RMP and Big Sandy MFP provide land use guidance for development of oil and gas reserves within this area. The proposed development is in conformance with the guidance provided by both plans. The environmental analysis will incorporate relevant provisions from both plans.

Green River Resource Management Plan and Draft Environmental Impact Statement (RMP/DEIS) (1992) - The Green River RMP/DEIS provides proposed guidance and current data on oil and gas development within the Green River Resource Area, including projections on reasonably foreseeable development. It would be used to the extent the information is appropriate, including as a benchmark for the No Action Alternative (i.e., current management).

Big Sandy/Salt Wells Oil and Gas Environmental Assessment (EA) (1988) - This EA may be referenced, although some or most of the information has been updated and included in the Green River RMP/DEIS.

Big Pines/LaBarge Coordinated Activity Plan Environmental Assessment and Decision Record (CAP/EA/ROD) (1991) - While the proposed development does not occur within the CAP area, the CAP analyzes natural gas drilling activity at an 80-acre spacing and contains pertinent information regarding management considerations for minerals development and operations, soils and watersheds, air quality, transportation, rights-of-way, reclamation and monitoring, socioeconomic impacts, and construction and reclamation guidance that would apply to this project area.

Lessees Stipulations - Most of the leases within the unit include special stipulations for occupancy. These are in addition to the standard lease terms. These stipulations are designed to protect surface resources such as soils, water, sheep lambing, and wildlife by restricting periods of activity and/or areas of disturbance.

Use Authorizations - All facilities located off-lease or beyond the gas metering point(s) would require a right-of-way under the proper authority. If the field becomes utilized, individual roads, pipelines, and ancillary facilities within the unit would be authorized by survey notice instead of right-of-way.

**COMPLIANCE WITH THE NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)**

McMurry's proposed development is subject to the appropriate level of environmental analysis. To comply with NEPA and the Council on Environmental Quality regulations which implement NEPA, the BLM is required to conduct an environmental analysis. The environmental document will serve two purposes: first, it will provide the public and government agencies with information about the environmental consequences of the proposed action and alternatives; and second, it will allow the public and various agency officials to evaluate the significance of the environmental consequences of the proposed action and alternatives.

Public input is important in establishing the scope of the analysis. At this time the BLM feels that an environmental assessment will be sufficient. However, if scoping comments identify resource issues that could be significantly affected by the proposed development, an environmental impact statement would be required. The BLM encourages public participation in this environmental process.

**LAND AND RESOURCE MANAGEMENT ISSUES AND CONCERNS**

An interdisciplinary team of resource specialists will be involved in the analysis of the environmental impacts of the proposed action. This team will include a wildlife biologist, range conservationist, surface and groundwater hydrologist, cultural/historic specialist, soils/reclamation specialist, and petroleum and civil engineers. The need for other resource specialists, including specialists from outside agencies, will be determined upon final
review of public, state, and other federal agency response to this scoping
notice.
Land and resource management issues and concerns that the BLN has identified
as potentially associated with McMurry's proposed field development, and which
would be analyzed in detail in the environmental analysis, are as follows:
0 Potential impacts to nesting raptors.
0 Sensitive and threatened/endangered species (plant and animal).
0 Potential impacts of sage grouse breeding and nesting habitat.
0 Potential impacts to Sublette antelope migration.
0 Increased traffic and associated impacts on U.S. & State highways.
0 Revegetation and restoration of short-term disturbances and long-term
stabilization, and control of noxious weeds.
0 Potential conflicts with livestock and range improvements.
0 Compatibility with management plans and objectives.
0 Potential impacts on cultural resources.
0 Potential impacts to surface and groundwater resources.
0 Increased public access and road density.
0 Social and economic affects to the local communities.
0 Cumulative impacts - from McMurry's proposal added to other energy-
related activities that are on-going or planned in the vicinity of
the Jonah Federal Field area.

PUBLIC PARTICIPATION

To assure that concerns are adequately evaluated in the analysis, the BLN is
requesting public input. Your comments, questions, or concerns are
encouraged. Comments should be received by December 10, 1993. Please submit
your comments as specified in the cover letter.

The scoping notice initial mailing distribution includes the following
agencies, individuals, industries, organizations, and media:

Government Offices
Bureau of Land Management, Wyoming State Office (910, 912, 920, 934)
Bureau of Land Management, Green River Resource Area
Bureau of Mines
Bureau of Reclamation, Upper Colorado Region
U.S. Fish and Wildlife Service, Seedskadee Wildlife Refuge
U.S. Fish and Wildlife Service
Environmental Protection Agency, Region VIII
Minerals Management Service
National Park Service, Rocky Mountain Regional Director
U.S. Department of the Army, Corps of Engineers
U.S. Soil Conservation Service, Farson Office
Wyoming State Cleargrounds
Wyoming Department of Environmental Quality
Wyoming Oil and Gas Conservation Commission
Wyoming Game and Fish Department (Cheyenne, Green River)

Elected Officials
Mayor of Rock Springs
Mayor of Green River
Mayor of LaBarge
Mayor of Pinedale
Mayor of Big Piney
Mayor of Marbleton
Postmaster, Farson
State Senators: Mark Harris, Carl Maldonado, Frank Prevedel
State Representatives: Sam Blackwell, Chris Boswell, Elvin McGrew,
Bud Nelson, Louise Ryckman, Ray Sarcoletti, Louie Tombali
Sublette County Commissioners
Sublette County Libraries, Big Piney, Pinedale
U.S. Senator Malcolm Wallop, Billes Jalouchan, Pam Redfield,
Representatives
U.S. Senator Alan K. Simpson, Lyn Shanaghy, Representative
U.S. Congressman Craig Thomas, Pati Smith, Representative

Public Land Users and User Groups

Multiple Use Advisory Council, Rock Springs District
Green River Cattlemen's Association
Affected Grazing Permits in Desert Common allottment: South Desert
Pasture, and the Sand Draw Pasture; Stud Horse Butte Allotment; H.W.
Squarestop Allotment
Rock Springs Grazing Association
Affected Grazing Permits in the Highway Gasson, Big Sandy, 18-
Mile, Lomard Allotments
Petroleum Association of Wyoming
Rocky Mountain Oil and Gas Association (RNOSA)
Shoshone-Arapahoe Joint Tribal Council
Sierra Club, Northern Plains Representative
Southwest Wyoming Industrial Association
Wilderness Society
National Wildlife Federation
Wyoming Wildlife Federation
Wyoming Association of Professional Archaeologists
Wyoming Mining Association
Wyoming Outdoor Council
Wyoming Public Lands Council

Newspapers
Pinedale Roundup
R owna Gazette
Rock Springs Daily Rocket-Miner
Casper Star-Tribune
Green River Star
Wyoming State Journal
Uinta County Herald

Radio Stations
KERV - Afton
KQSW/KKEX - Rock Springs
KEIT - Rock Springs
KUGR - Green River
KVCY - Rock Springs
KMER - Kemmerer

Television Stations
KTWQ-TV - Casper
KCHW-TV - Casper
KPFN-TV - Casper
KQMC-TV - Casper
Sweetwater Television
MEMORANDUM

To: Area Manager, Pinedale Resource Area, BLM, Pinedale, WY

From: Field Supervisor, ES, Cheyenne, WY (ES-61411)

Subject: Jonah Federal Field Lease Development Project

This responds to the scoping statement received by this office on November 12, regarding the subject proposal. I have concerns with the following issues, and they receive full treatment in the analysis of this project.

1. Endangered Species: In accordance with Section 7(c) of the Endangered Species Act of 1973, as amended (ESA), the following threatened or endangered (T/E) species may be present in the project area.

<table>
<thead>
<tr>
<th>Species</th>
<th>Status</th>
<th>Expected Occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black-footed ferret</td>
<td>Endangered</td>
<td>Potential resident in prairie dog (Cynomys sp.) colonies.</td>
</tr>
<tr>
<td>Bald eagle</td>
<td>Endangered</td>
<td>Migrant.</td>
</tr>
<tr>
<td>Peregrine falcon</td>
<td>Endangered</td>
<td>Migrant.</td>
</tr>
</tbody>
</table>

If your proposed action will lead to water depletion (consumption) in the Colorado River System, you should include the following species in your evaluation:

<table>
<thead>
<tr>
<th>Species</th>
<th>Status</th>
<th>Expected Occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colorado squawfish</td>
<td>Endangered</td>
<td>Downstream resident of Green River System.</td>
</tr>
<tr>
<td>Humpback chub</td>
<td>Endangered</td>
<td>*</td>
</tr>
<tr>
<td>Bonynail Chub</td>
<td>Endangered</td>
<td>*</td>
</tr>
</tbody>
</table>

Razorback sucker
(Krauschen taxanus) Endangered

Candidate species that may occur within the project area are identified below. Many Federal agencies have policies to protect candidate species from further population declines. Our office would appreciate receiving any information available on the status of these species in or near the project area.

<table>
<thead>
<tr>
<th>Category</th>
<th>Expected Occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birds</td>
<td></td>
</tr>
<tr>
<td>Ferruginous hawk</td>
<td>2 Grasslands statewide</td>
</tr>
<tr>
<td>Burro regalis</td>
<td></td>
</tr>
<tr>
<td>Mountain plover</td>
<td>1 Grasslands statewide</td>
</tr>
<tr>
<td>Charadrius montanus</td>
<td></td>
</tr>
<tr>
<td>Long-billed curlew</td>
<td>3C Grasslands/wetlands</td>
</tr>
<tr>
<td>Numenius americanus</td>
<td></td>
</tr>
<tr>
<td>Loggerhead shrike</td>
<td>2 Woodlands/shrublands</td>
</tr>
<tr>
<td>Lanius ludovicianus</td>
<td></td>
</tr>
<tr>
<td>Fish</td>
<td></td>
</tr>
<tr>
<td>Flannelmouth sucker</td>
<td>2 Green &amp; Little Snake Rivers &amp; trib.</td>
</tr>
<tr>
<td>Catostomus latipinnis</td>
<td></td>
</tr>
<tr>
<td>Roundtail chub</td>
<td>2 Green &amp; Little Snake River drainages</td>
</tr>
<tr>
<td>Gila robusta</td>
<td></td>
</tr>
</tbody>
</table>

Plants
Bastard draba milkvetch
(Astragalus drabiflora) Endangered

*1 = Federal T/E listing appears appropriate and is anticipated. 2 = Current data insufficient to support listing. 3C = More widespread or abundant than previously believed, or no immediate threat identified.

2. Wetland Impacts: I am concerned that wetlands may be impacted by the proposed project. In meeting its responsibilities for wetland protection and conservation, the Bureau must assure that proposed activities do not result in the taking of any Federal trust wildlife resources nor lead to the contamination of other water sources. Action should be taken to avoid or mitigate any wetland losses in accordance with Section 404 of the Clean Water Act, the Fish and Wildlife Coordination Act, Executive Order 11990 (wetland protection) and Executive Order 11988 (floodplain management). If wetlands may be impacted by the proposed action, those wetlands in the project area should be inventoried and fully described in terms of functions and values. Acreage of wetlands, by type, should be disclosed and specific actions outlined to avoid, minimize, and compensate for unavoidable wetland impacts.
This office recommends that you request assistance from the U.S. Army Corps of Engineers to determine whether a Section 404 Clean Water Act permit will be required for the proposed work. Under Section 404(b)(1) guidelines of the Clean Water Act, the analysis should describe alternative actions which avoid, minimize, and compensate for unavoidable wetland impacts. The Service will participate in review of any application for a Section 404 permit. I advise early consultation with the Service and other appropriate agencies on wetland matters. If wetlands are involved but the Corps determines that an individual permit is not required, you should ensure that the intent of Section 404 of the Clean Water Act is met. Wetland issues should be disclosed and addressed in the analysis even if a Section 404 permit is not required.

3. Water Quality/Habitat Quality: I am concerned with water quality impacts of the proposed project, particularly with respect to their effects on fisheries, migratory birds, and Federally listed threatened or endangered species. The analysis should describe project activities that may affect water quality or that have the potential to expose fish and wildlife to hazardous substances. Such activities may include, but are not limited to: wastewater discharges, transportation of hazardous materials, spills, evaporation ponds, and water pits. Since selenium is a commonly detected trace element in Wyoming and has been detected in varying concentrations in ground and surface waters and soils, the analysis should assess, if appropriate, the project’s potential to mobilize selenium and cause bioaccumulation in the food chain.

4. Fish and Wildlife: Short-term and long-term impacts of the proposed project on fish and wildlife and their habitats should be given full treatment in the analysis. In addition to assessing impacts to T/E and candidate species, the analysis should address impacts to nesting raptors and other migratory birds. We also recommend that future analyses include requirements that water pits be netted to reduce bird losses associated with oiling and other toxic affects.

5. Section 7 Responsibilities: Section 7(c) of ESA requires that Federal agencies proposing major construction actions complete a biological assessment to determine the effects of the proposed actions on listed and proposed species. If a biological assessment is not required (i.e., all other actions), the lead agency is responsible for review of proposed activities to determine whether listed species will be affected. I would appreciate the opportunity to review your determination document.

For those actions where a biological assessment is necessary, it should be completed within 180 days of initiation, but can be extended by mutual agreement between your agency and the Fish and Wildlife Service (Service). If the assessment is not initiated within 90 days, the list of T/E species should be verified with this office prior to initiation of the assessment. The biological assessment may be undertaken as part of the agency’s compliance of Section 102 of the National Environmental Policy Act (NEPA), and incorporated into the NEPA documents. The Service recommends that biological assessments include:

1. a description of the project;
2. a description of the specific area potentially affected by the action;
3. the current status, habitat use, and behavior of T/E species in the project area;
4. discussion of the methods used to determine the information in item 3;
5. direct and indirect impacts of the project to T/E species;
6. an analysis of the effects of the action on listed and proposed species and their
   habitats including cumulative impacts from Federal, State, or private projects in the
   area;
7. coordination measures that will reduce/eliminate adverse impacts to T/E species;
8. the expected status of T/E species in the future (short and long term) during and
   after project completion;
9. determination of "is likely to adversely affect" or "is not likely to adversely affect"
   for listed species;
10. determination of "is likely to jeopardize" or "is not likely to jeopardize" for
    proposed species;
11. citation of literature and personal contacts used in assessment.

If it is determined that any agency program or project "is likely to adversely affect" any
listed species, formal consultation should be initiated with this office. If it is concluded that
the project "is not likely to adversely affect" listed species, I should be asked to review the
assessment and concur with the determination of no adverse effect.

A Federal agency may designate a non-Federal representative to conduct informal
consultation or prepare biological assessments. However, the ultimate responsibility for
Section 7 compliance remains with the Federal agency, and written notice should be
provided to the Service upon such a designation. I recommend that Federal agencies provide
their non-Federal representatives with proper guidance and oversight during preparation of
biological assessments and evaluation of potential impacts to listed species.

Section 7(d) of ESA requires that the Federal agency and permit or license applicant shall not
make any irreversible or irretrievable commitment of resources which would preclude
the formulation of reasonable and prudent alternatives until consultation on listed species is
completed.

These preliminary scoping comments are made pursuant to the National Environmental
Policy Act, the Endangered Species Act and Fish and Wildlife Coordination Act. Please keep
this office informed of any developments or decisions concerning this project. If you have
any questions, please contact me or Mike Jennings of my staff at the letterhead address or
phone (307)772-2374.

Charles P. Davis

cc: Director, WGFD, Cheyenne, WY
    Nongame Coordinator, WGFD, Lander, WY
APPENDIX A

GENERAL STANDARD OPERATING PROCEDURES FOR SURFACE-DISTURBING ACTIVITIES

The following are general standard operating procedures applied to surface-disturbing activities. These measures are applied, when necessary, to reduce environmental impacts. Some projects may require construction and use plans (CUP) and/or erosion control revegetation and restoration plans (ERRPs). These situations will also require a site specific environmental analysis to address impacts and appropriate mitigation measures.

HANDLING OF TOPSOIL AND Spoil

Before a surface disturbing activity is authorized, the amount of topsoil to be removed and storage areas will be specified. The need to strip topsoil along buried pipelines, or other buried linear facilities, will be determined on a site specific basis. The general policy will be to strip topsoil unless it can be shown that the specific operations will not negatively impact soil compaction, stability, or fertility. Topsoil in excess of six inches may be stored. If it is available, so that it may be used offsite in areas that do not have adequate topsoil. Areas which have stored topsoil will be marked for use as borrow areas for other areas deficient in topsoil. Whenever possible, topsoil will be used for immediate reclamation. For topsoil stockpiles that are to be kept through the winter, erosion will be controlled by reducing the piles to less than 3 feet in height and by seeding and/or mulching them.

Topsoil stockpiles will be designed to maximize surface area to reduce impacts to soil microorganisms. All surface vegetation will be incorporated directly into the topsoil as organic matter and seed source unless brush is required to be handled separately.

For pipelines on slopes less than 10 percent, a minimum of six inches of topsoil will be stripped from the trench and spoil storage side and placed into a berm by side casting with a grader. For pipelines that are less than 9 inches in diameter, topsoil will not normally be stripped from the working side of the trench.

After the pipe is installed and the spoil material has been compacted back into the trench, topsoil will be spread over the spoil storage and pit area, water bars installed, and reseeding. Care must be taken to not block drainage ditches.

For roads on slopes of less than 10%, available topsoil will be stripped from the construction area and placed in berms by sidecasting with a grader. After access construction, the topsoil will then be spread back onto the road outslopes and cut slopes.

CONSTRUCTION, MAINTENANCE AND RECLAMATION OF ROADS

Recognized roads, as shown on the Rock Springs District Office Transportation Plan, will be used when the alignment is acceptable for the proposed use. Generally, roads will be required to follow natural contours; be constructed in accordance with standards as described in BLM Road Standards and BLM Manual section 9113; and be reclaimed to BLM standards.

Access roads will be constructed to the standard necessary to accommodate their intended functions. All roads in the oil field will be treated as "all weather roads." Unless the road sub grade material has enough gravel in it as determined by the authorized officer (AO) all "all weather roads" will be graveled with 2 inch pit run or crushed gravel. All roads constructed by non-government entities across public lands must be designed by or under the direction of a licensed professional engineer. The engineer must certify that the road was built as designed. Soil compaction is required during road construction and culvert installation.

Authorized users are responsible for preventative and corrective road maintenance on all roads associated with field operations. This includes crowning, cleaning ditches and drainage facilities, culvert installation, graveling, dust abatement, or other requirements as directed by the AO.

Riprap will be required at the inlet and outlet of all culvert installations. The minimum size will be determined by the AO's representative.
APPENDIX A

Surface runoff and sedimentation control will be incorporated in all access road design in accordance with BLM Manual 9113 guidelines and installed as approved by the A.O. Road grades, ditches, culverts, sediment traps, material cut and fill, and topsoil and spoil areas will be designed and located in the field prior to construction.

Access road culvert location and spacing will be approved by the AO using BLM Road Standards Manual 9113 Illustration 9 "Recommended Spacing for Lateral Drainage Culverts in Various Soil Types", shown below. The culvert spacing shown in feet under the erosion index of 10 to 40 will be used.

Spacing for Drainage L laterals

Recommended Spacing for Lateral Drainage Culverts

in Various Soil Types*

<table>
<thead>
<tr>
<th>Soil Types</th>
<th>EROSION INDEX</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Silty sands, sand-silt mixtures, inorganic silts and very fine sands</td>
<td>X</td>
</tr>
<tr>
<td>Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts, organic silts and organic silty clays or low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays</td>
<td>X</td>
</tr>
</tbody>
</table>

*Unified Soil Classification

To control or reduce sediment from roads, guidance involving proper road placement and buffer strips to stream channels, grading, proper drainage, seasonal closure, and in some cases, redesign or closure of old roads will be developed when necessary.

On newly constructed roads and permanent roads, the placement of topsoil, seeding, and stabilization will be required on all cut and fill slopes unless conditions prohibit this (e.g., rock). No unnecessary side-casting of material (e.g., maintenance) on steep slopes will be allowed.

Snow removal plans may be required for access which have winter use so that snow removal does not adversely affect drainage systems, reclamation efforts, or other resources adjacent to the road.

Reclamation of abandoned roads will include reshaping, contouring, resurfacing with topsoil, installation of water bars, and drill seeding on the contour. The removal of structures such as bridges, culvert catleguards, and signs usually will be required. Stripo spoil vegetation will be spread over the disturbance for nutrient recycling, where practical. Fertilization or fencing these disturbances will not normally be required. Additional erosion control measures (e.g., fiber matting) and road barriers to discourage travel may be required.

CONSTRUCTION OF WELL PADS AND FACILITIES

Prior to construction, the proposed pad location will be surveyed and staked and all erosion control design considerations will be reviewed (See Operating Order #1 for required engineering and design information).

The well pads will be laid out so that they are parallel to the contour and the pit is uphill whenever possible (H2S wells may require an exception).

The drill pads will be designed and constructed to disturb the smallest practicable area that will still provide for efficient and safe operations.

All cut and fill slopes will be staked out at least every 50' on slopes with greater than 3' cut and/or fill to identify where topsoil will be removed. Spoil storage areas also must be staked so topsoil can be stripped and stored prior to any other dirt work. All cut and fill work will be balanced to minimize excess spoil material required during pad construction.

If excess spoil exists it will have to be incorporated into the fill pad slope by compacting the spoil in six inch lifts using water and rubber tire vehicles and/or sheep's foot rollers or placed in designated areas and stabilized. The areas of the pad that will support the drill rig and any other heavy equipment will be compacted.

All precautions necessary to stabilize structures will be taken during construction.

During the construction phase, interceptor ditches will be installed above the cut, where necessary. Collector ditches and sediment control structures, designed for a 10-year/24 hour event, may be required below the fill. Water, with a flow less than the 10-year/24 hour storm event, will be diverted and/or collected before being discharged from the disturbed area.

Qualified supervision will be provided during the installation of all erosion control structures including the construction of berms, dikes, trenches and the outslope fill.

CONSTRUCTION AND RECLAMATION OF PIPELINES AND COMMUNICATION LINES

Existing crowned and ditched roads will be used for access where practical to minimize surface disturbances. Pipelines are to follow new or existing roads or existing buried pipelines where it is practical. The pipeline trenches will not be placed in the access road borrow ditches unless no other reasonable alternative is available.

Generally, pipelines will be laid on the surface when slopes are over 25 percent and where rock outcrops are crossed. When possible pipelines should be built perpendicular to the contour in order to minimize the amount of area required for construction.
Clearing of pipeline and communication line rights-of-way will be accomplished with the least degree of disturbance to topsoil. Vegetation removed from the right-of-way will also be required to be spread to provide protection, nutrient recycling, and a natural seed source.

To promote soil stability, the compaction of spoil material free of vegetative material back into pipeline trenches following each lift replacement. The first lift should be 18" deep to reduce the chance of puncturing the pipeline. The rest of the lifts should be 8" deep or less. The soil berm above the pipeline trench shall not settle below the original ground surface or rise any more than 3" above it. Any areas that do not meet this requirement will have to be brought in compliance and reseeded. Water bars, mulching, and terracing will be required, as needed, to minimize erosion. Instream protection structures (e.g., drop structures) may be required in drainages crossed by the pipeline. The rest of the pipeline will be accomplished with temporary cut and fill slopes with adjacent undisturbed areas while minimizing slope length, improving stability, reducing runoff, and decreasing erosion. Grading will provide for uniform distribution of spoil and topsoil. Grading will be used to implement one or more of the following specialized techniques: slope rounding, bench grading, stair-step grading, contour furrowing, and berm placement on top of cut or fill slopes.

Snow fences, placed to increase snowfall depth over a reclaimed area, and reshaping to create shallow depressions (to catch surface runoff) may be required in areas receiving 10 inches or less of annual precipitation.

If environmental analysis or monitoring identifies the specific need, well sites and sensitive areas along linear rights-of-way will be fenced to protect the revegetated areas from damage by domestic and wild animals and off-road vehicles.

If linear facilities follow the same right-of-way for all or part of the route, they will generally be required to be constructed so that only one reclamation effort is required. Generally, they will be required to be constructed either concurrently or during the same field season.

AppE 1 ia

Grading may be required to improve steep, long, or rough slopes in preparation for seed bed manipulations and planting.

In particular, grading will be used to blend cut-and-fill slopes with adjacent undisturbed areas while minimizing slope length, improving stability, reducing runoff, and decreasing erosion. Grading will provide for uniform distribution of spoil and topsoil. Grading will be used to implement one or more of the following specialized techniques: slope rounding, bench grading, stair-step grading, contour furrowing, and berm placement on top of cut or fill slopes.

Snow fences, placed to increase snowfall depth over a reclaimed area, and reshaping to create shallow depressions (to catch surface runoff) may be required in areas receiving 10 inches or less of annual precipitation.

If environmental analysis or monitoring identifies the specific need, well sites and sensitive areas along linear rights-of-way will be fenced to protect the revegetated areas from damage by domestic and wild animals and off-road vehicle use. All fences will be built in accordance with the BLM fencing manual and Wyoming State Laws on legal fencing in effect at the time of reclamation. Fences will be kept in a usable condition until reclamation has been approved by the authorized officer. After reclamation has been approved and the fences have been removed, the authorized officer can then release the operator or grantee from any further liability.

Off-road vehicle barriers will be installed, where necessary, and will consist of boulders, pylons, brush piles of other feasible barriers as required on a site-specific basis.

Seeding

On all areas to be reclaimed, seed mixtures will be required to be site-specific and will be required to include species promoting soil stability. Livestock palatability and wildlife habitat needs will be given consideration in seed mix formation. Interseeding, secondary seeding, or staggered seeding may be required to accomplish revegetation objectives. During rehabilitation of areas in important wildlife habitat, provision will be made for the establishment of native browse and forb species, if determined to be beneficial for the habitat affected.

Topsoil will be distributed uniformly on the area to be reclaimed. If there is between 2 to 3" of topsoil available for reclamation, it may be mixed with the top 3" of "acceptable" spoil prior to seeding the site. If 4" to 6" of topsoil is available no mixing will be required. Following topsoil application, seed bed preparation procedures will be determined on the basis of the physical and chemical characteristics of the topsoil and the physical nature of the site itself. A friable, but firm seed bed will be required.

Final seed bed preparation will be scheduled for completion immediately prior to seeding to maximize the effectiveness of seed establishment. If topsoil spreading is completed on a site during Spring and seeding is going to be delayed until fall, a suitable cover crop (an annual grass) will be broadcast seeded for stabilization and weed control.

All disturbed areas will be seeded using a drill equipped with a depth regulator. All seed will be drilled on the contour. The seed will be planted between one-quarter and one-half inches deep. Where drilling is not possible (too steep or rocky), the seed will be broadcast and the area raked or chained to cover the seed. If the seed mixture is broadcast the listed rate will be doubled. The seeding shall be repeated until a satisfactory stand, as determined by the AO, is obtained.

Each operator will submit the seed certification tags from each bag of seed used, upon request of the AO. In addition, the company will submit a list of what species were actually seeded and the actual application rate for each site.

The following are representative seed mixtures and rates that will be used. The seeding rate will generally be 12 - 15 lbs/acre. The seeding rate will be doubled if the seed is broadcast.

SITES WITH TOPSOIL AVAILABLE: (Soil amendments and mulch may be required)
Follow-up soil testing and/or seeding or corrective erosion control measures will be required on areas of surface disturbance which experience reclamation and/or erosion failure.

Treatments

Mulches will be applied on seed beds with high soil erosion potential or where seed bed microclimate may limit seedling establishment. Any mulch used will be free from mold, fungi, or noxious weed seeds. Mulch may include native hay, small grain straw, wood fiber, live mulch, cotton, jute, synthetic netting, and rock. Straw mulch should contain fibers long enough to facilitate crimping and provide the greatest cover. Some type of matting may be required in more severe conditions such as steep slopes, sandy soils, and other poor soil sites which need site condition modifications to enhance seedling success.

The grantee or lessee will be responsible for the control of all noxious weed infestations on surface disturbances. Control measures will adhere to those listed in the Rock Springs District Noxious Weed Control Program (USDI 1982a) or the Regional Northwest Area Noxious Weed Control Program EIS (USDI 1987).

Ripping and chiseling will be used to break up compacted soils, increase water penetration, promote root growth, and control erosion. Ripping (6’ deep) will normally be used on compacted spoil material and old road beds prior to spreading topsoil. Chiseling on the contour (12’ deep) will be done after the site is contoured, rippled, the topsoil is spread, and soil amendments are added.

On sites where quick establishment of shrub and/or small tree species is desirable, bare rooted and containerized species will be hand planted to supplement drilling or broadcast seeding. Shrub species will be planted in areas where wildlife forage is essential, mass slope failure is possible, or along stream crossing to facilitate site stability and wildlife habitat restoration.

Hydroseeding may be required on steep, gravelly slopes which require the seed to be "anchored" onto the soil surface prior to a mulch treatment. Care will be taken to assure that the solution is not harmful to the seed mix components.

AIR QUALITY PROTECTION MEASURES

As projects are planned that include possible major sources of air pollutant emissions, special air quality protection related stipulations are added to BLM permits and rights-of-way grants. In addition, the BLM coordinates with the Wyoming Department of Environmental Quality/Air Quality Division (DEQ/AQD) during the process of analysis that may lead to the issuance of permits to construct emission sources. This coordination often results in the technical review of applications for permits and/or identification of additional stipulations to be applied to these permits.

The release of hazardous air contaminants, particularly the emissions from sour natural gas sweetening plants (a process used to remove H2S from natural gas resulting in the emission of sulfur dioxide), is a public concern. BLM requires industry to prepare detailed analyses of risks involved with the development of sour gas pipelines and treatment facilities. These analyses are designed to project impacts both to the public and to resource values. Plant siting will be scrutinized to provide for public safety and to ensure that only areas with the least potential for the transport of pollutants to the wilderness are considered.

To aid in achieving these goals, BLM will consult with the State of Wyoming, the U.S. Forest Service, industry, and the public to ensure that the most technically sound, environmentally balanced, and economically feasible decisions are made.
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL, DEEPEN OR PLUG BACK

la. Type Of Work
Drill X DEEPEN ____ PLUG BACK ____

b. Type Of Well
Oil Well X Gas Well X Other Single Zone

2. Name of Company
McMurry Oil Company

3. Address of Operator
P.O. Box 220, Casper, WY 82602

4. Location Of Well (At Surface)
1320' NML 1117' FEL (NE 1/4) Jonah

5. Proposed Depth
1320' X 1/2

6. Approximate 32 Miles Northwest of Parson, Wy.

7. Name of Company proposes drilling an Upper Mesaverde test
McMurry Oil Company proposes drilling an Upper Mesaverde test according to the following plan:

1. Drill a 12-1/4" hole to 2,500', set 9-5/8" casing and cement to surface.
2. Drill a 7-7/8" hole to 10,300', log, and if productive, set and cement 5-1/2" casing, perforate and stimulate as necessary.
3. If well is uneconomic, an authorization to plug and abandon will be obtained.

EXHIBITS ATTACHED
A. Location & Elevation Plat
B. Drilling Program
C. BOP Diagram
D. Surface Use Program

Note: See Exhibit D for statement of bond coverage and self-certification.

This space for Federal of State office use only:

Title

Date

Signed

Title

Date

Approved By

Title

Date

Approved Date

Date
DRILLING PROGRAM

Attached to Form 3160-3
Company: McMurry Oil Company
Well Name & Number: Jonah Federal 1-8
Well Location: 1320' FNL 1117' FEL (C NE 1/4)
SEC. 8, T29N, R1OBW

Field: Jonah
County: Sublette
State: Wyoming

1. Estimated Important Geological Markers

<table>
<thead>
<tr>
<th>Horizon</th>
<th>Drilling Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wasatch</td>
<td>Surface 3,500'</td>
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<tr>
<td>Fort Union</td>
<td>8,700'</td>
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<tr>
<td>Lance</td>
<td>10,300'</td>
</tr>
<tr>
<td>Upper Mesaverde</td>
<td>10,300'</td>
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<td>T.D.</td>
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</table>

2. Estimated Depth of Anticipated Water, Oil, Gas or Minerals

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<thead>
<tr>
<th>Formation</th>
<th>Drilling Depth</th>
<th>Remarks</th>
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</thead>
<tbody>
<tr>
<td>Wasatch</td>
<td>Surface 3,500'</td>
<td>Water Possible</td>
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<tr>
<td>Fort Union</td>
<td>8,700'</td>
<td>Gas</td>
</tr>
<tr>
<td>Upper Mesaverde</td>
<td>10,300'</td>
<td>Gas</td>
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</tbody>
</table>

3. Operator's Minimum Specifications for Pressure Control:
   A. Exhibit "C" is a schematic diagram of the blowout preventer equipment which consists of 11" 5,000 psi W.P. Double Ram annular type, Hydraulic Preventer. All fill, kill and choke lines will be 5,000 psi W.P.
   B. Testing Procedure
      1. Ram type preventers and associated equipment shall be tested to approved stack working pressure, and annular type preventers shall be tested to 50% of the rated working pressure, if isolation by test plug, or to 70% of internal yield pressure of casing if the BOP stack is not isolated from casing. Pressure shall be maintained for at least 10 minutes, or until the requirements of the test are met, whichever is longer.
      All BOP tests will be done by a tester and not by the rig pumps. The tests will include a low pressure test of 250 psi for ten minutes as well as the high pressure tests discussed in Onshore Order No. 2
      2. Tests will be run at the time of installation, prior to drilling out of each casing shoe, whenever any seal
subject to test pressure is broken, and at least every 30 days.

3. All casing strings will be pressure tested to 0.22 psi/ft. or 1,500 psi (whichever is greater) with rig pumps prior to drilling the plug after cementing. Test pressure will not exceed 70% of the minimum internal yield of the casing.

C. Accessories to BOP's include upper and lower kelly cock valves with handles and a floor safety valve, drill string BOP and choke manifold with pressure rating equivalent to the BOP stack. The choke line, including vent and flare lines will be a minimum of 2".

D. An accumulator unit will be used that has sufficient capacity to open the hydraulically controlled choke line valve (if so equipped), close all rams and retain a minimum of 200 psi above precharge on the closing manifold without the use of the closing unit pumps. The system shall have 2 independent power sources to close the preventers. Hydraulic controls will be located at the master accumulator and on the rig floor. Manual controls (hand wheels) will also be installed on the blind and pipe rams.

4. Casing and Cementing Program
A. All new casing
C. Production casing: 10,300' of 5-1/2", 17#, P-110 and cement to 400' above all hydrocarbon barring zones with Class "G" Cement.
D. All hydrocarbon barring zones will be cemented or covered.
E. A float will not be used.
F. Pit volumes will be visually monitored.
G. A one man mud logging unit will be used from 8,000' to TD.

5. Mud Program
The mud system will be a low solids nondispersed system which will be on site to handle any anticipated downhole problems, as well as any possible spills of fuel and oil on the surface.

<table>
<thead>
<tr>
<th>Depth</th>
<th>Mud Type</th>
<th>Mud Weight</th>
<th>Viscosity</th>
<th>Water Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>0' - 2,500'</td>
<td>Fresh Water - Lime &amp; Gal Spud Mud</td>
<td>9.0 to 11.0 ppg</td>
<td>35 to 50 seconds</td>
<td>15 cc or less</td>
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<tr>
<td>2,500' - 8,300'</td>
<td>Water with light mud up if needed</td>
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<tr>
<td>8,300' - 10,300'</td>
<td>Low solids nondispersed mud</td>
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<td></td>
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</tbody>
</table>

6. Testing, logging and Coring Program
A. The primary objective in this well is the Lance Formation.
B. DST's are possible on shows of interest.
C. Logging: The following electric logs will be run:
   DIL/GR/SFL -From TD to the base of surface casing
   FDC/CNL/GR -Over all zones of interest
D. Coring: Possibility of one in the Lance Formation.
E. Well completion and stimulation procedures will be determined following the evaluation of drilling results and open hole logs. A "Sundry Notice" will be submitted outlining the planned completion procedure at the time.

7. Abnormal Pressure or Temperatures
A. No abnormal temperatures of other problems are anticipated. Anticipated static bottomhole pressure is estimated to be 5,700 psig.
B. No H2S is anticipated.

8. Miscellaneous Facets of Operation
I. Starting Date and Duration of Operations
The anticipated starting date is May 1, 1994. The drilling and completion operations should be completed within 45 days after spudding the well.
II. Standard Conditions of Approval

A. The operator is responsible for the actions of his subcontractors. A copy of the approved APD must be on location during construction, drilling and completion operations.

B. All drilling operations will be in compliance with Onshore Order No. 2.

C. It is understood that prior approval from the BLM will be necessary in there are any major deviations from the original drilling plan.

D. The spud date will be reported verbally to the BLM Pinedale Resource Area Office within 24 hours prior to spudding.

E. The Pinedale BLM office will be notified of the approximate date and time of the cementing of all surface casing and production casing. The notification shall be so sent as to allow a representative from this office to witness the operation.

F. The Pinedale BLM will be called prior to all BOPE tests, with enough advance to allow a representative from the office to witness the test.

G. All lines upstream and downstream of the choke manifold will be straight or will give tee blocks or targeted tees and shall be anchored sufficiently to prevent whip and reduce vibration.

H. All shows of fresh water and minerals will be reported and protected. All water flows will be reported to the BLM's Pinedale Resource Area Office on the next business day. A sample will be taken of the water flow and furnished to the Pinedale Resource Area Office. All oil and gas shows will be evaluated for commercial possibilities and reported.

I. All Kicks during, i.e. influx of oil, gas, or water, will be reported to the Pinedale Resource Area after the flow has been killed. Information reported will be depth at time of kick, mud weight in hole at time of kick, volume of pit level increase, initial surface pressure, and kill mud weight.

J. Weekly drilling progress reports will be filed with the Pinedale Resource Area Office.

K. Gas produced from this well may not be vented or flared beyond an initial, authorized test period of 30 days or 50 MCF following its completion, whichever first occurs, without the prior, written approval of the authorized officer.

L. Whether the well is completed as a dry hole or as a producer, a Well Completion and Recompletion Report and Log (Form 3160-4) will be submitted not later than 30 days after completion of operations. With the completion report, a diagram of the wellbore depicting the completion (showing packers, tubing, etc.), two copies of each log run, core descriptions, DST reports if run, deviations surveys, and a geologic report detailing the wall history, formation tops, and a summary and conclusions.

M. Unless there is prior approval to the contrary, all oil and gas measurement facilities will be installed on the well location. Oil and gas meters will be calibrated in place prior to any deliveries. The Pinedale Resource Area Office will be probed with a date and time for the initial meter probing and calibration reports will be submitted to the Pinedale Resource Area Office.

N. Approval of this application does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which entitle the applicant to conduct operations thereon.

O. It is understood that this permit is valid for a period of one year from the date of approval. If the permit terminates, any surface disturbance must be reclaimed in accordance with the approved plan.

Pinedale Resource Area Office Contacts:

Petroleum Engineer Greg Noble
Pat. Eng. Tec. Ken Jones
Resource Specialist Tom Curry
Rock Springs District Office Contacts (if unable to reach Greg Noble)

Petroleum Engineer Jeff Hunt

Home Phone (307) 367-6419
Home Phone (307) 367-2622
Mobile Phone (307) 260-8105
Mobile Phone (307) 367-6578
Home Phone (307) 260-8089
Home Phone (307) 367-6877
Work Phone (307) 382-5350
Home Phone (307) 382-5310
SURFACE USE PROGRAM

Attached to Form 3160-3

Exhibit "D"

Surface Use program

Company: McMurry Oil Company

Well Name & Number: Jonah Federal 1-8

Well Location: 1320' FNL 1117' FEL (C NE 1/4)

SEC. 8, T29 N, Rloew

Field: Jonah

County: Sublette

1. Existing Roads

A. Exhibits "A" and "F" are surveyors' plats of the proposed well site showing the location and elevation.

B. By road directions, this well is about 39 miles north-northwest of Farson, Wyoming. From Farson, proceed north on U.S. Highway 181 for about 27 miles to mile post 67. Proceed west on an upgraded BLH road for approximately 10 miles. Turn left and proceed southwest about 3-1/2 miles to the location.

C. All proposed access roads are shown on Exhibits "E" and "H".

D. This is a development well and all existing roads within one mile are also shown on Exhibits "E" & "H".

E. The initial 10.5 miles of road after leaving the highway will not need to be upgraded. The remainder of the 0.2 mile access will be newly constructed. We will maintain all existing roads used, in the same or better condition. Roads will be maintained as necessary to prevent soil erosion and accommodate year-round traffic.

F. If the access road is dry during construction, drilling, and completion activities water will be used on the access road to help road compaction and minimize soil loss due to blowing dust.

2. Planned Access Roads

A. The final 3-1/2 miles will be a new road. The road will be crowned and ditched with a running surface of approximately 16' in width, with a total disturbed width of approximately 35', Exhibit E.

B. Construction is not permitted and will not be performed using frozen material or during periods when the soil material is saturated, or when watershed damage is likely to occur.

C. Topsoil will be stripped to a depth of 6 inches and stockpiled at the edges of the disturbed area on both sides of the road. This topsoil will be spread back over the slopes if the well is productive.

D. McMurry Oil will construct the access road and associated drainage structures as approved and certified by the attached certified plans.

E. If the access road is dry during construction, drilling, and completion activities, water will be used to help road compaction and minimize soil loss due to blowing dust.

F. The road will be regularly maintained in a safe, usable condition. A regular maintenance program shall include, but not be limited to, blading, ditching, culvert installation, drainage installation, surfacing, and cattle guards, as needed. Design, construction and maintenance of the road will be in compliance with the standards contained in BLM Manual, Section 9113 (Roads) and in the "Gold Book", "Oil and Gas Surface Operating Standards for Oil and Gas Exploration and Development, Third Edition.

G. McMurry Oil Company has an existing right-of-way grant WYW 101906 over a portion of the proposed access road. A standard Form 299 has been filed with the Pinedale Resource Area requesting an additional access road right-of-way grant for this well and others.

3. Location on Existing Wells (Exhibit E)

Wells known within a two-mile radius of the location:

A. Water Wells: Two

B. Abandoned Wells: None

C. Temporary Abandoned wells: None

D. Disposal Wells: None

E. Drilling Wells: None

F. Producing Well: Seven

G. Shut In Wells: None

H. Monitoring or Observation Wells: None

J. Proposed or permitted: Five
4. **Existing Production Facilities**

A. There are seven existing production facilities operated by McMurry Oil Company in the area.

B. Prior to installing any production facilities, we will have an approved sundry notice with a topographic overview of the approved wellpad at a 1"-50' scale which well show the proposed production facility layout, the areas of the wellpad not required for production and will be reclaimed, and the topsoil source that will be available for final reclamation when the well is abandoned.

C. All above ground permanent structures (permanent means on-site for longer than 90 days) not subject to safety requirements shall be painted by the Operator to blend with the natural color of the landscape. The paint used shall be color which simulates "Standard Environmental Colors" designated by the Rocky Mountain Five - State Interagency Committee. The color for this well will be Carlsbad Canyon 2.5y 6/2.

5. **Water Supply**

Water for this well will be obtained from a water well located in the NE 1/4 SW 1/4 OF Section 4, T28N,R10S,W. The water will be piped through a temporary surface pipeline to the drill site.

6. **Source of Construction Materials**

A. Any construction materials, insofar as drilling, will be obtained from private sources.

B. No construction materials will be obtained from Federal or Indian lands.

C. All surface materials will be obtained from private sources or through agreement with the BLM.

7. **Handling of Waste Disposal**

A. Drill cuttings will be buried in the reserve pit when dry.

B. Normal drilling fluid, will include bentonite, barite, and water and will be handled in the reserve pit.

C. Any fluid produced during drilling tests or while making production tests will be collected in a test tank. Any unavoidable spills will be cleaned up and removed.

D. Sewage disposal facilities will be in accordance with State and local regulations.

E. All trash will be contained in a portable trash cage.

F. Syphons, catchments, and absorbent pads will be used as necessary to keep hydrocarbons produced by the drill rig from entering the reserve pit. Pads will be disposed of in accordance with Wyoming DEQ requirements.

8. **Ancillary Facilities**

A. No airstrip, camp or other facility will be built during the drilling or completion of this well.

9. **Well Site Layout**

A. The drill pad showing cuts and fills, are shown on Exhibits "F" and "G". Construction will not be done with frozen material or during periods when the soil material is saturated, or when watershed damage is likely to occur.

B. All equipment and vehicles will be confined to the access road, pad and spoil and topsoil storage areas.

C. If drilling fluids are to be transferred from a previously drilled well in the Jonah Field to this location, the fluids will be tested in accordance with DEQ Guideline 8, before being transferred.

D. The top six inches of soil will be removed from the location including areas of cut, fill and/or subsoil storage areas and will be stockpiled at the site.

E. If there is snow on the ground at the time of pad construction, all snow will be stockpiled to the downhill side of the pad.

F. The reserve pit will be constructed with a minimum of one-half the total depth below the original ground surface on the lowest point within the pit, and will be designed to prevent the collection of surface runoff. The reserve pit will be examined by the operator and the authorized officer after construction and prior to the addition of any fluids to determine if the materials are permeable and potentially capable of allowing transfer of pit contents to groundwater.

G. The reserve pit will be fenced on three (3) nonworking sides prior to, and during drilling and on the fourth side at the time the rig is removed, using woven wire at least 28 inches high and 2 top strands of barbed wire with 10-inch spacing, held in place by line posts and wooden corner "H" braces.
H. McMurry Oil will compact any fill section of the pad that supports the drill rig and any other heavy equipment to 95% maximum density as determined by ASHTE test T99.

10. Reclamation
A. Rat and mouse holes will be filled and compacted from bottom to top immediately upon release of the drilling rig from the location.
B. Drill cuttings and muds still remain in the reserve pit until dry. The reserve pit will not be "squeezed," "crowded," or "cut". The reserve pit will be backfilled as soon after drilling and completion operations are finished and as weather conditions will permit.
C. If the reserve pit does not dry, alternative methods for drying, or removable of fluids, will be considered. If fluids will be disposed of by a method other than evaporation or hauling to a DEQ approved disposal pit, prior approval will be obtained from the BLM. Note: If disposal involves discharge or transport, Wyoming DEQ approval will be obtained.
D. Fall seeding will be completed after September 1 and prior to ground frost.

II. Plans for Restoration and Production Facilities if the well is Productive
A. Topsoil from the berms and/or storage piles will be spread along the cut and fill slopes of the access road. Drainage ditches and culverts will not be blocked with topsoil and associated organic matter. The topsoil areas will be seeded in the manner described in 10. C., utilizing the seed mixture detailed in 10. D.
B. After recontouring, the unused pad areas will be prepared as per item 10.A., and will be seeded in accordance with items 10. C. and 10. D.
C. A Sundry Notice showing the location of production facilities will be submitted for approval prior to installation.
D. A dike will be constructed of non-porous material, will hold 1.1 times the capacity of the largest tank, and will be independent of the back cut.

11. Surface Ownership
Surface ownership of all involved lands in the area is owned by the United States of America. The managing body is the Bureau of Land Management, and their office is located in Pinedale, Wyoming.
12. Other Information

A. There will be no construction during times when ground is frozen or using frozen material, or during periods when the soil material is saturated, or when watershed damage is likely to occur.

B. The Area Manager, Pinedale Resource Area, Bureau of Land Management, Pinedale, will be contacted if there are any questions concerning the above rehabilitation stipulations at 307-367-4358.

13. Leases' or Operator's Representatives

John Martin
McMurry Oil Company
P.O. Box 220
Casper, Wyoming 82602
307-473-2033

Certification

The undersigned, on behalf of McMurry Oil Company, hereby certifies that said company is authorized to conduct operations on the above described lands under the terms and conditions of Federal Lease WY 125943. Bond coverage pursuant to 43 CFR 3104 is being provided by McMurry Oil Company. The application bond is Statewide Federal Bond No. SLR 06413968.

I hereby certify that I, or persons under my direct supervision, have inspected the proposed drillsite and access route. The statements made in this plan are, to the best of my knowledge, true and correct. The work associated with this plan and the terms and conditions under which it is approved.

McMurry Oil Company

DATE: John Martin
By: President
Exhibit "G"
Cross Section

<table>
<thead>
<tr>
<th>Section AA-AA</th>
<th>Exhibit &quot;G&quot;</th>
<th>Cross Section</th>
<th>120'</th>
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McMurry Oil Company
Jonah Federal No. 1-B
NEH/7
SECTION 8
28V R 08V
APPENDIX E

ACRES OF DISTURBANCE BY VEGETATION AND SOIL TYPE
### APPENDIX E

**ACRES OF DISTURBANCE BY VEGETATION AND SOIL TYPE**

<table>
<thead>
<tr>
<th>WELL NUMBER</th>
<th>ACRES PAD</th>
<th>ROAD/Pipeline CORRIDORS ACRES LENGTH&lt;sup&gt;1&lt;/sup&gt;</th>
<th>VEGETATION TYPE&lt;sup&gt;2&lt;/sup&gt;</th>
<th>SOILS TYPE&lt;sup&gt;3&lt;/sup&gt;</th>
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<tbody>
<tr>
<td>JF 1-19</td>
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### ROAD/Pipeline CORRIDORS

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<sup>1</sup> ACRES PAD, ROAD/Pipeline CORRIDORS ACRES LENGTH

<sup>2</sup> VEGETATION TYPE

<sup>3</sup> SOILS TYPE
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1 Length in feet, width is 56 feet for access road/gathering pipeline corridors. Width for sale pipelines is 55 feet. 20-acre wareyard not included in table.

2 Vegetative Key:
  - ARTR = Wyoming Big Sagebrush
  - ADGA = Thickspike Wheateagrass
  - ATGA = Gardner's Saltbush
  - AGSM = Western Wheateagrass
  - CHVI = Green Rabbitbrush
  - ORHY = Indian Ricegrass
  - CELA = Winter Fat (White Sage)
  - POA = Bluegrasses
  - CHNA = Rubber Rabbitbrush
  - STCO = Needle and Thread

3 Soils Key:
  - L = loam
  - C = clay
  - SL = sandy loam
  - CL = clay loam
  - SCL = sandy clay loam
  - SIC = silty clay
  - SICL = silty clay loam
  - S = sand
  - SIL = silt loam
  - FSL = fine sandy loam

LS = loamy sand
CNV-L = very channery loam
GR-S = gravelly sand
GR-SL = gravelly sandy loam

Depth to bedrock:
- 10-20 inches (shallow)
- 20-40 inches (moderately deep)
- 40+ or 60+ inches (deep)

Frac mudstone, soft sandstone, soft shale, etc. is the type of bedrock likely to be found under soils less than 60 inches deep.

These soil types have not been field checked for site-specific identification but are derived from the Burma Road Soil Survey (1988) located in the Pinedale Resource Area and Rock Springs District offices. The Burma Road Survey has more detailed soil descriptions than this report. It is recommended that soils information found in this EA not replace on-site investigation.