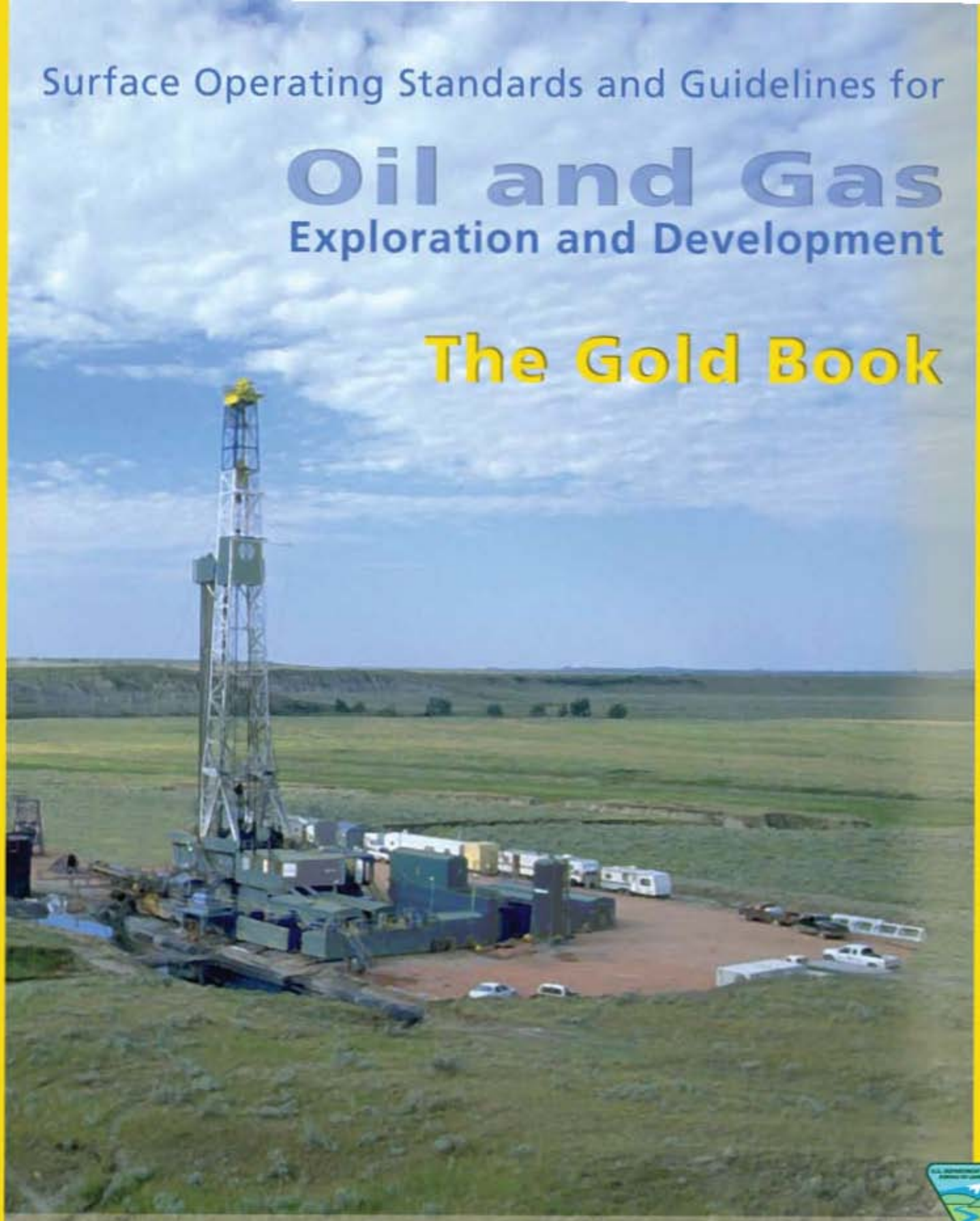
BLM

Surface Operating Standards and Guidelines for

Oil and Gas
Exploration and Development

The Gold Book



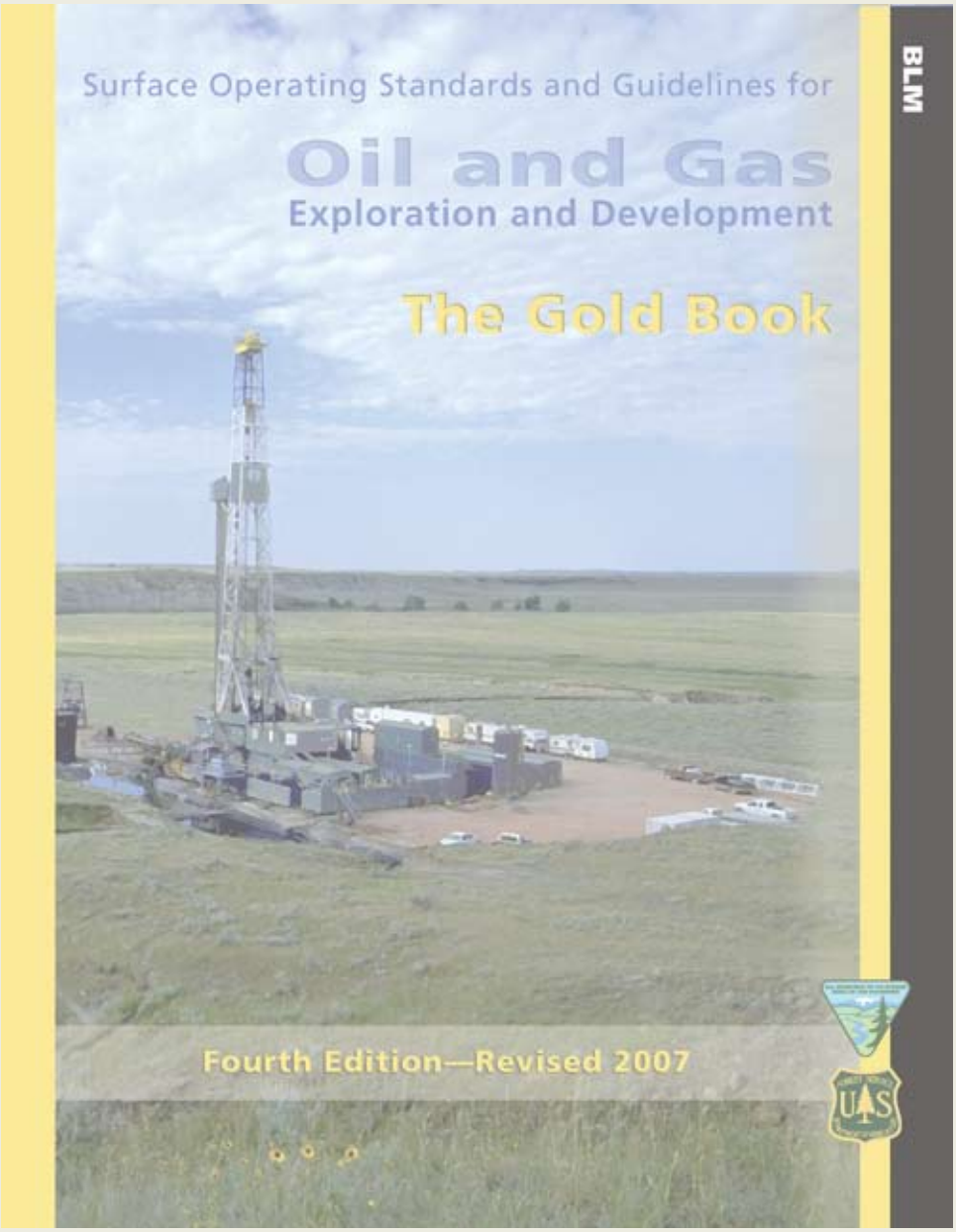
Fourth Edition—Revised 2007

We wish to thank the numerous organizations, agencies, companies, and individuals
for their contributions to this publication.

P-417
BLM/WO/ST-06/021+3071/REV 07

Production services were provided by the BLM National Science and Technology Center
Branch of Publishing Services

This document is available online at **www.blm.gov**



Prepared By:

United States Department of the Interior
Bureau of Land Management

United States Department of Agriculture
Forest Service

Fourth Edition
Revised 2007

Suggested Citation

United States Department of the Interior and United States Department of Agriculture. 2007. Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development. BLM/WO/ST-06/021+3071/REV 07. Bureau of Land Management. Denver, Colorado. 84 pp.

Table of Contents

Chapter 1 – Introduction . . . 1

Surface Management Agency . . . 1
Filing Plans . . . 1
Environmental Analysis . . . 2
Onsite Inspection . . . 2
Interim and Final Reclamation . . . 2
Environmental Best Management Practices . . . 2
Stipulations and Conditions of Approval . . . 3
Other Federal, State, Tribal, or Local Permits or Authorizations . . . 3

Chapter 2 – Geophysical Operations . . . 5

BLM and FS Requirements . . . 5
Split Estate Minerals Administered by the BLM . . . 6

Chapter 3 – Permitting and Approval of Lease Operations . . . 7

Initiating the Process . . . 7
Drilling Application Options . . . 7
Surveying and Staking . . . 8
Onsite Inspection, Environmental Review, and Permit Approval . . . 9
Variances . . . 10
Lease Stipulation Exceptions, Waivers, and Modifications . . . 10
BLM Rights-of-Way and FS Special Use Authorizations . . . 10
Other Authorizations . . . 11
Exploration and Development on Split Estates . . . 11
Indian Lands . . . 12
Bonding . . . 12

Chapter 4 – Construction and Maintenance . . . 15

Well Sites . . . 15
Roads and Access Ways . . . 19
Transportation Planning . . . 21
Road Design and Construction . . . 22
General Design Specifications for Different Types of Roads . . . 24
Road Maintenance . . . 30
Drainage and Drainage Structures . . . 31
Pipelines and Flowlines . . . 36

Chapter 5 – Drilling and Production Operations 37

General Operating Standards and Objectives 37
Well Completion Report 37
Subsequent Well Operations 37
Approval Procedures 38
Production Startup Notification 38
Measurement of Production 38
Disposal of Produced Water 38
Pollution Control/Hazardous Waste 39
Safety and Emergency Actions 40
Noise Control 40
Visual/Scenic Resources 40
Painting of Facilities 41
Placement of Production Facilities 41
Inspection and Enforcement 41

Chapter 6 – Reclamation and Abandonment 43

Reclamation Objective 43
Reclamation Plan 44
Pipeline and Flowline Reclamation 45
Well Site Reclamation 45
Road Reclamation 47
Reclamation of Other Associated Facilities 49
Water Well Conversion 49
Inspection and Final Abandonment Approval 49
Release of Bonds 49

Chapter 7 – Appeals 51

Bureau of Land Management Administrative Relief 51
Forest Service Appeals 51
Bureau of Indian Affairs Appeals 51

List of Commonly Used Abbreviations and Acronyms 53

Appendix 1 – BLM/FS Office Locations 55

Appendix 2 – Forms and Formats for Required Information 57

Application for Permit to Drill or Reenter (APD) . . . . **Form 3160-3** 59-60

Notice of Staking (NOS) . . . . . **Sample Format** 61-62

Sundry Notices and Reports on Wells . . . . . **Form 3160-5** 63-64

Spill Report . . . . . **Sample Format** 65-66

Well Completion or
Recompletion Report and Log. . . . . **Form 3160-4** 67-69

Notice of Intent and Authorization to Conduct
Oil and Gas Geophysical Exploration Operations . . **BLM Form 3150-4/FS Form 2800-16** 71-73

Notice of Completion of Oil and Gas
Geophysical Exploration Operations . . . . . **BLM Form 3150-5/FS Form 2800-16a** . . . 75-76

List of Figures

Figure 1 – Recommended construction standards for exclosure fences in livestock areas 18
Figure 2 – Illustration of commonly used terms in road design 19
Figure 3 – Cross-sections and plans for typical road sections representative of BLM resource or FS local and higher-class roads 20
Figure 4 – Typical road plan and profile drawing for an oil and gas road 29
Figure 5 – Typical drainage dip and construction specifications. 32
Figure 6 – Culvert spacing 33
Figure 7 – Diagrams for proper culvert installation 34

Chapter 1 – Introduction

The Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development (commonly referred to as The Gold Book) was developed to assist operators by providing information on the requirements for obtaining permit approval and conducting environmentally responsible oil and gas operations on Federal lands and on private surface over Federal minerals. Operations include exploration, production, reclamation, associated rights-of-way (ROWs), and Special Use Authorizations (SUAs).

The Gold Book provides operators with a combination of guidance and standards for ensuring compliance with agency policies and operating requirements, such as those found in the Code of Federal Regulations at 43 CFR 3000 and 36 CFR 228 Subpart E; Onshore Oil and Gas Orders (Onshore Orders); and Notices to Lessees (NTLs). Agency field offices and websites can provide more detailed discussions of specific procedures and requirements and copies of regulations, Onshore Orders, Notices to Lessees, and other agency policies currently in effect.

Every operation authorized under a Federal oil and gas lease should conform to USDI Bureau of Land Management (BLM), USDA Forest Service (FS), or other agency standards and reflect relevant, site-specific conditions. Knowledge of BLM resource management plans (RMPs) and FS land and resource management plans, as well as agency operational standards, procedures, and environmental protection requirements will help operators meet those standards.

Surface Management Agency

Federal oil and gas lease surface operations are managed by the BLM in cooperation with the appropriate Federal surface management agency or non-Federal surface owner. On National Forest System (NFS) lands, the FS has approval authority for the surface use portion of Federal oil and gas operations and for appeals related to FS decisions and approvals. Early coordination with the BLM and the appropriate surface management agency or Bureau of Indian Affairs (BIA) office is encouraged as procedures and requirements vary by agency or reservation. Appendix 1 provides a map showing BLM State Offices and Regional FS Offices with addresses and telephone numbers.

Filing Plans

Onshore Oil and Gas Order No. 1 describes the procedure for filing either an *Application for Permit to Drill or Reenter* (APD), Form 3160-3, or a *Notice of Staking* (NOS) followed by an APD (Appendix 2 – Forms and Formats for Required Information). Early contact and discussions with the BLM and the surface management agency are highly encouraged and will expedite approval of the APD. It is recommended that this contact be made ***prior*** to the commitment of dates, equipment, access route acquisition, and preparation of the APD.

The operator is required to file the complete APD package for all operations, including those on National Forest System lands, with the appropriate BLM office. The completed APD package must include APD Form 3160-3, a well plat, a Drilling Plan, a Surface Use Plan of Operations (SUPO), evidence of bond coverage, and operator certification in accordance with the requirements of Onshore Order No. 1. Drilling and related surface-disturbing operations are not allowed without an approved APD. Requests for changes to an approved APD must be submitted to the BLM for prior approval on a Sundry Notice (SN) (Form 3160-5). Operators are encouraged to file APDs, Sundry Notices, and Well Completion Reports (Form 3160-4) through the BLM's electronic filing system. Contact any BLM State or Field Office for further information on electronic filing options.

Environmental Analysis

The BLM, and if applicable, the FS, is responsible for ensuring compliance with the National Environmental Policy Act (NEPA). Upon receipt of a complete APD or formal proposal that encompasses multiple wells in a specific area, the BLM, the surface management agency, or the agency's or operator's envi ronmental contractor will conduct an environmental analysis and prepare an environmental document in conformance with the requirements of NEPA and the regulations of the Council on Environmental Quality (CEQ). Regardless of which agency, entity, or individual prepares the environmental analysis document, the BLM (and FS, for actions on National Forest System lands) must concur with the content prior to issuing a decision document. In the case of National Forest System lands, where the environmental analysis is conducted jointly with the BLM, each agency will issue its own decision. The extent of the environmental analysis process and the time frame for issuance of a decision will depend upon the complexity of the proposed action and resulting analysis, the significance of the environmental effects disclosed, and the completion of appropriate consultation processes.

Onsite Inspection

Before approval of the APD, an onsite inspection will be conducted with the operator to further identify site-specific resource protection concerns and requirements. Prior to, or in conjunction with, the onsite inspection, the surface management agency will advise the operator if any special inventories or studies are required, such as for cultural resources or threatened and endangered species.

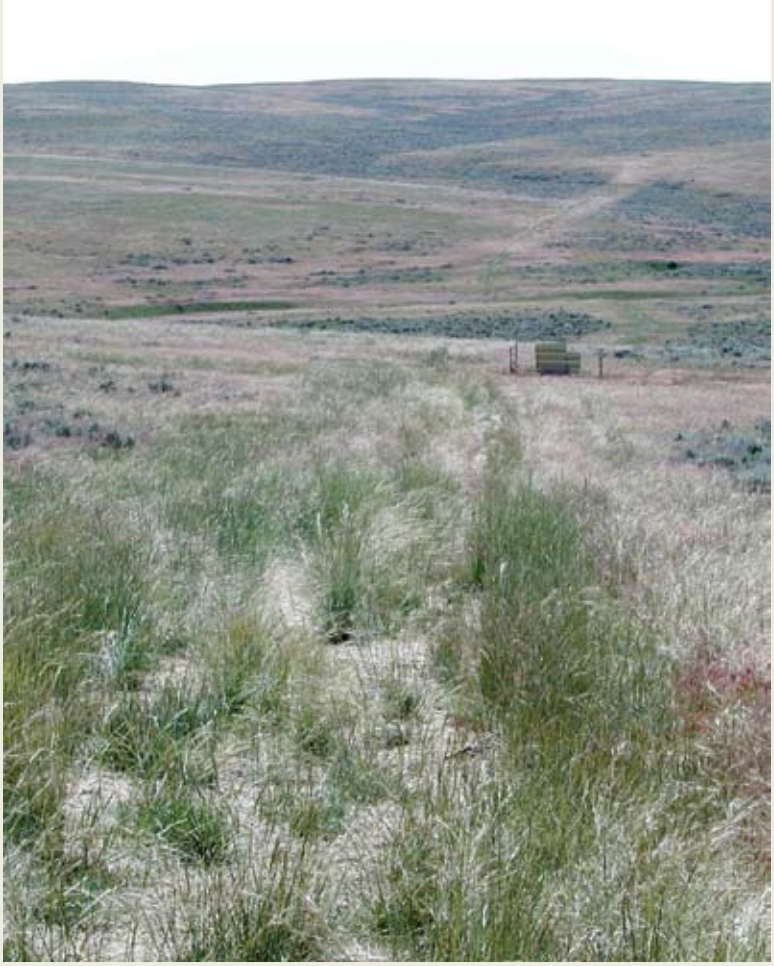
Interim and Final Reclamation

The objective of reclamation in the short term is to provide site stability and basic resource productivity. The final goal of reclamation is to restore the character of the land and water to its pre-disturbance condition. The operator is responsible for completing the reclamation activities necessary to achieve the short-term objective, and upon abandonment, establishing the conditions on the site so that no impediment exists that would prevent achieving the final goal.

To reduce areas of disturbance not needed for long-term operations, interim reclamation will be initiated for areas such as active well and facility locations, pipelines, and roads when well completion operations or facility installation operations are concluded. All surface disturbances associated with plugged wells and facility abandonment must be reclaimed after operations have concluded. The final abandonment notice (FAN), including final reclamation, will not be approved by the BLM until reclamation work is determined to be successful by the BLM in consultation with the surface management agency or surface owner.

Environmental Best Management Practices

Environmental Best Management Practices (BMPs) are state-of-the-art mitigation measures designed to provide for safe and efficient operations while minimizing undesirable impacts to the environment. Proper planning and consultation among the operator, surface management agency, and non-Federal surface owner, and the proactive incorporation of environmental Best Management Practices into the APD Surface Use Plan of Operations by the operator, will typically result in a more efficient APD and environmental review



Best Management Practices in this photograph include a two-track, primitive road with full interim reclamation of the road and well pad; flowlines and electrical lines buried deep within the road; remote monitoring to reduce traffic to the well; a submersible pump; and a small well box painted to blend in with the background.

process, increased operating efficiency, reduced long-term operating costs, reduced final reclamation needs, and less impact to the environment.

Stipulations and Conditions of Approval

Constraints that are consistent with the rights granted by the lease may be imposed on the location of access roads, well sites, and facility sites or the timing of geophysical exploration, well drilling, or other operations. Constraints may result from lease stipulations, the surface management agency's review and environmental analysis of the proposed operations, Notices to Lessees, Onshore Orders, or regulations. When consultation with the State Historic Preservation Office (SHPO), Tribe, or the U.S. Fish and Wildlife Service (FWS) is required, the time needed for an APD review may be extended and result in additional constraints on operations.

Other Federal, Tribal, State, or Local Permits or Authorizations

A permit, right-of-way, or other authorization from the BLM or surface management agency will be required unless otherwise exempted by Onshore Order or Notice to Lessee for on-lease uses, such as disposal of produced water, authorization for use of sand or gravel, and gas flaring. Off-lease uses, such as facilities and roads, will require a permit, right-of-way, or other authorization from the surface management agency. All facilities located on the lease, but owned by parties other than the operator, will require authorization from the surface management agency.

BLM approval of an APD does not relieve the operator from obtaining any other authorizations required for drilling or subsequent operations. This includes any requirements of other Federal, Tribal, State, or local authorities.

Chapter 2 – Geophysical Operations

This chapter identifies the basic procedures necessary for ensuring the efficient review and approval of environmentally responsible geophysical exploration. Prior to conducting operations, the operator must contact the surface management agency to obtain approval. Requirements for operations on BLM-administered lands can be found in the Code of Federal Regulations at 43 CFR 3150 and on National Forest System lands in the Forest Service (FS) Manual.

Geophysical operations may be conducted on most Federal lands by bonded geophysical operators, regardless of whether the Federal lands are leased or by whom they are leased.

BLM and FS Requirements

Geophysical Operator

An operator is required to file a *Notice of Intent (NOI) and Authorization to Conduct Oil and Gas Geophysical Exploration Operations* (BLM Form 3150-4/FS Form 2800-16) with the BLM for operations on BLM administered lands, with the FS for operations on National Forest System lands, and with both agencies for operations that overlap lands managed by both agencies. However, geophysical operations or testing that are conducted for a lessee entirely within the lessee's Federal oil and gas lease are considered lease operations that may be permitted either by Sundry Notice or by Notice of Intent. The operator will be apprised of practices and procedures to be followed prior to commencing operations on BLM or National Forest System lands. The Notice of Intent shall include site-specific project information and field techniques to minimize surface impacts; a map showing the location of the proposed 2D geophysical lines or 3D source and receiver proposed locations; all access routes and ancillary facilities; and a proposed schedule of field activities. The map should be at a minimum scale of one-half inch equals 1 mile; however, a 1:24,000 USGS topographic map is recommended.

The party filing the Notice of Intent (named on the top of the form) will need a bond for most operations. On BLM-managed lands, the geophysical exploration operator is required to be bonded. On National Forest System lands, the authorized officer will decide whether a bond is required. When applicable, a copy of the bond or other evidence of satisfactory bonding must accompany the Notice of Intent. Holders of statewide or nationwide oil and gas lease bonds may satisfy this requirement by obtaining a rider to include coverage of geophysical operations. For geophysical operation methods involving surface disturbance, a cultural resources survey may be necessary. In some circumstances, sensitive or threatened and endangered species surveys may also be necessary.

The completion and signing of the Notice of Intent signifies agreement to comply with its terms and conditions and subsequent practices and procedures specified by the authorized officer. A

pre-work field conference is recommended and may be conducted by the surface management agency. Earth moving equipment shall not be used without prior approval. Upon completion of operations, including any required reclamation, the operator is required to file a *Notice of Completion (NOC) of Oil and Gas Geophysical Exploration Operations* (BLM Form 3150-5/FS Form 2800-16a).

Articulated vibroseis trucks are one of many geophysical exploration methods.

Authorized Officer

The authorized officer will contact the operator after the Notice of Intent (BLM Form 3150-4/FS Form 2800-16) is filed and inform the operator of the practices and procedures to be followed and the estimated time frame for approval. On National Forest System lands, a user fee will be assessed for operations on Federal lands that are not under lease by the operator.

The authorized officer will complete a final post-work inspection of the site and notify the operator that the terms and conditions of the Notice of Intent have been met or that additional action is required by the operator. Consent to release the bond or terminate liability will not be granted by the surface management agency until the operator has met the terms and conditions of the Notice of Intent.

Split Estate Minerals Administered by the BLM

Where the minerals are federally owned and the surface is privately or State owned, no authorization is necessary from the Federal Government to conduct geophysical operations. Operators must work with the surface owner to obtain access to private lands and the State permitting agency for authorization of operations proposed on State lands.

Chapter 3 – Permitting and Approval of Lease Operations

This chapter identifies the process for ensuring the efficient review and approval of environmentally responsible oil and gas lease development. The information provided will acquaint the operator with the basic procedures required for approval of lease operations.

The operator has two procedural options for securing approval to drill: The Notice of Staking (NOS) option and the Application for Permit to Drill (APD) option. Although the time frames in the regulations are the same for both options, each option has specific advantages. The NOS option, if properly coordinated early in the process, may expedite final permit approval because it allows the operator the opportunity to gather information and better address site-specific resource concerns while preparing the APD package. The APD option may be more efficient for use with in-fill wells in developed fields where the operator and surface management agency have developed a close working relationship or have agreed on a Master Development Plan and standard operating practices for the field.

Initiating the Process

The process for obtaining approval to drill is generally initiated by filing either an NOS followed by an APD, or by filing just an APD. With either option, a complete and acceptable APD must be filed with the BLM. Planning and coordination with the BLM or other surface management agency can be critical to meeting the operator's needs for a smooth and timely permitting process. It is highly recommended that operators consult with the surface management agency ***prior*** to filing either an NOS or an APD to discuss the operator's general plans for development. At this initial planning meeting, the surface management agency will inform the operator of surface management agency procedures and requirements, sensitive areas or seasons that have to be avoided, as well as recommendations to aid in timely permit processing.

Drilling Application Options

Application for Permit to Drill

No drilling operations or related surface disturbing activities may be initiated without an approved APD. The APD must be approved by an authorized officer of the BLM, in consultation with the surface management agency as appropriate. On National Forest System lands, the FS must approve the Surface Use Plan of Operations portion of the APD before the BLM can approve the APD. Operators are strongly encouraged to consult with the appropriate surface management agency as early as possible before filing an APD to identify local requirements and potential concerns.

To help ensure timely processing, the APD should be complete and include all necessary supporting information, such as information on

the well and associated rights-of-way, roads, pipelines, and production facilities. Onshore Order No. 1, Section III, D, describes specific information requirements for filing a complete APD, including the Drilling Plan and Surface Use Plan of Operations. For operations proposed on National Forest System lands, also refer to Subpart E of 36 CFR 228. In addition to these requirements, the onsite inspection must be held before the APD package can be judged complete. Within 10 days of receiving an APD, the BLM (in consultation with the FS if the application is on National Forest System lands) will notify the operator whether or not the application is complete. The APD package consists of:

- Form 3160-3, Application for Permit to Drill or Reenter
- Surface Use Plan of Operations
- Drilling Plan
- A well plat certified by a registered surveyor
- Evidence of bond coverage
- Operator certification
- Original or electronic signature
- Other information required by order, notice, or regulation

In order to facilitate processing multiple APDs, plan for orderly development, and better analyze cumulative effects and appropriate mitigation, an operator may elect or be asked to submit a Master Development Plan for all or a portion of the wells proposed in a developing field. All wells within a Master Development Plan share a common Drilling Plan, Surface Use Plan of Operations, and plans for future development and production. APD Form 3160-3 and survey plats must be submitted for each proposed well either with the Master Development Plan or following its approval, but each APD must reference the common Drilling Plan and Surface Use Plan of Operations.

Posting a NOS or APD in the local BLM office (and FS office for operations on National Forest System lands) initiates the BLM/FS 30-day public notification period that is required before a Federal APD can be approved. The onsite inspection is held after the filing of the APD, if the onsite inspection was not held previously under the NOS option.

Approved APDs are valid for 2 years from the date of approval as long as the lease does not expire during that time. An APD may be extended for up to 2 years at the discretion of the BLM and the surface management agency if a written request is filed before the 2 year expiration date. The terms of an APD may require the operator to contact the BLM and surface management agency before beginning construction activities.

Notice of Staking

By filing a NOS with the BLM, the operator is formally requesting an onsite inspection prior to filing an APD. During or within 7 days of the onsite inspection, all parties will jointly develop and provide a list of resource concerns for the operator to address in the APD. This will help the operator in filing a complete APD. If an APD is not filed with the BLM within 60 days of the onsite inspection, the NOS will be returned to the operator. Posting a NOS in the local BLM and FS offices also initiates the mandatory BLM/FS 30-day public notification requirement. There is no specific form available for this information, but a sample format is provided in Appendix 2 with the necessary information requirements. When the lands involved are managed by a Federal agency other than the BLM, the BLM will provide a copy of the NOS to the appropriate agency.

Surveying and Staking

Regardless of the option selected (NOS or APD), the center stake for the proposed well and two reference markers must be staked and the access roads flagged along the centerline ***prior*** to the onsite inspection. Surveying and staking are considered casual use unless the activity is expected to cause more than negligible disturbance or damage. Surveying and staking may be initiated without advance approval from the BLM or the surface management agency, except for lands administered by the Department of Defense or used for military purposes, Indian lands, lands where motorized access is prohibited, or where more than negligible disturbance is likely to occur.

Operators are advised to notify the surface management agency and are required to make a good faith effort to notify the private surface owner prior to entry. This will allow the surface management agency or private surface owner to inform the operator of sensitive resources or areas that need to be avoided and any difficult or problem conditions.

When an APD is submitted, staking must include the center stake for the proposed well, two 200-foot directional reference stakes, the exterior dimensions of the drill pad, reserve pit, cuts and fills, and the outer limits of the area to be disturbed, unless a variance is granted. Because the well, road location, and other associated off-location facilities may change as a result of the onsite inspection, the operator may request a variance to the full staking requirements for purposes of conducting the initial onsite inspection. However, the full staking requirements found in Oil and Gas Onshore Order No. 1 must be met before the APD can be approved. Off-location facilities must also be staked, as well as the centerlines of new roads and routes for flowlines and power lines, with stakes being visible from one to the next (intervisible). In steep terrain or environmentally sensitive areas, cut and fill staking or slope staking may be required for roads and any ancillary facilities.

The well location plat must describe the location of the surface disturbances and their proximity to the nearest section lines, lease lines, ownership, or special use area boundaries in geographical coordinates referenced to the National Spatial Reference System (NSRS), North American Datum 1983 (NAD83), and in feet and direction from the nearest two adjacent section lines, or, if not within the Rectangular Survey System, the nearest two adjacent property lines. The authorized officer has the option of approving the use of the BLM's Geographic Coordinate Data Base (GCDB) to describe the boundaries, when the GCDB coordinates reliability ensures that operations will be within the intended boundaries. In unsurveyed townships, the latest protraction or amended protraction diagram will be used to describe the boundaries. The registered surveyor should coordinate with the cadastral survey section of the appropriate BLM State Office, particularly where the boundaries are uncertain or unsurveyed.

Onsite Inspection, Environmental Review, and Permit Approval

Within 10 days of receiving the NOS or APD package, the BLM, in coordination with the operator and surface management agency or private surface owner, will schedule a date for the onsite inspection. The onsite inspection will be held as soon as practicable based on schedules and weather conditions. For operations on National Forest System lands, the FS will schedule the onsite inspection with BLM involvement.

The onsite inspection team will include a BLM/surface management agency representative, the operator or permitting agent, and other parties associated with planning work on the project, such as the operator's principal dirtwork contractor, agency resource specialists, surveyors, and pipeline or utility company representatives. When the onsite inspection is on private surface, the surface owner will be invited by the BLM.

The purpose of the onsite inspection is to discuss the proposal; determine the best location for the well, road, and facilities; identify site-specific concerns and potential environmental impacts associated with the proposal; and discuss the conditions of approval (COAs) or possible environmental Best Management Practices for mitigating these impacts. Before conducting the onsite inspection, the BLM or surface management agency will determine whether any of the following requirements or features would affect the operational proposal:

- Land management plan
- Lease stipulations
- Level of National Environmental Policy Act (NEPA) analysis required
- Well spacing
- Cultural survey needs
- Wildlife survey needs
- Riparian and wetland areas
- Excessive slopes and erosive soils
- Landowner consultation

- Road, pipeline, or utility right-of-way or FS Special Use Authorization

Cultural resources, sensitive or threatened and endangered species, or other resource survey information may be needed in order to comply with the National Historic Preservation Act (NHPA), the Endangered Species Act (ESA), or to complete a staff review or an environmental analysis under NEPA.

If the operator is completing cultural or other survey reports, the early submission of those reports to the surface management agency, at or prior to the onsite inspection, will help ensure timely and efficient consultation, environmental review, and processing of APDs. Cultural resource "block" surveys are an option that can provide the operator with increased flexibility to locate or relocate wells, roads, and utilities at the onsite inspection and reduce the need to conduct additional surveys that could delay the project.

The BLM, surface management agency, or private contractor will complete the environmental review process in accordance with the requirements of the BLM and the surface management agency. The BLM will issue the decision document, except in the case of National Forest System lands where the environmental review is conducted jointly and each agency issues its own decision. APDs on Federal leases will not be approved by the BLM until after completion of the environmental review and the public posting/notification process.

Approved permits will be subject to the operator's permit application as modified by the existing lease stipulations, rights-of-way terms and conditions, and APD or Sundry Notice conditions of approval developed during the permit review process. The operator must have a copy of the approved APD and any Conditions of Approval available for review at the drill site, including during the construction and reclamation phases. Operators are responsible for their contractor's and subcontractor's compliance with the approved APD.

Variances

The operator may make a written request to the agency with jurisdiction to request a variance from the requirements of Onshore Order No. 1. The request must explain the reason the variance is needed and demonstrate how the operator will satisfy the intent of the Order.

Lease Stipulation Exceptions, Waivers, and Modifications

Many leases contain stipulations developed during the land use planning process. The land use plan also serves as the primary vehicle for explaining to industry, other agencies, and to the public the circumstances and procedures under which exceptions, waivers, and modifications of lease stipulations may be granted.

An operator may request that the authorized officer grant an exception, waiver, or modification to a lease stipulation as explained in the Code of Federal Regulations at 43 CFR 3101.1-4 (BLM) and 36 CFR 228.104 (FS). Operator requests should be submitted in writing and include information demonstrating that the factors leading to its inclusion in the lease have changed sufficiently to make the protection provided by the stipulation no longer justified or that the proposed operation would not cause unacceptable impacts.

When the drilling operation is proposed on land managed by another surface management agency, the BLM will forward operator requests to that surface management agency and obtain their concurrence or recommendation. All final decisions will be processed through the BLM. After drilling has commenced, the BLM (and FS for operations on National Forest System lands) may consider verbal requests for an exception, waiver, or modification; however, the verbal request must be followed up by a written request within 7 days. The BLM and FS will confirm, in writing, any verbal approval.

BLM Rights-of-Way and FS Special Use Authorizations

On BLM-administered lands and National Forest Systems lands, pipelines (upstream from the custody transfer point), access roads, and utilities located on a lease (or within a unitized area), which are to be constructed and managed by the leaseholder/

operator, can be authorized under an APD or Sundry Notice. On or off lease/unit, pipelines, roads, and utilities constructed and managed by someone other than the leaseholder/operator require a BLM right-of-way or an FS Special Use Authorization.

On BLM-administered lands, pipelines, access roads, and utilities located off the lease or the unitized area require a right-of-way. A pipeline on BLM-administered lands (or on lands administered by two or more Federal agencies), located downstream of the custody transfer point either on or off a lease, also requires a right-of-way from the BLM. (Refer to 43 CFR 2800, April 22, 2005). On National Forest System lands, certain access roads and utilities, including pipelines downstream of the custody transfer point, may require a Special Use Authorization (36 CFR 252 Subpart B).

A detailed APD can be accepted as an application for a BLM right-of-way off lease or FS Special Use Authorization for facilities owned by the leaseholder/operator in lieu of the *Application for Transportation and Utility Systems and Facilities on Federal Lands* (Standard Form 299). If the leaseholder/operator plans to use the APD as the application, it should provide sufficient detail for the entire proposal, including all facilities located off the lease. At the NOS or the APD onsite inspection involving rights-of-way on BLM-administered lands, the BLM will review items on the pre-application checklist with the operator, if a pre-application meeting has not already taken place, and will provide the operator with a blank SF-299.

Right-of-way project information may be included in the APD or Sundry Notice rather than being submitted on the SF-299. To use this option, the operator must complete and submit an APD or Sundry Notice to the BLM with a Surface Use Plan of Operations, which references the requested rights-of-way; maps; a plan of development containing information specific to the right-of-way and construction; and other required details. The BLM will evaluate the application, determine the cost recovery processing fee category, and request the non-refundable processing fee and any additional information that may be required. After the processing fee and any additional information have been received, BLM will process the right-of-way application.

Following the completion of NEPA analysis for the entire project, a decision will be issued concerning approval of the right-of-way. Upon a decision to grant the right-of-way, BLM will request that the applicant sign the right-of-way grant and return it with payment of the rent and cost recovery monitoring fees. After the rent, fees, and a signed right-of-way grant are returned to the BLM, the grant will be executed by the authorized officer and a copy returned to the applicant/leaseholder with the approved APD and Surface Use Plan of Operations.

The FS uses a similar process to approve the APD Surface Use Plan of Operations and associated Special Use Authorization when needed for pipelines, access roads, and utilities located entirely on National Forest System lands. The Special Use Authorization may include the APD conditions of approval and any special stipulations resulting from the NEPA analysis.

Other Authorizations

All proposed drilling operations and related surface disturbance activities, as well as any change from an approved APD, must be approved before such activities are conducted. Approval will be in accordance with lease terms, conditions of approval; 43 CFR 3160; Onshore Oil and Gas Orders; and Notices to Lessees.

For operations on National Forest System lands, approval of the Surface Use Plan of Operations must also be in accordance with 36 CFR 228 Subpart E before BLM final approval of the APD. Approval must be obtained from the BLM prior to drilling from private surface into Federal minerals.

The BLM's approval of an APD does not relieve the operator from obtaining any other authorizations or approvals required for conducting drilling or related subsequent operations. This includes requirements of other Federal, Tribal, State, or local authorities.

Exploration and Development on Split Estates

Non-Federally Owned Surface/ Federally Owned Minerals

The operator must make a good faith effort to notify the private surface owner before entering

private surface to stake a well location and access road or to conduct cultural or biological surveys. Each APD, NOS, or Sundry Notice permitting new surface disturbing activities must contain the name, address, telephone number, and e-mail address (if available), of the private surface owner.

The BLM will invite the surface owner to participate in the onsite and final reclamation inspections and will take into consideration the needs of the surface owner when reviewing the APD and reclamation plans and when approving final abandonment and reclamation. The BLM will offer the surface owner the same level of surface protection that the BLM provides on Federal surface. The BLM will not apply standards or conditions that exceed those that would normally be applied to Federal surface, even when requested by the surface owner.

Prior to approval of the APD (or Sundry Notice to conduct new surface disturbing activities), the operator must certify as part of the complete application that a good faith effort had been made to reach a surface use agreement with the private surface owner and that an agreement was reached or that it failed. If the surface owner and operator fail to reach an agreement, the operator must file a bond with the BLM ($1,000 minimum) for the benefit of the surface owner to cover compensation, such as for reasonable and foreseeable loss of crops and damages to tangible improvements. Prior to approving the APD, the BLM will advise the surface owner of the right to object to the sufficiency of the bond and will review the value of the bond if the surface owner objects. The BLM will either confirm the current bond amount or establish a new amount. Once the operator has filed an adequate bond, the BLM may approve the APD. Following APD approval, the operator and the surface owner may appeal the BLM's final decision on the bond amount.

The operator must negotiate in good faith with the surface owner. Negotiating in good faith provides a forum through which the operator and surface owner can discuss the preferences and needs of both the surface owner and the operator. In addressing those needs, the operator may be able to modify the development proposal to both minimize damage to the surface owner's property while reducing reclamation and surface damage costs. For example, operator costs can might be minimized by placing roads and facilities in locations that meet the surface owner's long-term development plans for the property, thereby lessening the future reclamation obligations of the operator.

The surface use agreement between the surface owner and the operator is confidential. However, the APD Surface Use Plan of Operations must contain sufficient detail about any aspects of the agreement necessary for NEPA documentation and to determine that the operations will be in compliance with laws, regulations, Onshore Orders, and agency policies.

When the operator submits its Surface Use Plan of Operations to the BLM, the operator must make a good faith effort to provide a copy to the surface owner. Following APD approval, the operator must also provide a copy of the Conditions of Approval to the surface owner. In addition, the operator must make a good faith effort to provide a copy of any proposal involving new surface disturbance to the private surface owner.

Indian Lands

The BLM will process APDs, Master Development Plans, and Sundry Notices on Tribal and allotted oil and gas leases and Indian Mineral Development Act mineral agreements in a manner similar to Federal leases. However, the approval procedures, including cultural resource and other environmental requirements, may vary between reservations depending on Tribal ordinances and whether tribes have assumed the functions of a State Historic Preservation Office. Both the Bureau of Indian Affairs (BIA) and the Tribe have the opportunity to recommend conditions of approval to the APD. For processing such applications, the BLM considers the BIA to be the surface management agency for all Indian lands unless a Tribe has contracted the BIA realty function for its lands. The BIA is the lead Federal agency for complying with Section 106 of the National Historic Preservation Act on Indian lands, although this may vary in some States. Operators are responsible for obtaining any special use or access permits from appropriate BIA and/or

tribal offices. BLM is not required to post APDs for minerals subject to Indian leases or agreements for public inspection.

Bonding

Bonding is required (43 CFR 3104 and 36 CFR 228 Subpart E) for oil and gas lease operations in order to ensure that the operator performs all obligations of the lease contract, including but not limited to: royalty obligations, plugging leasehold wells, surface reclamation, and cleanup of abandoned operations. Operators may post the bond in their own name, or obtain consent of the surety under an existing lessee's bond or operating rights owner's bond, extending coverage under that existing bond to include such operations.

The bond may be a surety bond or pledge backed by cash, negotiable securities, Certificate of Deposit, or Letter of Credit in the minimum amount of $10,000. In lieu of a $10,000 lease bond, a bond of not less than $25,000 for statewide operations or $150,000 for nationwide operations may be furnished. The operator must identify the type of bond and the bond number on the APD form.

The authorized officer may require an increase in the amount of any bond for factors, including but not limited to, a history of previous violations; a notice from the Minerals Management Service (MMS) that there are uncollected royalties due; the total number, location, and depth of wells; the age and production capability of the field; unique environmental issues; or the total cost of plugging existing wells and reclaiming lands exceeds the present bond amount by an unacceptable amount.

A bonded principal (operator or lessee) may request a partial release of a lease bond when portions of the abandonment or final reclamation process are deemed complete by the authorized officer. Statewide and nationwide bonds cannot be partially released. The operator must notify the authorized officer prior to and upon the completion of all leasehold abandonment and final reclamation activities.

A separate bond may be required for rights-of-way or Special Use Authorizations to cover losses, damages, or injury to human health, the environment, or property in connection with the use, occupancy, and termination of the right-of-way (43 CFR 2800 and 36 CFR 251 Subpart B).

The BLM will require a separate bond to protect the surface owner in split-estate situations if the operator and surface owner fail to reach an agreement regarding terms of use, compensation for loss or damages, or a waiver.

For operations on National Forest System lands, the authorized FS officer may require additional bonding prior to or during the conduct of operations (36 CFR 228.109).

Chapter 4 – Construction and Maintenance

This chapter provides guidance for the operator about the basic requirements for safe and environmentally sound construction and maintenance of oil and gas-related infrastructure. Construction and maintenance must be performed to standards that ensure the long-term health and productivity of the land. The operator's representative must ensure compliance with all plans and designs. The representative should be designated prior to construction; be accessible to the surface management agency authorized officer; have immediate access to an approved copy of the Application for Permit to Drill (APD), including all maps, drawings, templates, and construction standards; and have the authority to make changes at the request or order of the BLM or surface management agency.

Well Sites

Site Selection and Design

To the extent permitted by the geologic target, well spacing, and drilling and production technology, the locations selected for well sites, tank batteries, pits, and compressor stations should be planned so as to minimize long-term disruption of the surface resources and existing uses, and to promote successful reclamation. Design and construction techniques and other practices should be employed that would minimize surface disturbance and the associated effects of proposed operations and maintain the reclamation potential of the site. The following guidelines can be used to assist in meeting these objectives and reducing the overall undesirable impacts from well sites and other construction areas.

Well sites should be designed to fit the landscape and minimize construction needs. In many cases, this means designing a well site that has an irregular shape, not rectangular. The site layout should be located and staked in the most level area, off narrow ridges, and set back from steep slopes, while taking into consideration the geologic target, technical, economic, and operational feasibility, spacing rules, natural resource concerns, and safety considerations. Well locations constructed on steep slopes cost more to construct, maintain, and reclaim and result in greater resource impacts. Locations on steep slopes that require deep, nearly vertical cuts and steep fill slopes should be avoided where possible or appropriately mitigated. Operations should also be avoided or properly mitigated in riparian areas, floodplains, playas, lakeshores, wetlands, and areas subject to severe erosion and mass soil movement. In visually sensitive areas, locations should be selected that provide for vegetative and topographic screening. The well site or production facility location should also be reviewed to determine its effect on the location of the access road. The advantages gained by a good well site or tank battery location should not be negated by the adverse effects of the access road location.

Construction

Construction procedures must conform to the approved Surface Use Plan of Operations. In order to minimize surface disturbance, construction equipment appropriately sized to the scope and scale of the proposed operation should be used. All surface soil materials (topsoil) are to be removed from the entire cut and fill area and temporarily stockpiled for reuse during interim reclamation or final reclamation if the well is a dry hole. The depth of topsoil to be removed and stockpiled should be determined at the onsite inspection and should be stated either in the proposed Surface Use Plan of Operations or specified in the APD conditions of approval.

Topsoil should be segregated and stored separately from subsurface materials to avoid mixing during construction, storage, and interim reclamation. Subsurface materials should never be placed on top of topsoil material at any point in the operation. Stockpiles should be located and protected so that wind and water erosion are minimized and reclamation potential is maximized.

Excavation of the cut and fill slopes is normally guided by information on the slope stakes. Fills should be compacted to minimize the chance of subsidence or slope failure. If excess cut material exists after fill areas have been brought to grade, the excess material will be stockpiled at approved locations. Snow and frozen soil material is not to be used in construction of fill areas, dikes, or berms. To reduce areas of soil disturbance, the surface management agency may allow mowing or brush beating of vegetation for parts of the well location or access road where excavation is not necessary.

The area of the well pad where the drilling rig substructure is located should be level and capable of supporting the rig. The drill rig, tanks, heater-treater, and other production equipment are not to be placed on uncompacted fill material. The area used for mud tanks, generators, mud storage, and fuel tanks should be at a slight slope, where possible, or a suitable alternative, such as ditching, should be used to provide surface drainage from the work area to the pit.

To reduce erosion and soil loss, it may be appropriate to divert storm water away from the well location with ditches, berms, or waterbars above the cut slopes and to trap well location runoff and sediments on or near the location through the use of sediment fences or water retention ponds.

Reserve Pits

Reserve pits are generally used for storage or disposal of water, drill mud, and cuttings during drilling operations. The pit should normally be located entirely in cut material. Avoid constructing reserve pits in areas of shallow groundwater. Reserve pits should not be constructed in natural watercourses. Water courses include lake beds, gullies, draws, streambeds, washes, arroyos, or channels that are delineated on a 1:24,000 USGS quadrangle map or have a hydrologic connection to streams, rivers, or lakes.

For reserve pit construction on sloping sites, the preferred method is to locate the pit on the drill pad next to the high wall. Pits are constructed totally in cut at such locations. If this is not possible, at least 50 percent of the reserve pit should be constructed below original ground level to help prevent failure of the pit dike. Fill dikes should be properly compacted in lifts. The necessary degree of compaction depends on soil texture and moisture content. The pit should

be designed to contain all anticipated drilling muds, cuttings, fracture fluids, and precipitation while maintaining at least 2 feet of freeboard.

Pits improperly constructed on slopes or poor soil types may leak along the plane between the natural ground level and the fill. There is a significant potential for pit failure in these situations. When constructing dikes for pits or impoundments with fill embankment, a keyway or core trench should be excavated to a minimum depth of 2 to 3 feet below the original ground level. The core of the embankment can then be constructed with compacted, water-impervious material.

To prevent contamination of ground water and soils or to conserve water, it is recommended that operators use a closed-loop drilling system or line reserve pits with an impermeable liner, particularly when it is anticipated that pits will contain moderate or high levels of hydrocarbons and chloride, or the pits are located in areas of shallow groundwater or porous soils over fractured bedrock aquifers.

Pits can be lined with synthetic liners or other materials such as bentonite or clay. Impermeable liners should have a permeability of less than 10^{-7}cm/sec. Liners must be installed so that they will not leak and must be composed of materials compatible with all substances to be placed in the pit. Synthetic liners with a minimum thickness of 12 mils and resistance to ultraviolet radiation, weathering, chemicals, punctures, and tearing are most commonly used, although some States may require liners that are thicker. Suitable bedding material, such as sand, clay, or felt liners should be used in areas where the base rock might puncture the liner.

Depending on the proposed contents of the pit and sensitivity of the environment, the surface management agency may require a leak detection system or the use of self-contained mud systems with the drilling fluids, mud, and cuttings being transported to approved disposal areas.

Reserve pits should be appropriately fenced to prevent access by persons, wildlife, or livestock. During drilling in active livestock areas, the reserve pit must be fenced with an exclosure fence on three sides and then fenced on the fourth side once drilling has been completed. Refer to Figure 1 for recommended fence construction standards in active livestock areas. In areas where livestock will not be present, other types of fences may be appropriate.

The fence should remain in place until pit reclamation begins. After cessation of drilling and completion operations, any visible or measurable layer of oil must be removed from the surface of the reserve pit and the pit kept free of oil. In some situations and locations, precautions, such as netting, may be required in order to prevent access and mortality of birds and other animals.

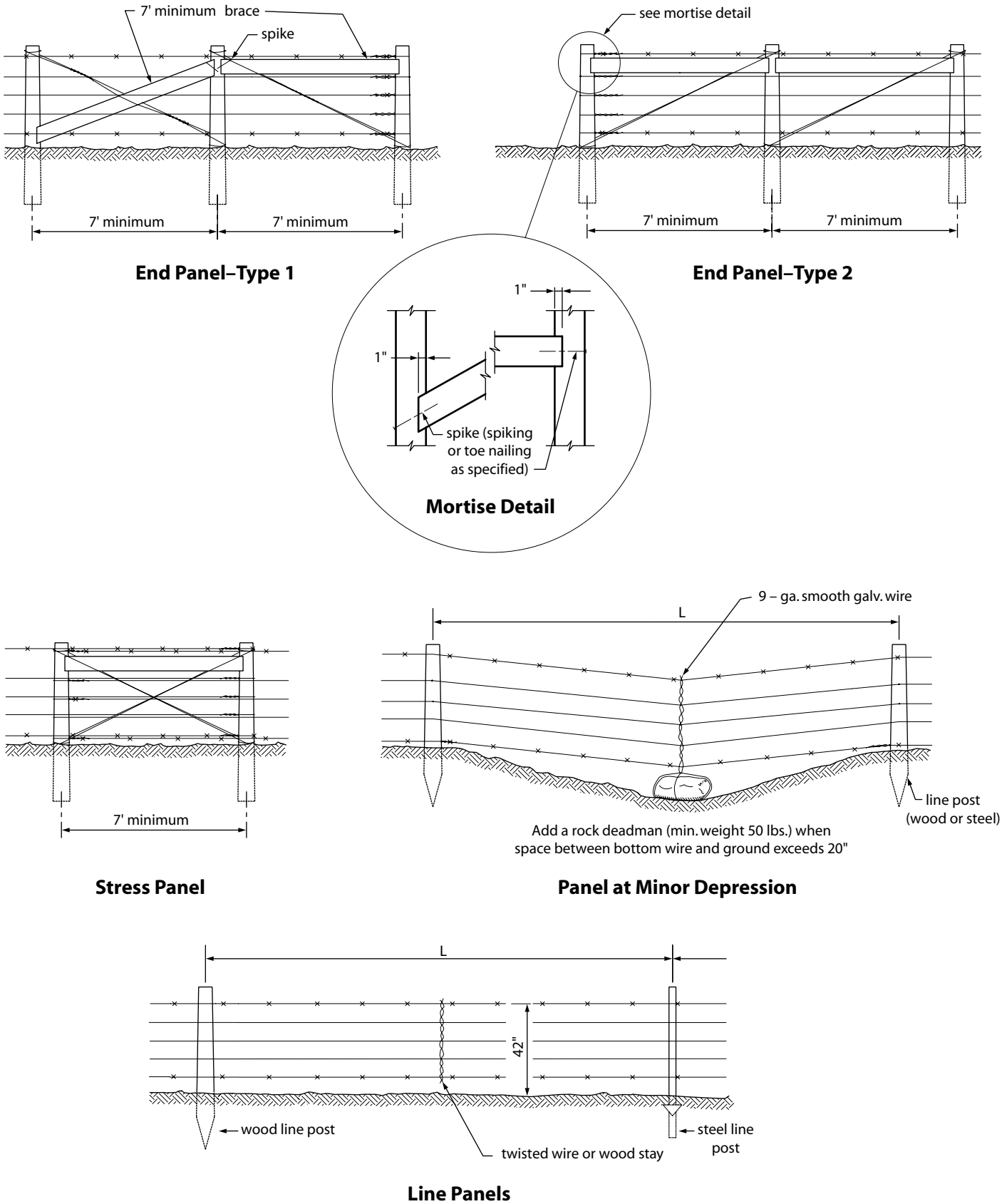
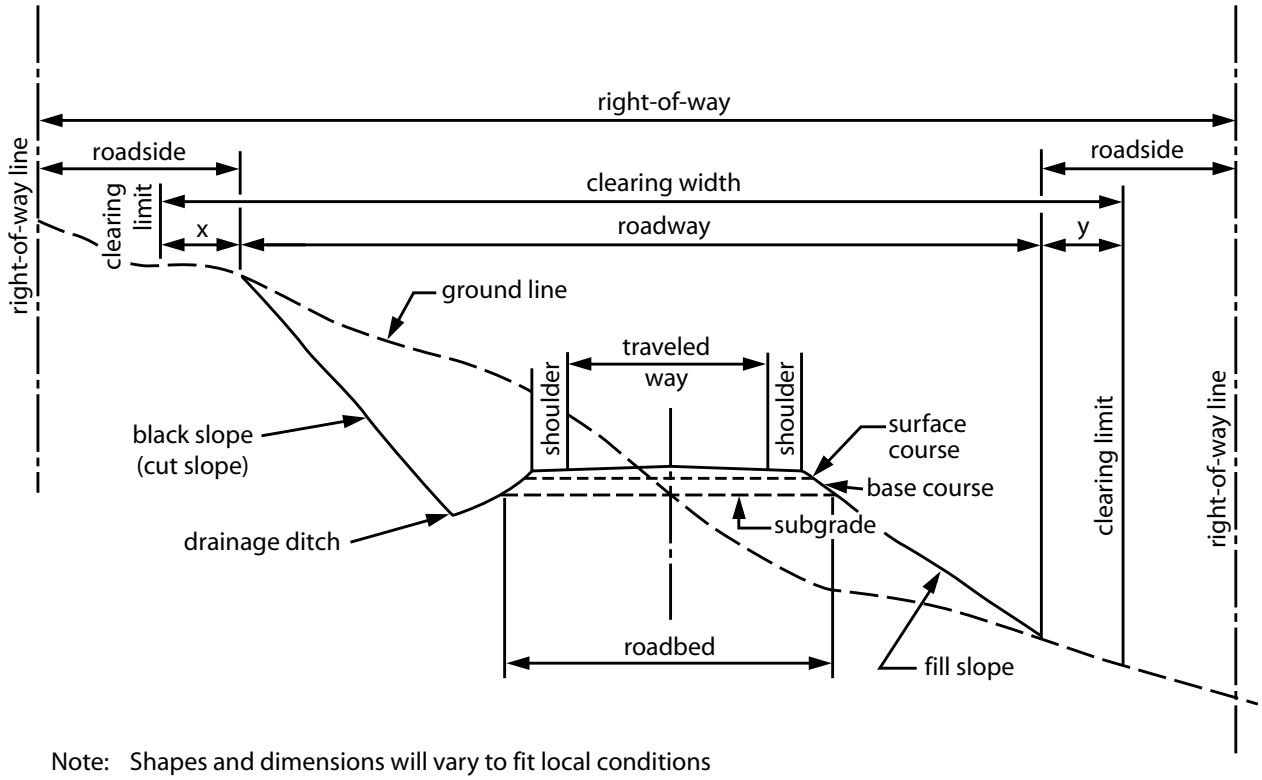


Figure 1. Recommended construction standards for exclosure fences in livestock areas.

Roads and Access Ways

This section provides the minimum guidelines for oil and gas operators on BLM and FS policy and standards relative to the planning, location, design, construction, maintenance, and operation of roads and access ways on public and National Forest System lands. Contact the local BLM or FS office for specific requirements. Exception to or modification of these guidelines is at the surface management agency's discretion based on the physical conditions at the site and the project proposal. Figure 2 illustrates commonly used terms in road design and should be referred to when reviewing this section.



Note: Shapes and dimensions will vary to fit local conditions
See drawings for typical sections
x and y denote clearing outside of roadway

Figure 2. Illustration of commonly used terms in road design

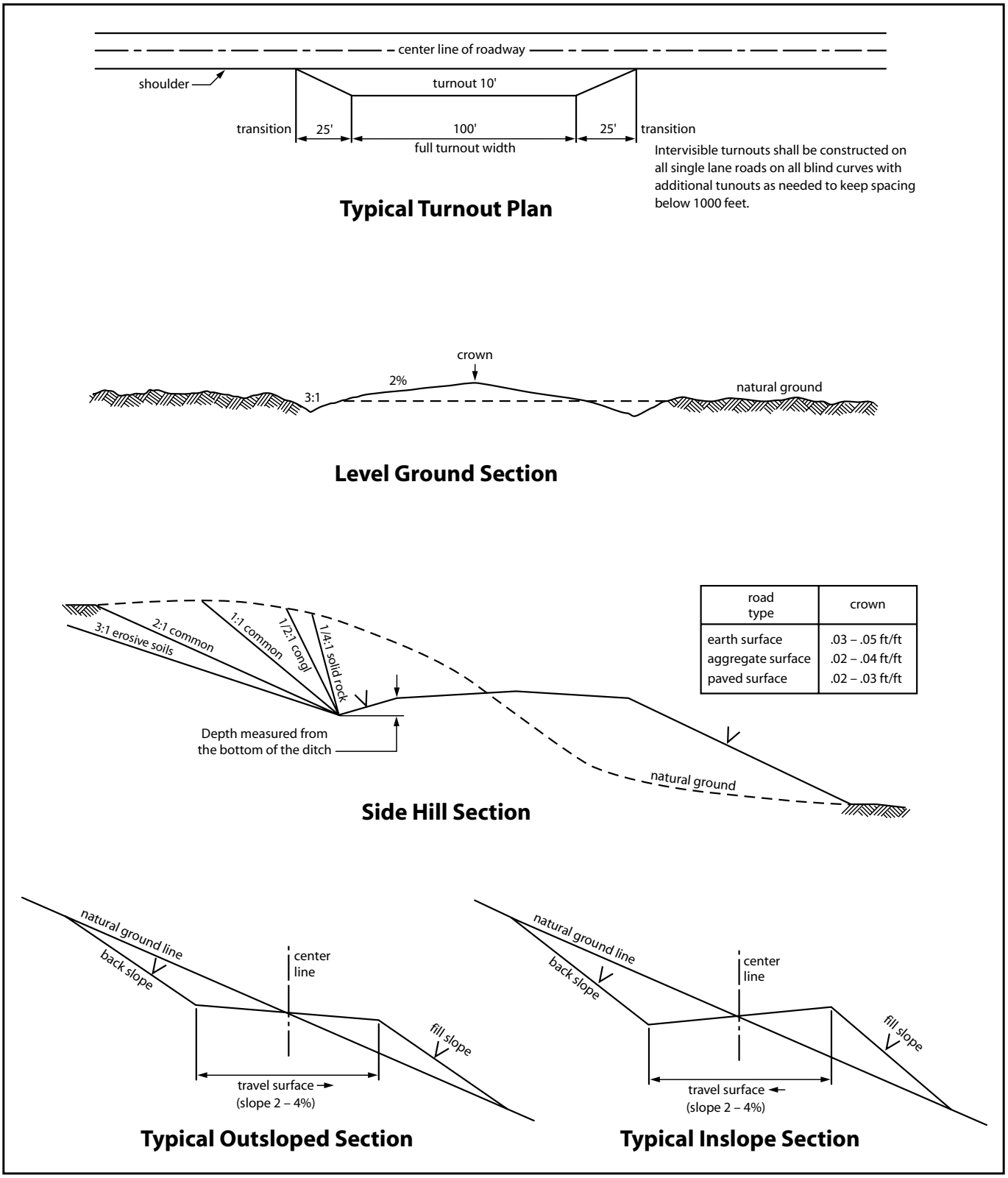
To ensure public safety and the protection of Federal resources, BLM and FS roads must be constructed to an appropriate standard no higher than necessary to accommodate the intended use. In many cases, the construction of a lower-class road will meet the operator's access needs, while minimizing the effects on other important resource values.

Roads used to access oil and gas locations are typically constructed for that primary purpose, are rarely permanent, and exist only as long as necessary to complete exploration and production operations. They are authorized with an accompanying reclamation plan and are to be reclaimed after well and field operations are completed. In relatively rare cases, the surface management agency or surface owner may assume responsibility for the continued operation and maintenance of roads deemed necessary.

The authorized officer has the option of determining whether professional engineering design and construction oversight is necessary or whether the road can be constructed by the operator consistent with site-specific standards and approved road design templates (Figures 2 and 3). The need for professional engineering design and oversight should be based on factors such as topography,

Construction Steps

1. Salvage topsoil
2. Construct road
3. Redistribute topsoil
4. Revegetate slopes



road type	crown
earth surface	.03 – .05 ft/ft
aggregate surface	.02 – .04 ft/ft
paved surface	.02 – .03 ft/ft

Figure 3. Cross-sections and plans for typical road sections representative of BLM resource or FS local and higher-class roads.

soils, hydrology, safety, and levels and types of use by the operator and general public. For oil and gas roads on National Forest System lands, a qualified FS engineer reviews all project design drawings, officially attesting to their technical adequacy.

To meet the requirements of Onshore Order No. 1 (Surface Use Plan of Operations, 2a and b) for new or reconstructed roads, the operator must provide information such as:

- Road width, maximum grade, and crown design
- Location of turnouts
- Plans for soils-, hydrology-, and topography-dependent drainage, including ditches and locations and sizes of culverts and bridges
- On- and off-site erosion control
- Plans for revegetation of disturbed areas
- Fence cuts and cattle guards
- Major cuts and fills
- Source and storage sites for topsoil
- Types of surfacing materials, if any
- Plans for maintaining or improving existing roads

All roads must be designed, constructed, and maintained by the operator in a safe and environmentally responsible manner. Oil and gas roads that are not closed to public use (through the use of gates or other traffic control devices) have the potential to serve secondary uses, such as providing access for hunters and other recreational users who may not be familiar with the road and area. Therefore, safety is a primary design consideration.

Roads also have the potential to cause environmental harm through erosion, air pollution, stream degradation, habitat alteration, and increased public use of an area. Careful attention to the proposed road location and design can significantly minimize environmental harm. For example, shorter roads constructed on steep slopes may cost more to construct, maintain, and reclaim and can also result in greater environmental impacts than would longer roads constructed along the contours of the land or constructed in flatter terrain. In areas of high environmental sensitivity, special road location, design, and construction and maintenance techniques may be required, as well as seasonal vehicular closures to the general public.

It is always a good practice to consult with the surface management agency or private landowner prior to submitting the road design. Helpful design information can also be found on agency websites. For the BLM, guidance can be found in BLM 9113–Roads Manual; and BLM 9130–Sign Manual. For the FS, information is available in EM-7100-15: Sign and Poster Guidelines for the FS or the FS Water/Road Interaction Series of publications.

Transportation Planning

The goal of transportation planning is to identify and analyze feasible alternatives for access that meet the objectives of the surface management agency, private surface owner, and the needs of the diverse users of Federal lands. The transportation planning process:

- Considers future road use needs, including public access and resource development or use
- Considers affected resource values and safety
- Avoids haphazard or unnecessary development of roads and utility corridors

Road location and design criteria are also developed and documented during the transportation planning process. Transportation planning can prevent unnecessary expenditures of time and money and prevent unnecessary surface disturbance. Therefore, it is important for the operator to become involved in the transportation planning process.

Road Location

Road location is critical to the long-term maintenance and environmental success of a road construction project. Proper road location can significantly reduce or eliminate impacts to cultural, scenic, biological, and other environmental resources. Operators are strongly encouraged to contact the surface management agency or private surface owner about possible route locations before surveying and staking. This early communication between the operator and the surface management agency or private surface owner can minimize changes made at the onsite inspection and reduce project delays.

Existing roads should be considered for use as access routes and may be used when they meet agency standards, transportation and development needs, and environmental objectives. When access involves the use of existing agency roads, operators must obtain agency approval and may be required to upgrade the roads, contribute to road maintenance funds, or participate in road maintenance agreements.

When selecting a location for new roads, consider following topographic contours. While laying out roads in a point-to-point approach minimizes the length of road, it often increases soil erosion, maintenance costs, long-term loss of vegetation, and visual contrast. Following natural topographic contours preserves natural drainage patterns and usually makes it possible to design a more aesthetically pleasing road with lower construction, maintenance, and reclamation costs and less impact on the environment.

Initial steps in road location include:

- Determination of the intended use of the road, planned season of use, type of vehicles to be used, road class, and needs of the surface owner or agency
- Examination of the surface management agency's transportation plan, which may already have identified feasible routes for the area
- Examination of existing data, including maps and aerial photos, land use plan decisions, and biological, physical, and cultural conditions of the area
- Determination of oil and gas lease obligations, future development needs, and safety considerations.

Once these steps have been taken, an appropriate route can be identified. This process is critical to ensuring that the safest and least intrusive route is chosen.

Geotechnical Factors

In complex terrain or conditions, it is recommended that the operator look at various route alternatives before selecting the preferred route. Field reconnaissance of alternative routes may be necessary in order to provide information on such factors as soil types, construction/reclamation limitations, type of excavation, landslide areas, subgrade conditions indicating the need for surfacing, potential cut slope problems, surface or subsurface water problem areas, suitability of fill material, potential gravel pits or quarries for road aggregate, and potential borrow and waste sites. A good road location analysis may avoid costly problems and identify cost-saving opportunities.

Other Factors

Other factors to consider that are unique to the oil and gas industry include:

- The potential for encountering sour gas (H2S). Note the prevailing wind direction and identify a clear escape route from the drill site.
- The potential for year-round operation. Drill sites and producing locations may require all-weather access and special maintenance considerations for snow removal.
- The potential for exploratory drilling to result in a producing operation. Select initial road alignments and road classes based on the potential for upgrade if the wells are completed for production.

When the road location information is submitted to the surface management agency, the acceptability of the proposed route, and if applicable, alternative routes, can be evaluated. The preferred road location will be identified by the authorized officer at the onsite inspection in coordination with the private surface owner on non-Federal surface.

Road Design and Construction

Construction and Reclamation Considerations

New road construction or reconstruction by the operator must be suitable for the intended use and must comply with BLM road and safety standards, such as those found in BLM's 9113–Roads Manual. Roads constructed within the jurisdiction of the FS must comply with applicable FS road and safety standards.

Roads should be designed and constructed to allow for successful interim and eventual final

reclamation. Revegetation of road ditches and cut and fill slopes will help stabilize exposed soils and reduce sediment loss, reduce the growth of noxious weeds, reduce maintenance costs, maintain scenic quality and forage, and protect habitat. To ensure successful growth of plants and forbs, topsoil must be salvaged where available during road construction and respread to the greatest degree practical on cut slopes, fill slopes, and borrow ditches prior to seeding. To ensure the stability of freshly topsoiled slopes during revegetation, the application of mulch or other sediment control measures may be appropriate.

Construction with saturated or frozen soils results in unstable roads and should be avoided. Vehicular travel under wet conditions can produce significant rutting of unsurfaced roads resulting in soil loss and safety concerns. If road use is anticipated during saturated soil conditions, the surface management agency may require road surfacing to provide safe vehicle access, ensure uninterrupted operations, and reduce road damage and sediment loss.

Nonconstructed Roads and Routes

When site conditions are appropriate, the surface management agency may approve the creation or use of "primitive," two-track roads or overland route corridors to meet the operator's access needs. Primitive roads and route corridors may serve as appropriate access to exploration drilling locations where it is not certain if the well will be productive, or to producing wells where vehicle traffic is infrequent due to the use of off-site production facilities and automated well monitoring.

The appropriateness of primitive roads or routes is both site-specific and use-specific and is typically based on many factors, such as anticipated dry or frozen soil conditions, seasonal weather conditions, flat terrain, low anticipated traffic, or driller's or operator's access needs. Primitive roads or routes necessitate low vehicle speed and are typically limited to four-wheel drive or high clearance vehicles. They can consist of existing or new roads with minor or moderate grading; two-track roads created by the operator's direct vehicle use with little or no grading; overland routes within a defined travel corridor leaving no defined roadway beyond crushed vegetation; or any combination along the route. Operators should not flat-blade roads. Drainage must be maintained, where appropriate, to avoid erosion or the creation of a muddy, braided road.

These roads and routes must be used and maintained in a safe and environmentally responsible manner and are not intended for use as all-weather access roads. Resource damage must be repaired as soon as possible and the operator must consult with the surface management agency

A minimum disturbance, primitive, two-track road winds its way to a drilling operation. To further reduce disturbance, most of the well location has not been stripped of vegetation or topsoil.

to determine if all or a portion of the road needs to be upgraded to an all-weather access road. When used and maintained appropriately, nonconstructed roads and routes have the advantage of reducing construction, maintenance, and reclamation costs and reducing resource impacts. The use of nonconstructed roads must be approved by the surface management agency.

Constructed Roads

The surface management agency determines the appropriate road type and associated road design standards based on the expected traffic volume and other factors, such as seasonal or year-round use, the design vehicle, soil types, rainfall, topography, construction costs, compatibility with other resource values, and safety. This information is documented during the transportation planning process and onsite meeting. Road types may vary along the same route depending on the operator's or the surface management agency's access or resource protection needs. In some cases, exploration drilling may warrant a lower design standard or primitive road, mentioned previously, which could be upgraded if the well becomes a producing well.

BLM Resource or FS Local Roads

BLM resource or FS local roads are low-volume, single-lane roads. They normally have a 12 to14 foot travelway with "intervisible turnouts," as appropriate, where approaching drivers have a clear view of the section of road between the two turnouts and can pull off to the side to let the approaching driver pass. They are usually used for dry weather, but may be surfaced, drained, and maintained for all-weather use. These roads connect terminal facilities, such as a well site, to collector, local, arterial, or other higher-class roads. They serve low average daily traffic (ADT) and are located on the basis of the specific resource activity need rather than travel efficiency.

BLM Local or FS Collector Roads

BLM local or FS collector roads may be single-lane or double-lane with travelways 12 to 24 feet in width and intervisible turnouts. They are normally graded, drained, and surfaced and are capable of carrying highway loads. These roads provide access to large areas and for various uses. They collect traffic from resource or local roads or terminal facilities and are connected to arterial roads or public highways. The location and standards for these roads are based on both long-term resource needs and travel efficiency. They may be operated for either constant or intermittent service, depending on land use and resource management objectives for the area being served.

BLM Collector or FS Arterial Roads

BLM collector or FS arterial roads are usually double-lane, graded, drained and surfaced, with a 20 to 24 foot travelway. They serve large land areas and are the major access route into development areas

General Design Specifications for Different Types of Roads

Definitions

Design Criteria are requirements that govern the selection of elements and standards for a road, such as resource management objectives, road management objectives, safety requirements, and traffic characteristics.

Design Elements are the physical characteristics of a road, such as the ditches, culverts, travelway clearing limits, curve widening, slopes, and drainage characteristics that, when combined, comprise the planned facility.

Design Standards comprise the lengths, widths, and depths of design elements, such as a 14-foot-wide travelway, 2-foot shoulders, 2:1 cut slopes, 3-foot curve widening, and 6 inches of crushed aggregate. Design terms are illustrated in Figure 2.

Design Vehicle is the vehicle most frequently using the road that determines the minimum standard for a particular design element. No single vehicle, however, controls the standards for all the design elements for a road.

with high average daily traffic rates. The locations and standards are often determined by a demand for maximum mobility and travel efficiency rather than a specific resource management service. They usually connect with public highways or other arterials to form an integrated network of primary travel routes and are operated for long-term land and resource management purposes and constant service.

BLM Resource and FS Local Roads

Basic Design Requirements

The surface management agency will provide requirements specific to proposed oil and gas roads during project planning and/or at the onsite review with consideration of safety, impacts on land and resources, and cost of transportation. Requirements for specific proposals may vary somewhat from the generalized requirements that follow.

- Design speed specific to oil and gas roads is 10 to 30 miles per hour. For the FS, this should generally be less than 15 miles per hour.
- Preferred travelway width is 14 feet with turnouts. For the FS, this can vary from two parallel vehicle tracks, bladed 12-foot sections with turnouts, or a broader defined overland corridor approved by the surface management agency.
- Recommended minimum horizontal curve radii is determined by the design vehicle and design speed. Where terrain will not allow the proper curve radii, curve widening is necessary. Specifications are available from the surface management agency.
- Road gradient has a major effect on the environmental and visual impact of a road, particularly in terms of erosion. The gradient should fit as closely as possible to the natural terrain, considering vehicle operational limitations, soil types, environmental constraints, and traffic service levels. The gradient should not exceed 8 percent except for pitch grades (300 feet or less in length) in order to minimize environmental effects. In mountainous or dissected terrain, grades greater than 8 percent up to 16 percent may be permissible with prior approval of the surface management agency.
- The primary purpose of turnouts is for user convenience and safety and to maintain user speed. Turnouts are generally naturally occurring, such as additional widths on ridges or other available areas on flat terrain. On roads open to the public, turnouts must be located at 1,000-foot intervals or be intervisible, whichever is less.
- Drainage control must be ensured over the entire road through the use of drainage dips, insloping, natural rolling topography, ditch turnouts, ditches, or culverts. Ditches and culverts may be required in some situations, depending on grades, soils, and local hydrology. If culverts or drainage crossings are needed, they should be designed for a 25-year or greater storm frequency, without development of a static head at the pipe inlet.
- Gravel or other surfacing is not always required, but may be necessary for "soft" road sections, steep grades, highly erosive soils, clay soils, or where all-weather access is needed.
- At times, a limited number of oil field vehicles (critical vehicles) larger than the design vehicle may make occasional use of the road. The operator should consider these needs in road design.

Field Survey Requirements

Field survey requirements vary with topography, geologic hazard, potential for public and recreational use, or other concerns. Each surface management agency has survey requirements based on design requirements and concerns specific to the area. The surface management agency should be contacted as early as possible to determine the survey requirements. The following general requirements are imposed to control work and produce the desired road.

- A flagline is established along the construction route. Flags should be placed approximately every 100 feet, or be intervisible, whichever is less.
- Construction control staking may be required depending on conditions of the site.
- Culvert installations are located and staked.

Design Drawings and Templates

- On side slopes of 0 to 20 percent, where horizontal and vertical alignment can be worked out on the ground, a plan and profile drawing may not be required. Standard templates, drainage dip spacing,

culvert locations, and turnout spacing guides would be acceptable.

- A plan and profile view would be the minimum drawing required on steeper slopes and in areas of environmental concern. The drawing should identify grade, alignment, stationing, turnouts, and culvert locations.
- Standard templates of road cross-sections and drainage dips are required for all resource, local, and higher-class roads. Figures 2 and 3 illustrate these sections.
- Additional information may be required in areas of environmental or engineering concern.

Construction

The operator must take all necessary precautions for protection of the work and safety of the public during construction of the road. Warning signs must be posted during blasting operations.

Clearing and Grubbing

Clearing and grubbing will normally be required on all sections of the road. Exceptions would be allowed in areas of sparse, non-woody vegetation.

All clearing and grubbing should be confined to a specified clearing width (Figure 2), which is usually somewhat wider than the limits of actual construction (roadway). Branches of all trees extending over the roadbed should be trimmed to provide a clear height of 14 feet above the roadbed surface. All vegetative debris must be disposed of as specified by the surface management agency.

Excavation

All soil material and fragmented rock removed in excavation is to be used as directed in the approved plan. Excess cut material shall not be wasted unless specified in the approved plan.

Roadbed Construction

Roadbed material should not be placed when the materials or the surface are frozen or too wet for satisfactory compaction. Equipment should be routed over the layers of roadbed material already in place to help avoid uneven compaction anywhere along the travel route. Borrow material shall not be used until material from roadway excavation has been placed in the embankments, unless otherwise permitted. Borrow areas used by the operator must be approved prior to the start of excavation.

Roadside ditches should conform to the slope, grade, and shape of the required cross-section with no projections of roots, stumps, rocks, or similar debris. Side ditches must be excavated to a depth of 1-foot minimum below the finished road surface. Drainage turnout spacing on these ditches should not exceed 500 feet; slopes greater than 5 percent may require closer spacing of turnout furrows (wing ditches or relief ditches).

BLM Local and FS Collector Roads

Basic Design Requirements

- Design speed is generally 15 to 50 miles per hour. For the FS, it is 15 to 25 miles per hour. The selected design speed establishes the minimum sight distance for stopping and passing, and road geometrics such as minimum radius of curvature, the gradient, and type of running surface.
- Travelway minimum is 14 feet (single lane) and 24 feet (double lane) with intervisible turnouts, as may be required.
- Recommended minimum horizontal curve radius is 220 feet. Where terrain will not allow 220-foot curve radii, curve widening is necessary. Super-elevation should be considered at speeds greater than 20 miles per hour. Specifications are available from surface management agency engineering offices.
- Vertical curves should be designed with an appropriate "k" value (rate of vertical curvature length per percent of "A", the algebraic difference in grade) based on design speed (for example on FS, crest vertical curves, 30 mph k=9; 40 mph k=22; 50 mph k = 45).
- Maximum grades should not exceed 8 percent. Pitch grades for lengths not to exceed 300 feet may be allowed to exceed 8 percent in some cases.
- All culverts must be sized in accordance with accepted engineering practices and any special environmental concerns. The minimum size culvert in any installation is 18 inches. Drainage crossings

and culverts should be designed for a 25-year or greater storm frequency and allow fish passage in perennial streams where fish are present.

- Turnouts are required on all single-lane roads. Turnouts must be located at 1000-foot intervals or be intervisible, whichever is less. The length should not be less than 100 feet, with additional 50-foot transitional tapers at each end.
- Surfacing may be required to provide all-weather access. If surfacing is needed, aggregate size, type, amount, and application method will be specified by the local office of the surface management agency. Subgrade analysis may be required to determine load-bearing capacities.

Field Survey Requirements

Generally, the survey requirements for these roads are similar to those for BLM resource and FS local roads. These roads, however, are designed for higher average daily traffic rates and greater speeds. Thus, in addition to flagline and culvert survey requirements, an instrument or topographic survey with preliminary centerline staking and slope staking is usually required on steep terrain and in areas requiring special engineering. Specific survey requirements are available at the local office of the surface management agency.

Design Drawings and Templates

- Generally, the required drawings for this road class would include a plan and profile (Figure 4). The drawing should identify grade, location, stationing, surfacing, turnouts, culvert locations, and drainage dip spacing.
- Standard templates of the proposed road cross-section(s) (Figures 2 and 3) and drainage dip design are required for this type of road.
- Additional information may be required in areas of environmental or engineering concern.

Construction

- Drainage dips, construction, and spacing are the same as for BLM resource and FS local roads.
- Culvert cross-drains should be used in lieu of drainage dips for road grades in excess of 10 percent. Culvert installation is discussed in the Drainage and Drainage Structure Section.
- Construction standards are the same as given in the BLM Resource and FS Local Roads Section.

BLM Collector and FS Arterial Roads

Basic Survey and Design Requirements

- Vertical, horizontal, and topographic data, as well as significant features should be plotted on standard plan and profile sheets to a scale of 1 inch = 100 feet horizontal and 1 inch = 20 feet vertical, or as otherwise directed by the surface management agency. The design shall conform to the most current edition of the AASHTO, *Guidelines for Geometric Design of Very Low-Volume Local Roads*, for access roads with an anticipated average daily traffic of less than 400 vehicles.

- Plot "L" (layout) line along "P" (preliminary) line using the following design standards criteria:
  - Design speed is 30 miles per hour or greater unless otherwise directed.
  - Travel width-minimum is 20 feet, maximum is 24 feet.
  - Minimum horizontal curve radius is 460 feet unless shorter radii are approved. The curve radius must take into account super-elevation.
  - Design vertical curves with an appropriate "k" value based on design speed.
  - Maximum grade is 8 percent (except pitch grades not exceeding 300 feet in length and 10 percent in grade).
  - Mass diagrams and earthwork balancing may be required. Obvious areas of waste or borrow shall be noted on the plan and profile as well as proposed locations of borrow or waste disposal areas.
  - All culverts should be designed for a minimum 25-year storm frequency with an allowable head that does not overlap the roadway or cause damage. However, the minimum acceptable size culvert diameter is 18 inches. Show all culverts planned to accurate vertical scale on plan profile sheets.
  - Slope staking is required.

Design Drawings and Templates

- Complete plan and profile drawings are required for any BLM collector or FS arterial road (Figure 4). These drawings should identify grade, location, stationing, and all culvert sizes and locations (see Figure 7 for examples).
- Standard templates of road cross-sections, drainage design, and culvert location and installation are required (Examples in Figures 3 through 6).
- Mass diagrams and materials investigation and classification may be required.

Construction

Except for the specific items that follow, construction standards are given in the BLM Resource/FS Roads or the BLM Local/FS Collector Roads Sections. Construction shall be performed under the direction of a licensed, professional engineer as required by the BLM, or a qualified engineer for roads on FS lands.

Excavation and fill construction will be performed to secure the greatest practicable degree of roadbed compaction and stability. Roadbed materials shall be placed parallel to the axis of the roadway in even, continuous, approximately horizontal layers not more than 8 inches in thickness. The full cross-section of the fill must be maintained as each successive layer is placed. Place successive layers of material on embankment areas to produce the best practical distribution of the material. The materials throughout the roadbed shall be free from lenses, pockets, streaks, or layers of material differing substantially in texture, gradation, or compaction from the surrounding material. Ordinarily, stones coarser than a 3-inch-square mesh opening should be buried at least 4 inches below the finished surface of the roadway.

The operator should route construction equipment over the layers of roadbed material already in place and distribute the gravel evenly over the entire width of the embankment to obtain maximum compaction while placing the material and to avoid uneven compaction anywhere along the travel route.

Use excess excavation material, where practical, to improve the road grade line or to flatten fill slopes. Other waste areas must be approved prior to placement of waste material.

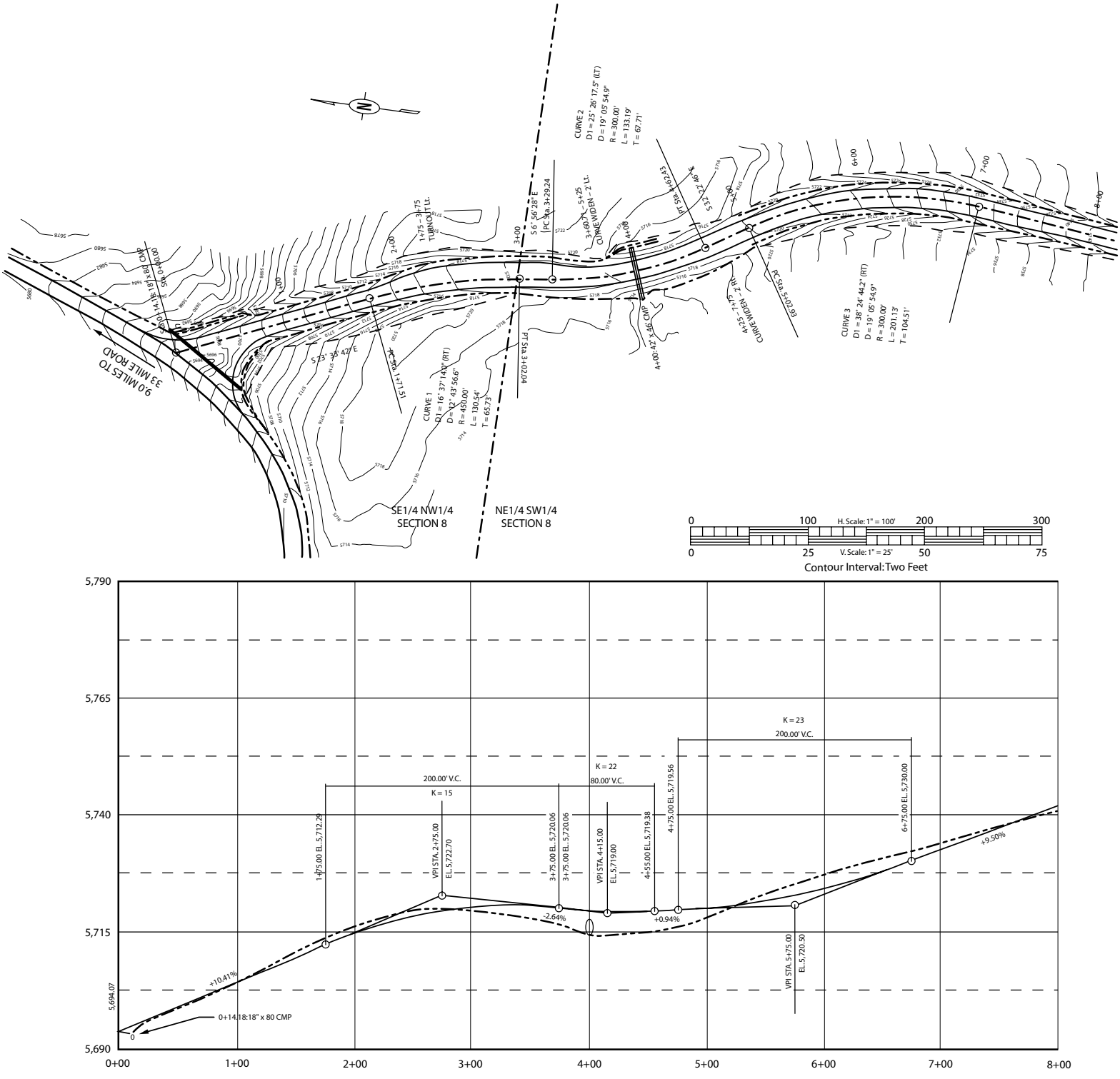


Figure 4. Typical road plan and profile drawing for an oil and gas road.

Road Maintenance

When required, the operator shall submit a road maintenance plan for all roads that will be constructed or used in conjunction with the drilling program. The maintenance plan will contain provisions for maintaining the traveled way, protection of the roadway features, requirements for road management, and the method to be used in carrying out maintenance activities.

Maintenance activities normally required include monitoring, blading, surface replacement, dust abatement, spot repairs, slide removal, ditch cleaning, culvert cleaning, litter cleanup, noxious weed control, and snow removal. When applicable, specific areas shall be identified in the road maintenance plan for disposal of slide material, borrow or quarry sites, stockpiles, or other uses that are needed for the project.

Key maintenance considerations include regular inspections; reduction of ruts and holes; maintenance of crowns and outslopes to keep water off the road; replacement of surfacing materials; clearing of sediment blocking ditches and culverts; maintenance of interim reclamation; and noxious weed control.

Conduct additional inspections following snowmelt or heavy or prolonged rainfall to look for drainage, erosion, or siltation problems. Blade only when necessary and avoid blading established grass and forb vegetation in ditches and adjacent to the road. Ensure that maintenance operators have proper training and understand the surface management agency's road maintenance objectives.

Authorized users may perform their share of road maintenance, enter into road maintenance agreements administered by the users, or may be required to deposit sufficient funds with the surface management agency to provide for their share of maintenance. If the road has only one permitted user, other than incidental use by others, that user may have total responsibility for maintenance.

This example of interim road reclamation shows that reapplying topsoil and the regrowth of vegetation along the road borrow ditches of this resource road reduces the loss of forage, habitat, and sediment, decreases maintenance costs, and helps maintain the scenic quality.

Drainage and Drainage Structures

The proper design and construction of structures for the drainage of water from or through the roadway often contributes the most to the long-term success of the road and structure and minimizes maintenance and adverse environmental effects, such as erosion and sediment production. It is vitally important to keep the water off the road.

Road Drainage Design

The most economical control measure should be designed to meet resource and road management objectives and constraints. The economic considerations should include both construction and maintenance costs. The need for drainage structures can be minimized by proper road location. However, adequate drainage is essential for a stable road. A proper drainage system should include the best combination of various design elements, such as ditches, culverts, drainage dips, crown, in-slope or out-slope, low-water crossings, subsurface drains, and bridges.

Surface Drainage

Surface drainage provides for the interception, collection, and removal of water from the surface of roads and slope areas. The design may need to allow for debris passage, mud flows, and water heavily laden with silt, sand, and gravel. Culverts should be designed in accordance with applicable practices adopted by State and Federal water quality regulators under authority of the Federal Clean Water Act (CWA). Culverts should accommodate a 10-year flood without development of a static head and avoid serious velocity damage from a 25-year flood.

Subsurface Road Drainage

Subsurface drainage is provided to intercept, collect, and remove groundwater that may flow into the base course and subgrade; to lower high water tables; or to drain locally saturated deposits or soils.

Drainage Structures

Proper location and design can provide economical and efficient drainage in many cases. However, structural measures are often required to ensure proper and adequate drainage. Some of the most common structures are drainage dips, ditches, road crowning, culverts, and bridges.

Drainage Dips

The primary purpose of a drainage dip is to intercept and remove surface water from the travelway and shoulders before the combination of water volume and velocity begins to erode the surface materials. Drainage dips should not be confused with water bars, which are normally used for drainage and erosion protection of closed or blocked roads. See Figure 5 for an illustration of a typical drainage dip and construction specifications. Spacing of drainage dips depends upon local conditions such as soil material, grade, and topography. The surface management agency should be consulted for spacing instructions.

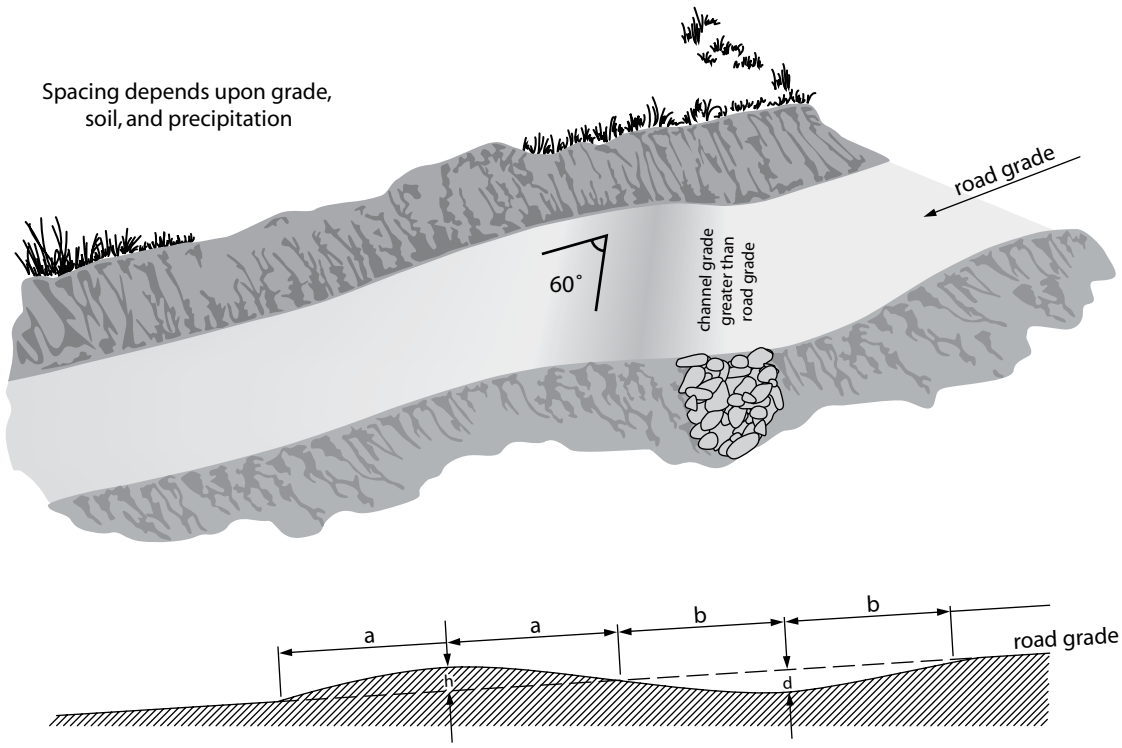
Ditches

The geometric design of ditches must consider the resource objectives for soil, water, and visual quality; maintenance capabilities and associated costs; and construction costs. Ditch grades should be no less than 0.5 percent to provide positive drainage and to avoid siltation. The types of ditches normally used are drainage, trap, interception, and outlet.

Road Crowning

Roads that use crowning and ditching are common and can be used with all road classes, except non-constructed roads. This design provides good drainage of water from the surface of the road.

Drainage of the inside ditch and sidehill runoff is essential if the travelway is to be kept dry and passable during wet weather.



Cross-Section of Waterdip on Center Line

Road Grade	d	h	a	b
2%	0.6'	0.4'	10'	10'
4%	1.0'	0.8'	14'	14'
6%	1.2'	1.4'	16'	18'
8%	2.0'	2.2'	22'	24'

Figure 5. Typical drainage dip and construction specifications.

Culverts

Culverts are used in two applications: in streams and gullies to allow normal drainage to flow under the travelway and to drain inside road ditches. The latter may not be required if drainage dips are used. The location of culverts should be shown on the plan and profile or similar drawings or maps submitted with the APD.

All culverts should be laid on natural ground or at the original elevation of any drainage crossed, except as noted for ditch relief culverts. See Figures 6 and 7 for installation details.

Culverts should have a minimum diameter of 18 inches. The diameter should be determined by the anticipated amount of water that would flow through the culvert. Factors to be considered include the geographic area being drained, soils and slopes in the drainage area, annual precipitation, and likely storm events.

The outlet of all culverts should extend at least 1 foot beyond the toe of any slope. It may be necessary to install rip-rap or other energy dissipation devices at the outlet end of the culvert to prevent soil erosion or trap sediment (see example in the photograph).

Properly sized rock rip-rap at culvert outlets helps reduce water velocity and resulting soil erosion.

Maximum Recommended Culvert Spacing (ft)

Soil Type	Road Grade 2–4%	Road Grade 5–8%	Road Grade 9–12%
Highly erosive granitic or sandy	240	180	140
Intermediate erosive clay or load	310	260	200
Low erosive shale or gravel	400	325	250

Figure 6. Culvert spacing.

All culverts used in the construction of access roads should be concrete, corrugated metal pipe made of steel, or properly bedded and backfilled corrugated plastic pipe. Only undamaged culverts are to be used, and any culvert should be inspected for damage prior to installation. All spots on the pipes where the zinc coating has been injured should be painted with two coats of zinc-rich paint or otherwise repaired as approved by the surface management agency.

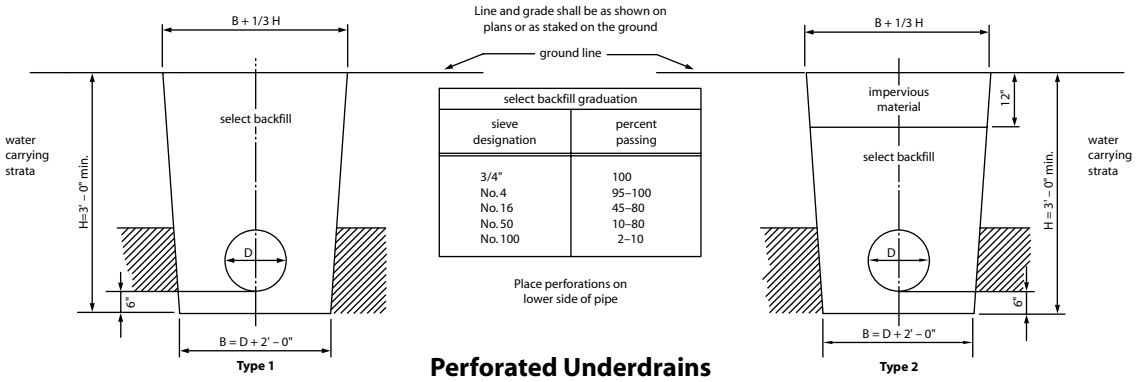
Excavation, bedding, and backfilling of culverts should be conducted according to requirements of the surface management agency and good engineering practices. Compliance with applicable Clean Water Act Best Management Practices and requirements for passage of aquatic species is required.

Ditch Relief Culverts

Ditch relief culverts are installed to periodically relieve the ditch line flow by piping water to the opposite side of the road where the flow can be dispersed away from the roadway. The spacing of ditch relief culverts (Figure 6) is dependent on the road gradient, soil types, and runoff characteristics.

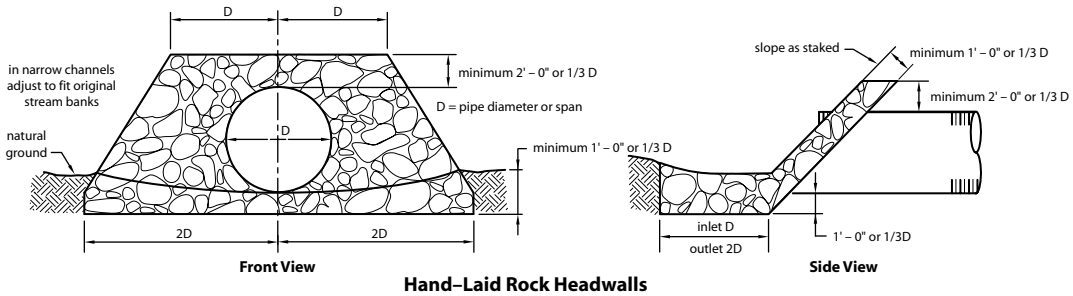
A culvert with an 18-inch diameter is the minimum for ditch relief to prevent failure from debris blockage.

The depth of culvert burial must be sufficient to ensure protection of the culvert barrel for the design life of the culvert. This requires anticipating the amount of material that may be lost due to road use and erosion.



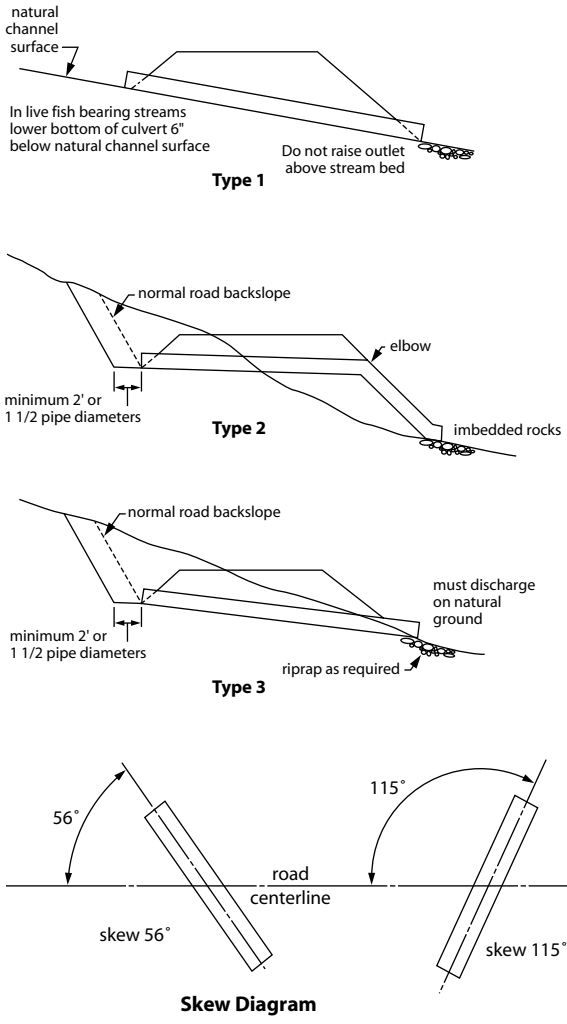
select backfill graduation	
sieve designation	percent passing
3/4"	100
No. 4	95–100
No. 16	45–80
No. 50	10–80
No. 100	2–10

Perforated Underdrains

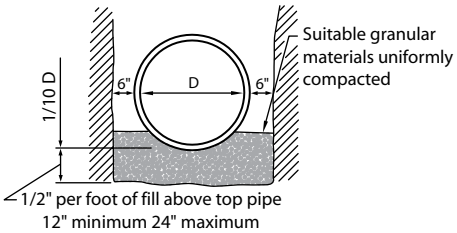


Hand–Laid Rock Headwalls

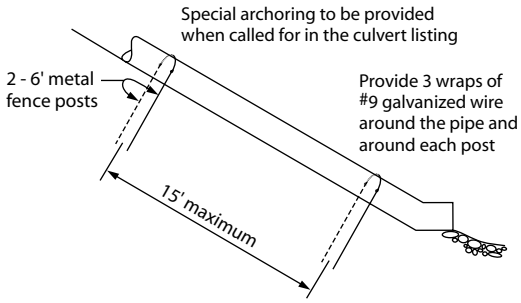
Culvert Construction Details



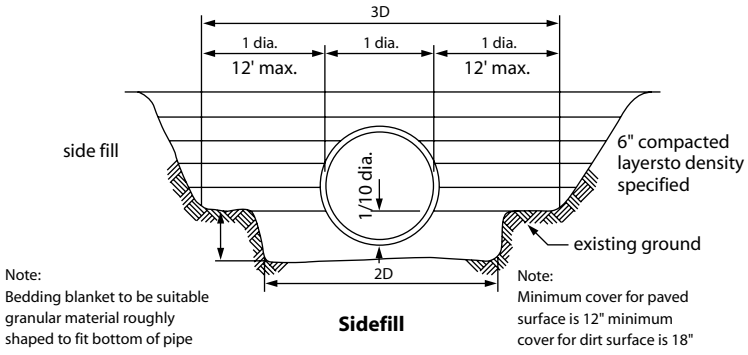
Typical Bedding Details



Rock Foundation



Special Anchoring Type 2 Downdrains



Sidefill

Figure 7. Diagrams for proper culvert installation

Ditch relief culverts can provide better flow when skewed with an entrance angle of 45 to 60 degrees with the side of the ditch. The culvert gradient should be greater than the approach ditch gradient. This improves the flow hydraulics and reduces siltation and debris plugging the culvert inlet. Culverts placed in natural drainages can also be used for ditch relief.

Bridges and Major Culverts

Federal Highway Administration (FHA) regulations and BLM and FS road manuals require that on roads open to public travel, all bridges and culverts that in combination span at least 20 feet horizontal distance, must comply with the National Bridge Inspection and Reporting Standards. Thus, BLM and FS manuals require that all such facilities have engineering approval from Regional or State offices. Operators are encouraged to prepare applications requiring major culverts or bridges to allow sufficient time for agency engineering evaluations. Construction of some stream crossings may require a Section 404 Corps of Engineers permit in addition to the approval of the surface management agency.

Wetland Crossings

Wetlands are especially sensitive areas and should be avoided, if possible. Generally, these areas require crossings that prevent unnatural fluctuations in water level. Marshy and swampy terrain may contain bodies of water with no discernible current. The design of culverts for roads crossing these locations requires unique considerations. Construction of some wetland crossings may require a Section 404 Corps of Engineers permit in addition to the approval of the surface management agency.

The culvert should be designed with a flat grade so water can flow either way and maintain its natural water level on both sides. The culvert may become partially blocked by aquatic growth and should be installed with the flowline below the standing water level at its lowest elevation. Special attention must be given to the selection of culvert materials that will resist corrosion.

Low-Water Crossings

Roads may cross small drainages and intermittent streams where culverts and bridges are unnecessary. The crossing can be effectively accomplished by dipping the road down to the bed of the drainage. Site-specific designs and the construction of gravel, rip-rap, or concrete bottoms may be required in some situations. In no case should the drainage be filled so that water will be impounded. Low-water crossings that are not surfaced should not be used in wet conditions. Low-water crossings, in combination with culverts, may be utilized if the crossing is designed such that the structure is stable and self cleaning.

Subdrainage

If water is not removed from the subgrade or pavement structure, it may create instability, reduce load-bearing capacity, increase possible damage from frost action, and create a safety hazard by freezing on the road surface.

Perforated pipe drains and associated filter fabric or aggregate filters may be used when necessary to provide subdrainage. Other methods may be approved by the authorized officer.

Subdrainage systems may effectively reduce final road costs by decreasing the depth of base course needed, thereby reducing subgrade widths. This, in turn, results in less clearing and excavation. Maintenance savings may also be realized as the result of a more stable subgrade.

The solutions to subdrainage problems can be expensive. Road management techniques, such as reducing traffic loads or removing traffic until a subgrade dries out, may be considered as an alternative.

Pipelines and Flowlines

Construction

Steep hillsides and water courses should be avoided in the location of pipelines and flowlines. Flowline routes should take advantage of road corridors wherever possible to minimize surface disturbance and provide better leak detection and access for installation and repair operations. Consider maintenance needs and safety when burying power and pipelines in or immediately adjacent to the road.

When clearing is necessary, the width disturbed should be kept to a minimum. Topsoil material must be stockpiled to the side of the routes where cuts and fills or other surface disturbances occur during pipeline construction. Topsoil material must be segregated and not be mixed or covered with subsurface material. Bladed materials must be placed back into the cleared route upon completion of construction and returned back to the original contour before reapplying topsoil.

Pipelines and flowlines should be tested for leaks before backfilling trenches. Pipeline trenches should be compacted during backfilling. After construction, cut-and-fill slopes must be regraded to conform to the adjacent terrain and reclaimed. Pipeline rights-of-way must be maintained in order to correct backfill settling and prevent erosion.

Pipeline construction should not block, dam, or change the natural course of any drainage. Suspended pipelines should provide adequate clearance for high-flow events, floating debris, wildlife, or livestock. Pipelines buried across stream crossings should be buried below the scouring depth.

Chapter 5 – Drilling and Production Operations

General Operating Standards and Objectives

Onshore oil and gas lease operations are subject to applicable laws, regulations, lease terms, the Application for Permit to Drill (APD), APD conditions of approval, Onshore Oil and Gas Orders, Notices to Lessees, and orders and instructions of the authorized officer. These include, but are not limited to, conducting operations in a manner that ensures the proper handling, measurement, disposition, and site security of leasehold production and protecting other natural resources, environmental quality, life, and property. The primary objective is to maximize the ultimate recovery of oil and gas with minimum waste and with minimum adverse effect on the ultimate recovery of other mineral resources, other natural resources, and environmental quality.

Production and sales reports must be filed with the Minerals Management Service (MMS), as appropriate, under regulatory requirements at 30 CFR Subpart B, using *Oil and Gas Operations Report (OGOR)*, Form MMS-4054.

Well Completion Report

A *Well Completion or Recompletion Report and Log, Form 3160-4*, is required to be filed within 30 days after completion of a well either for abandonment or production. The well completion report must reflect the mechanical and physical condition of the well. Geologic information, and when applicable, information on the completed interval and production is required.

Subsequent Well Operations

Productive wells and service wells periodically require repair and workover operations that may or may not require prior approval or subsequent notification. The operator should contact the surface management agency to confirm local requirements when surface disturbance activities are involved.

Operations requiring the prior approval of BLM's authorized officer include: deepening, plugging-back, non-routine fracturing jobs, recompletion in a different interval, and conversion to a service well. If there is additional surface disturbance, the proposal must include a Surface Use Plan of Operations. A subsequent report of operations must also be filed for these operations following completion of the work.

Operations, such as routine fracturing or acidizing jobs or recompletion in the same interval, do not require prior approval if such operations do not involve additional surface disturbance and conform to standards of prudent operating practice. However, a subsequent report of operations must be filed for these operations.

No prior approval or subsequent report is required for operations such as well cleanout or routine operations.

The required form for obtaining approval or reporting subsequent operations is *Sundry Notices and Reports of Wells, Form 3160-5* (Appendix 2). For more detailed information on reporting requirements, refer to 43 CFR 3162.3-2.

All wastes are to be treated or disposed of in an approved manner consistent with existing laws and regulations. Modifications of production handling equipment may require the submittal of a new site facility diagram or may require a new site security plan.

Approval Procedures

For operations requiring prior approval by the surface management agency or the BLM, the operator must submit a Sundry Notice or APD, as applicable. With the appropriate form, a detailed written statement of the plan of work must be provided to the authorized officer. When additional surface disturbance is proposed that was not previously authorized for the well pad or right-of-way, a description of any subsequent new construction, reconstruction, or alteration of existing facilities, including roads, dam sites, flowlines and pipelines, pits, tank batteries, or other production facilities on any lease, must be submitted to the authorized officer for environmental reviews and approval. On FS-administered lands, the BLM will coordinate with the FS to obtain its approval on surface disturbing activities.

Emergency repairs may be conducted without prior approval provided the authorized officer is promptly notified. Emergency repairs are defined as actions that are necessary in order to avoid threats to human safety or the environment, or to prevent significant loss of royalty income if such actions were delayed until prior approval could be given by the BLM authorized officer.

Production Startup Notification

Operators will notify the authorized officer by Sundry Notice (Form 3160-5) or letter no later than the fifth business day after any well begins production anywhere on a lease site or allocated to a lease site, or resumes production in the case of a well that has been off production for more than 90 days as required by Onshore Order No. 4 for oil and Onshore Order No. 5 for gas.

Measurement of Production

All oil, other hydrocarbons, and gas produced from the leased lands are to be put in a marketable condition to the extent economically feasible.

Oil production must be measured by tank gauging, positive displacement metering system, or other methods acceptable to the authorized officer. No oil is to be diverted to a pit except in emergency situations or with prior approval from the authorized officer. Oil in the pit must be recovered promptly, and the pit must be kept reasonably free from surface accumulations.

Gas production must be measured by orifice meters or other methods acceptable to the authorized officer. The flaring or venting of gas from leasehold operations must meet the requirements of Notice to Lessee, *NTL-4A: Royalty or Compensation for Oil and Gas Lost*, or an applicable Onshore Oil and Gas Order.

Disposal of Produced Water

Produced water from leasehold operations will be disposed of by subsurface injection, lined or unlined pits, surface discharge into channels or impoundments, or other methods, including beneficial use, acceptable to the authorized officer and in accordance with the requirements of Onshore Order No. 7, Disposal of Produced Water, and other Federal or State regulations.

Disposal of produced water often requires permits from State agencies or the Environmental Protection Agency (EPA), in addition to authorization by the BLM under Onshore Order No. 7. Disposal or use of water produced from Federal wells must be approved by the BLM before such operations begin, even if the operator has approval from the surface management agency. In cases of water disposal into pits or other impoundments, the structures must

conform to approved construction requirements in accordance with Onshore Order No. 7, BLM Manual 9172, and applicable State agency requirements.

Pits, water impoundments, and surface discharges that present a potential hazard to humans, livestock, wildlife, and other resources should be subject to appropriate mitigation, such as fencing, netting, caging, or covers, as appropriate. Refer to Figure 1 for exclosure fence construction standards.

Pollution Control/ Hazardous Waste

Operators are encouraged to substitute less toxic, yet equally effective products for conventional drilling products. All spills or leakages of oil, gas, salt water, toxic liquids or waste materials, blowouts, fires, personal injuries, and fatalities shall be reported by the operator to the BLM and the surface management agency in accordance with the requirements of *Notice to Lessees NTL-3A; Reporting of Undesirable Events*, and in accordance with any applicable local requirements.

The BLM requires immediate reporting of all Class I major events, such as spills of more than 100 barrels of fluid/500 MCF of gas released; fires that consume 100 bbl or more oil or 500 MCF gas; life threatening or fatal injury/loss of well control; release of reportable quantities of hazardous substances; spill, venting, or fire in sensitive areas, such as parks, recreation sites, wildlife refuges, lakes, reservoirs, streams, and urban or suburban areas (see the Spill Report format in Appendix 2). Volumes discharged during any of the above incidents will be estimated as necessary. Operators must take immediate action to prevent and control spills and the BLM, the surface management agency, and other applicable regulatory authorities must be consulted prior to treating or disposing of wastes and spills. Operators should become familiar with local surface management agency requirements for reporting and managing spills and leaks.

Containment structures sufficiently impervious to prevent a discharge to waters of the United States, such as containment dikes, containment walls, drip pans, or equivalent protection actions are to be constructed and maintained around all qualifying bulk oil storage facilities, including tank batteries, consistent with the Environmental Protection Agency's Spill Prevention, Control, and Countermeasure (SPCC) regulation (40 CFR 112). The containment structure must have sufficient volume to contain, at a minimum, the content of the largest storage tank containing liquid hydrocarbons within the facility/battery and sufficient freeboard to contain precipitation, unless more stringent protective requirements are deemed necessary by the authorized officer. Drip pans should be routinely checked and cleaned of petroleum or chemical discharges and designed to prevent access by wildlife and livestock.

Containment dikes are not to be constructed with topsoil or coarse, insufficiently impervious spoil material. Containment is strongly suggested for produced water tanks. Chemicals should be placed within secondary containment and stored

This central tank battery has been surrounded with a corrugated metal containment wall.

so that the containers are not in contact with soil or standing water and product and hazard labels are not exposed to weathering.

Safety and Emergency Actions

The operator must conduct and maintain its operations and facilities in a safe manner and protect the public from any hazardous conditions. In the event of an emergency, the operator may take immediate action without prior surface management agency approval to safeguard life or to prevent significant environmental degradation. The BLM or the FS must receive notification of the emergency situation and the remedial action taken by the operator as soon as possible, but not later than 24 hours after the emergency occurred. If the emergency involved surface resources on another agency's land or on a private surface owner's land, the operator should also notify the agency or surface owner within 24 hours. Operators may also undertake emergency repairs without prior approval if they promptly notify the BLM.

Noise Control

Noise that has the potential to disturb wildlife, livestock, and private surface owners or neighbors should be controlled to reduce sound levels. Suitable mufflers should be installed on all internal combustion engines and certain compressor components. Other noise reduction techniques to consider include siting wells, production facilities, compressors, roads to take advantage of topography and distance, and constructing engineered sound barriers or sound-insulated buildings. The placement of tank batteries and other facilities offsite and the use of remote well monitoring systems can reduce vehicle traffic in the field and the associated noise.

Visual/Scenic Resources

The operator must comply with the visual resource management objectives established in the land use plan for all activities that alter landforms, disturb vegetation, or require structures (BLM 8400 Manual Series). Site-specific mitigation practices may be required by the surface management agency to minimize visual impacts, while remaining consistent with the lessee's right to conduct operations under the lease. A primary consideration is the selection of a paint color that allows long-term facilities to blend in with the natural landscape background. Other considerations in more visually sensitive areas may include the aesthetic siting of roads, well locations, and production facilities; avoiding straight roads; reducing unnecessary

This pumping unit has been painted a color that helps it blend in with the surrounding juniper tree screening.

disturbance; modifying production facility or well pad shape or size; using low-profile or below ground pumping units and low-profile tanks; avoiding the placement of tanks on the ridgeline; manipulating vegetation to feather straight edges; using natural-looking earthwork berms or vegetative screening; and completing interim reclamation of disturbed areas.

Painting of Facilities

All long-term facility structures should be painted a color that enables the facilities to blend with the natural background color of the landscape as seen from a viewing distance and location typically used by the public. The selected color should be one or two shades darker than the dominant background color, typically a vegetation color.

In visually sensitive areas, the use of properly chosen camouflage techniques may be an appropriate method for matching the texture of the landscape. Semi-gloss paints may be preferred because of their resistance to staining and weathering. Where necessary, the use of contrasting safety paint can be used to highlight and mitigate a potential hazard, such as a tripping hazard or protruding or mechanical edge that could harm the operator or public.

Placement of Production Facilities

When production facilities are placed on the well pad, they should be placed to allow for maximum interim recontouring and revegetation of the well location. Consider centralizing production facilities offsite in an area that is out of important wildlife habitat or is screened from view by vegetation or topography. It is often possible to eliminate the need to construct all-weather roads to each individual well by instead constructing one all-weather access road to a centralized production facility closer to the main access road.

Inspection and Enforcement

Leaseholds that are producing or are expected to produce significant quantities of oil or gas in any year, or have a history of noncompliance, will be inspected by the BLM at least once a year and all operations on National Forest System lands will be inspected by the FS at least once a year. Other factors, such as health and safety, environmental concerns, and potential conflict with other resources also determine inspection priority. Inspections of leasehold operations are made to ensure compliance with applicable laws, regulations, lease terms, the APD and its conditions of approval, Onshore Oil and Gas Orders, NTLs, and other written orders of the authorized officer. Operators are expected to initiate their own inspection programs, identify noncompliance, and take appropriate corrective actions, rather than relying on Federal inspections to identify problems.

Chapter 6 – Reclamation and Abandonment

Reclamation Objective

Oil and gas development is one of many uses of the public lands and resources. While development may have a short- or long-term effect on the land, successful reclamation can ensure the effect is not permanent. During the life of the development, all disturbed areas not needed for active support of production operations should undergo "interim" reclamation in order to minimize the environmental impacts of development on other resources and uses. At final abandonment, well locations, production facilities, and access roads must undergo "final" reclamation so that the character and productivity of the land and water are restored.

Planning for reclamation ***prior*** to construction is critical to achieving successful reclamation in the future. Reclamation becomes significantly more difficult, more expensive, and less effective if sufficient topsoil is not salvaged, interim reclamation is not completed, and if proper care is not taken to construct pads and roads in locations that minimize reclamation needs.

The long-term objective of final reclamation is to set the course for eventual ecosystem restoration, including the restoration of the natural vegetation community, hydrology, and wildlife habitats. In most cases, this means returning the land to a condition approximating or equal to that which existed prior to the disturbance. The operator is generally not responsible for achieving full ecological restoration of the site. Instead, the operator must achieve the short-term stability, visual, hydrological, and productivity objectives of the surface management agency ***and*** take the steps necessary to ensure that long-term objectives will be reached through natural processes.

The reclamation process involves restoring the original landform or creating a landform that approximates and blends in with the surrounding landform. It also involves salvaging and reusing all available topsoil (whatever soil is on top) in a timely manner, revegetating disturbed areas to native species, controlling erosion, controlling invasive non-native plants and noxious weeds, and monitoring results. Reclamation measures should begin as soon as possible after the disturbance and continue until successful reclamation is achieved. With proper reclamation measures, over time, local native species will become re-established on the site and the area will regain its original productive and scenic potential.

Reclamation generally can be judged successful when a self-sustaining, vigorous, diverse, native (or otherwise approved) plant community is established on the site, with a density sufficient to control erosion and non-native plant invasion and to re-establish wildlife habitat or forage production. Erosion control is generally sufficient when adequate groundcover is reestablished, water naturally infiltrates into the soil, and gullying, headcutting, slumping, and deep or excessive rilling is not observed. The site must be free of State- or county-

listed noxious weeds, oil field debris, contaminated soil, and equipment. The operator should inform the surface management agency that reclamation has been completed and that the site is ready for final inspection when these requirements have been met.

Reclamation Plan

A reclamation plan is included in the Surface Use Plan of Operations and should discuss plans for both interim and final reclamation. Reclamation is required of any disturbed surface that is not necessary for continued production operations. The operator should submit a new reclamation plan with the Notice of Intent to Abandon (NIA) or Subsequent Report Plug and Abandon (SRA) using the Sundry Notices and Reports on Wells Form 3160-5 when abandoning wells and other facilities that do not have an approved reclamation plan or when the operator would like to update the plan. The BLM will forward the request to the FS or other surface management agency as appropriate. Additional reclamation measures may be required based on the conditions existing at the time of abandonment and made a part of the conditions of approval of the NIA or SRA. Earthwork for interim and final reclamation generally must be completed within 6 months of well completion or plugging (weather permitting). The following information includes components of the reclamation plan.

Plugging the Well

Well abandonment operations may not be started without the prior approval of the *Sundry Notices and Reports on Wells, Form 3160-5*, by the authorized officer. The Sundry Notice serves as the operator's NIA. In the case of newly drilled dry holes, failures, and emergency situations, oral approval may be obtained from the authorized officer subject to written confirmation. The operator must contact the BLM prior to plugging a well to allow for approval and witnessing of the plugging operations.

Pit Reclamation

All pits must be reclaimed to a safe and stable condition and restored to a condition that blends with the rest of the reclaimed pad area. If it was necessary to line the pit with a synthetic liner, the pit must not be breached (cut) or filled (squeezed) while still containing fluids. Pits must be free of oil and other liquid and solid wastes prior to filling. Pits may be allowed to air dry or may be solidified in place with BLM or FS approval. The pit liner must be removed to the solids level or treated to prevent its reemergence to the surface or its interference with long-term successful revegetation. If necessary, the pit area should usually be mounded slightly to allow for settling and positive surface drainage.

The concentration of nonexempt hazardous substances in the reserve pit at the time of pit backfilling must not exceed the standards set forth in the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), 42 USC 9605, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), PL 99-499. All oil and gas drilling-related CERCLA hazardous substances removed from a location and not reused at another drilling location must be disposed of in accordance with applicable Federal and State regulations. {(Refer to 42 USC 9601(14)(Definition of "hazardous substances"); 42 USC 6921(2)(A)(exclusion of certain wastes associated with exploration and production); EPA 530-95-003, Crude Oil and Natural Gas Exploration and Production Wastes: Exemption from RCRA Subtitle C Regulation (May 1995)}.

Site Preparation and Revegetation

Disturbed areas should be revegetated after the site has been satisfactorily prepared. Site preparation will include respreading topsoil to an adequate depth, and may also include ripping, tilling, disking on contour, and dozer track-imprinting. The operator will usually be advised of the revegetation methods, objectives, and seasons to plant, unless this information is included in the Application for Permit to Drill (APD) reclamation plan. Native perennial species or other plant materials specified by the surface management agency or private surface owner will be used. Seeding should be accomplished by drilling on the contour whenever practical or by other approved methods such as dozer track-walking followed by broadcast seeding. Seeding or planting may need to be repeated until revegetation is successful, as determined by the surface management agency.

When conditions are not favorable for the establishment of vegetation, such as periods of drought or the lack of sufficient salvaged topsoil, the surface management agency may allow for subsequent reseedings to be delayed until soil moisture conditions become favorable or may require additional cultural techniques such as mulching, fertilizing, irrigating, fencing, or other practices. It is the operator's responsibility to monitor the site, take the necessary steps to ensure reclamation success, and to notify the surface management agency when success is achieved.

Reclamation is most effective when the ecology of the site is considered. The previous plant community or potential plant community native to the site should be identified to help determine the plant communities that can exist on the reclaimed site. Revegetation efforts will be hampered and costs increased if the site contains conditions detrimental to revegetation, such as heavy grazing pressure, insufficient salvaged topsoil, erosion, and compacted or contaminated soil. (Refer to Figure 1 for exclosure fence standards.)

Additional Guidelines

Supplemental guidelines and methods may be available that reflect local site and geographic conditions. These guidelines or methods may be obtained from the local surface management agency. Technical advances in reclamation practices are continually being developed that may be successfully applied to lands affected by oil and gas development.

Pipeline and Flowline Reclamation

Pipeline routes and roads should be co-located as much as possible to reduce reclamation needs and impacts to other resources. Pipeline trenches are to be compacted during backfilling and must be maintained to correct backfill settling and prevent erosion. Reclamation involves placing fill in the trench, compacting the fill, regrading cut-and-fill slopes to restore the original contour, replacing topsoil, installing temporary waterbars only where necessary to control erosion, and revegetating in accordance with a reclamation plan. Waterbars and other erosion control devices must be maintained and repaired as necessary.

Following successful revegetation, surviving waterbars must be flattened to blend with the slope and then revegetated. If berms of topsoil were originally placed over the trench to accommodate settling, the surviving berms should also be flattened to blend with the surrounding landform and revegetated.

Final abandonment of pipelines and flowlines will involve flushing and properly disposing of any fluids in the lines. All surface lines and any lines that are buried close to the surface that may become exposed due to water or wind erosion, soil movement, or anticipated subsequent use, must be removed. Deeply buried lines may remain in place unless otherwise directed by the authorized officer.

Well Site Reclamation

Well site reclamation includes both interim and final reclamation.

Interim Reclamation

Interim reclamation consists of minimizing the footprint of disturbance by reclaiming all portions of the well site not needed for production operations. The portions of the cleared well site not needed for operational and safety purposes are recontoured to a final or intermediate contour that blends with the surrounding topography as much as possible. Sufficient level area remains for setup of a workover rig and to park equipment. In some cases, rig anchors may need to be pulled and reset after recontouring to allow for maximum reclamation. Topsoil is respread over areas not needed for all-weather operations. When practical, the operator should respread topsoil over the entire location and revegetate to within a few feet of the production facilities, unless an all-weather, surfaced, access route or turnaround is needed. Production facilities should be clustered or placed offsite to maximize the opportunity for interim reclamation. In order to inspect and operate the well or complete workover operations, it may be necessary to drive, park, and operate on restored, interim vegetation within the previously disturbed area. This is generally acceptable provided damage is repaired and reclaimed following use. Under some situations, such as the presence of moist, clay

soils, the operator or surface management agency may prefer that vegetation and topsoil be removed during workover operations and restored following operations to prevent soil compaction.

To reduce final reclamation costs; maintain healthy, biologically active topsoil; and to minimize habitat, visual, and forage loss during the life of the well, all salvaged topsoil should be spread over the area of interim reclamation, rather than stockpiled. Where the topography is flat and it is, therefore, unnecessary to recontour the well location at the time of final reclamation, the operator may set aside sufficient topsoil for final reclamation of the small, unreclaimed area around the wellhead. Any topsoil pile set aside should be revegetated to prevent it from eroding and to help maintain its biological viability. On sloped ground, during final reclamation, the topsoil and interim vegetation must be restripped from portions of the site that are not at the original contour, the well pad recontoured, and the topsoil respread over the entire disturbed site to ensure successful revegetation.

During the start of well production, this well pad was recontoured, revegetated, and shaped to blend in with the surrounding natural forest openings. Well production facilities were constructed off-site and out of view.

Final Reclamation

Following well plugging, well sites that do not blend seamlessly with the surrounding landform (contour) should not be left in place, even if there has been successful regrowth of vegetation on the site. Revegetation alone does not constitute successful reclamation. Restoration of the original landform is a key element in ensuring that the effects of oil and gas development are not permanent.

To achieve final reclamation of a recently drilled dry hole, the well site must be recontoured to original contour or a contour that blends with the surrounding landform, stockpiled topsoil evenly

redistributed, and the site revegetated. To achieve final reclamation of a formerly producing well, all topsoil and vegetation must be restripped from all portions of the old well site that were not previously reshaped to blend with the surrounding contour. All disturbed areas are then recontoured back to the original contour or a contour that blends with the surrounding landform, topsoil is redistributed, and the site revegetated.

In recontouring areas that have been surfaced with gravel or similar materials, the material must be removed from the well location or buried deep in the recontoured cut to prevent possible surface exposure. All excavations and pits must be closed by backfilling when they are dry and free of waste and graded to conform to the surrounding terrain.

Salvaged topsoil must be respread evenly over the surfaces to be revegetated. The topsoiled site should be prepared to provide a seedbed for reestablishment of desirable vegetation. Site preparation may include gouging, scarifying, dozer track-walking, mulching, fertilizing, seeding, and planting.

Water breaks and terracing should only be installed when absolutely necessary to prevent erosion of fill material and should be removed when the site is successfully revegetated and stabilized.

Road Reclamation

Interim reclamation consists of reclaiming portions of the road not needed for vehicle travel. Wherever possible, cut slopes, fill slopes, and borrow ditches should be covered with topsoil and revegetated to restore habitat, forage, scenic resources, and to reduce soil erosion and maintenance costs.

At abandonment, roads must be reclaimed by the operator unless the surface management agency or surface owner requests that they be left unreclaimed.

Final reclamation includes recontouring the road back to the original contour, seeding, controlling noxious weeds, and may also include other techniques to improve reclamation success, such as ripping, scarifying, replacing topsoil, constructing waterbars, pitting, mulching, redistributing woody debris, and barricading.

Seeds of native, perennial species or other plant materials specified by the surface management agency or surface owner must be used. If waterbars were used, they should be removed and seeded following successful revegetation.

The well pad and access road are constructed to the minimum size necessary to safely conduct drilling and completion operations.

The well pad and access road have been recontoured back to the original contour, the topsoil respread, and the site revegetated.

Reclamation of Other Associated Facilities

Other facilities and areas of surface disturbance associated with Federal oil and gas lease development, including water impoundments, power lines, metering buildings, compression facilities, and tank batteries must be removed and reclaimed in accordance with the standards identified previously and with the requirements of the surface management agency or surface owner.

Water Well Conversion

In some instances, the surface management agency or private landowner may wish to acquire a well that has encountered usable fresh water. Refer to 43 CFR 3162.3-4(b). In those cases, the operator must abandon the well and complete surface cleanup and reclamation according to BLM instructions. The BLM approval of the partial abandonment, completion of successful reclamation, and the signed release agreement will relieve the operator of further obligation for the well. The party acquiring the well assumes liability for the well.

Inspection and Final Abandonment Approval

The operator must file a Subsequent Report Plug and Abandon (SRA) following the plugging of a well. A Final Abandonment Notice (FAN) must be filed by the operator upon completion of reclamation operations, which indicates that the site meets reclamation objectives and is ready for inspection. Upon receipt of the Final Abandonment Notice, the surface management agency will inspect the site to ensure reclamation is fully successful.

The BLM must approve the Final Abandonment Notice, even when the surface is managed by another surface management agency. Final abandonment will not be approved by the BLM until the surface reclamation work required by the APD, Notice of Intent to Abandon, or Subsequent Report Plug and Abandon has been completed and the required reclamation is acceptable to the surface management agency. The operator is responsible for monitoring reclamation progress and taking the necessary actions to ensure success.

Release of Bonds

If the well and associated facilities are covered by an individual lease bond, the period of liability on that bond can be terminated once the final abandonment has been approved. The principal (operator or lessee) can request termination of the period of liability from the BLM State Office holding the bond. If the well is covered by a statewide or nationwide bond, termination of the period of liability of these bonds is not approved until final abandonment of all activities conducted under the bond have been approved. The operator may r equest termination of the bond on the Final Abandonment Notice.

Chapter 7 – Appeals

Maintaining successful working relationships can be accomplished by keeping the lines of communication open. In most cases, up-front and frequent phone calls, e-mails, meetings, and field tours can generate understanding, lead to agreement, and eliminate the delay, cost, and frustration of the administrative appeals process.

Bureau of Land Management Administrative Relief

All actions and decisions of the Bureau of Land Management (BLM), related to the oil and gas program as governed by 43 CFR 3160 and all Onshore Oil and Gas Orders and Notices to Lessees (NTLs) are subject to State Director Reviews (SDRs), appeals, or both upon request.

SDRs are conducted according to 43 CFR 3165.3. Appeals are processed according to 43 CFR 3165.4. An SDR must be conducted before pursuing an appeal under this set of regulations. SDRs apply to decisions related to Application for Permit to Drill (APD) conditions of approval or stipulations, inspection and enforcement actions, and APD or Sundry Notices. SDRs and appeals must be filed in the appropriate office according to the regulatory timeframes prescribed.

Forest Service Appeals

Forest Service (FS) decisions approving use of National Forest System lands are subject to agency appeal procedures in accordance with 36 CFR 215 or 251. Decisions governing Surface Use Plan of Operations (SUPO) and Special Use Authorization (SUA) approvals based on analysis, documentation, and other requirements of the National Environmental Policy Act (NEPA) are subject to agency appeal procedures under 36 CFR 215. Decisions solely affecting the business relationship between the FS and holders of written instruments regarding occupancy and use of National Forest System lands can be appealed by permit holders under 36 CFR part 251, subpart C, or under 36 CFR 215, but not under both regulations.

Appeals under either 36 CFR 215 or 251 must be filed within 45 days of the date of written notice of the decision being appealed. Generally, a response to appeals will be issued within 30 days following the close of the appeal period for appeals filed under 36 CFR 251, and within 45 days following the close of the appeal period for appeals filed under 36 CFR 215.

Bureau of Indian Affairs Appeals

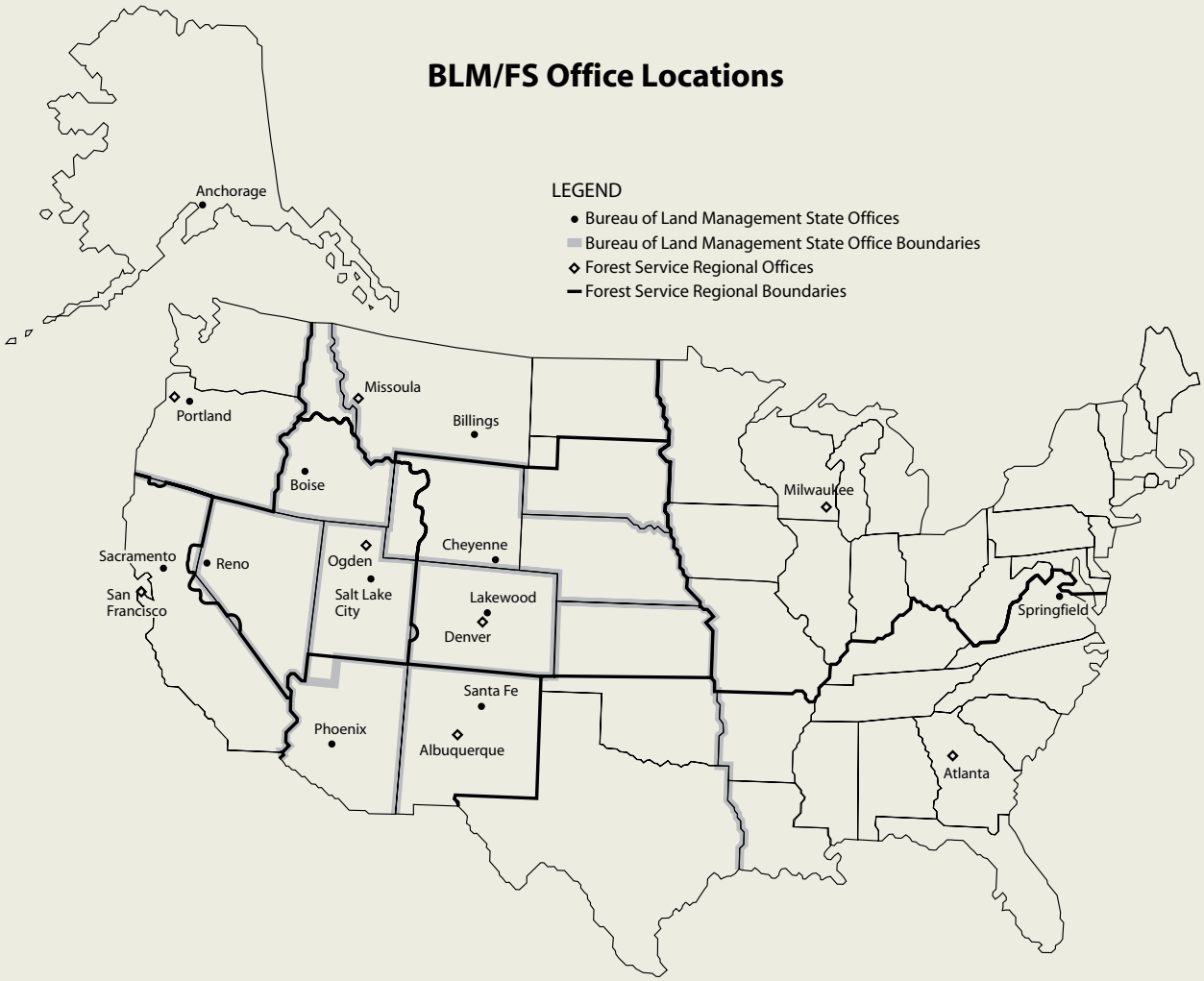
Decisions of the Bureau of Indian Affairs (BIA) may be appealed under 25 CFR 2.

List of Commonly Used Abbreviations and Acronyms

ADT - Average Daily Traffic
APD - Application for Permit to Drill
BLM - Bureau of Land Management
BIA - Bureau of Indian Affairs
BMP - Best Management Practice
CA - Communitization Agreement
CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CEQ - Council on Environmental Quality
CFR - Code of Federal Regulations
CMP - Corrugated Metal Pipe
COA - Condition of Approval
CWA - Clean Water Act
EPA - Environmental Protection Agency
ESA - Endangered Species Act
FAN - Final Abandonment Notice
FHA - Federal Highway Administration
FWS - Fish and Wildlife Service
FS - Forest Service
GCDB - Geographic Coordinate Data Base
MLA - Mineral Leasing Act
MMS - Minerals Management Service
NEPA - National Environmental Policy Act of 1969
NFS - National Forest System
NHPA - National Historic Preservation Act
NIA - Notice of Intent to Abandon
NOC - Notice of Completion
NOI - Notice of Intent
NOS - Notice of Staking
NSRS - National Spatial Reference System
NTL - Notice to Lessee (National, State, or District)
POD - Plan of Development
RMP - Resource Management Plan
ROD - Record of Decision
ROW - Right-of-Way
SARA - Superfund Amendments and Reauthorization Act of 1986
SDR - State Director Review
SHPO - State Historic Preservation Officer
SMA - Surface Management Agency, (includes only Federal agencies with land management responsibilities)
SN - Sundry Notice
SPCC - Spill Prevention, Control, and Countermeasure
SRA - Subsequent Report Plug and Abandon
SUA - Special Use Authorization
SUPO - Surface Use Plan of Operations
SWD - Salt Water Disposal
UA - Unit Agreement
USDA - United States Department of Agriculture
USDI - United States Department of the Interior
USGS - United States Geological Survey

Appendix 1 – BLM/FS Office Locations

Information is also available at the Bureau of Land Management Web site at *www.blm.gov* or the Forest Service Web site at *www.fs.fed.us*



BLM State Offices

Alaska State Office
222 West 7th Avenue, #13
Anchorage, AK 99513
907-271-5960

Arizona State Office
1 North Central Avenue
Phoenix, AZ 85004
602-417-9200

California State Office
2800 Cottage Way
Suite W-1834
Sacramento, CA 95825
916-978-4400

Colorado State Office
2850 Youngfield Street
Lakewood, CO 80215
303-239-3600

Eastern States Office
7450 Boston Boulevard
Springfield, VA 22153
703-440-1600

Idaho State Office
1387 South Vinnell Way
Boise, ID 83709
208-373-3889

Montana State Office
5001 Southgate Drive
Billings, MT 59101
406-896-5004

Nevada State Office
1340 Financial Boulevard
Reno, NV 89502
775-861-6500

New Mexico State Office
1474 Rodeo Road
Santa Fe, NM 87505
505-438-7471

Oregon State Office
333 SW 1st Avenue
Portland, OR 97204
503-808-6001

Utah State Office
440 West 200 South
Suite 500
Salt Lake City, UT 84101
801-539-4001

Wyoming State Office
5353 Yellowstone Road
Cheyenne, WY 82003
307-775-6256

Forest Service Regional Offices

Northern Region
P.O. Box 7669
Missoula, MT 59807
406-329-3511

Rocky Mountain Region
740 Simms Street
Golden, CO 80401
303-275-5350

Southwestern Region
333 Broadway Blvd SE
Albuquerque, NM 87102
505-842-3292

Intermountain Region
324 25th Street
Ogden, UT 84401
801-625-5306

Pacific Southwest Region
1323 Club Drive
Vallejo, CA 94592
707-562-8737

Pacific Northwest Region
P.O. Box 3623
Portland, OR 97208
503-808-2468

Southern Region
1720 Peachtree Street
Suite 760S
Atlanta, GA 30309
404-347-4177

Eastern Region
626 East Wisconsin Ave.
Milwaukee, WI 53202
414-297-3600

Alaska Region
P.O. Box 21628
Juneau, AK 99802
907-586-8806

Appendix 2 – Forms and Formats for Required Information

Application for Permit to Drill or Reenter (APD) . . . . **Form 3160-3** 59-60

Notice of Staking (NOS) . . . . . **Sample Format** 61-62

Sundry Notices and Reports on Wells . . . . . **Form 3160-5** 63-64

Spill Report . . . . . **Sample Format** 65-66

Well Completion or
Recompletion Report and Log. . . . . **Form 3160-4** 67-69

Notice of Intent and Authorization to Conduct
Oil and Gas Geophysical Exploration Operations . . **BLM Form 3150-4/FS Form 2800-16** 71-73

Notice of Completion of Oil and Gas
Geophysical Exploration Operations . . . . . **BLM Form 3150-5/FS Form 2800-16a** . . . 75-76

Form 3160-3
(April 2004)

FORM APPROVED
OMB No. 1004-0137
Expires March 31, 2007

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.

6. If Indian, Allotee or Tribe Name

1a. Type of work: ☐ DRILL ☐ REENTER

7. If Unit or CA Agreement, Name and No.

1b. Type of Well: ☐ Oil Well ☐ Gas Well ☐ Other ☐ Single Zone ☐ Multiple Zone

8. Lease Name and Well No.

2. Name of Operator

9. API Well No.

3a. Address

3b. Phone No. *(include area code)*

10. Field and Pool, or Exploratory

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*

At surface

At proposed prod. zone

11. Sec., T. R. M. or Blk. and Survey or Area

14. Distance in miles and direction from nearest town or post office*

12. County or Parish

13. State

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any)

16. No. of acres in lease

17. Spacing Unit dedicated to this well

18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft.

19. Proposed Depth

20. BLM/BIA Bond No. on file

21. Elevations (Show whether DF, KDB, RT, GL, etc.)

22. Approximate date work will start*

23. Estimated duration

24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No.1, shall be attached to this form:

1. Well plat certified by a registered surveyor.
2. A Drilling Plan.
3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO shall be filed with the appropriate Forest Service Office).
4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above).
5. Operator certification
6. Such other site specific information and/or plans as may be required by the authorized officer.

25. Signature

Name *(Printed/Typed)*

Date

Title

Approved by *(Signature)*

Name *(Printed/Typed)*

Date

Title

Office

Application approval does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.
Conditions of approval, if any, are attached.

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

**(Instructions on page 2)*

INSTRUCTIONS

GENERAL: This form is designed for submitting proposals to perform certain well operations, as indicated on Federal and Indian lands and leases for action by appropriate Federal agencies, pursuant to applicable Federal laws and regulations. Any necessary special instructions concerning the use of this form and the number of copies to be submitted, particularly with regard to local, area, or regional procedures and practices, either are shown below or will be issued by, or may be obtained from local Federal offices.

ITEM 1: If the proposal is to redrill to the same reservoir at a different subsurface location or to a new reservoir, use this form with appropriate notations. Consult applicable Federal regulations concerning subsequent work proposals or reports on the well.

ITEM 4: Locations on Federal or Indian land should be described in accordance with Federal requirements. Consult local Federal offices for specific instructions.

ITEM 14: Needed only when location of well cannot readily be found by road from the land or lease description. A plat, or plats, separate or on this reverse side, showing the roads to, and the surveyed location of, the well, and any other required information, should be furnished when required by Federal agency offices.

ITEMS 15 AND 18: If well is to be, or has been directionally drilled, give distances for subsurface location of hole in any present or objective productive zone.

ITEM 22: Consult applicable Federal regulations, or appropriate officials, concerning approval of the proposal before operations are started.

BLM would like you to know that you do not have to respond to this or any other Federal agency-sponsored information collection unless it displays a currently valid OMB control number.

NOTICE

The Privacy Act of 1974 and regulation in 43 CFR 2.48(d) provide that you be furnished the following information in connection with information required by this application.

AUTHORITY: 30 U.S.C. 181 et seq., 25 U.S.C. 396; 43 CFR 3160

PRINCIPAL PURPOSES: The information will be used to: (1) process and evaluate your application for a permit to drill a new oil, gas, or service well or to reenter a plugged and abandoned well; and (2) document, for administrative use, information for the management, disposal and use of National Resource Lands and resources including (a) analyzing your proposal to discover and extract the Federal or Indian resources encountered; (b) reviewing procedures and equipment and the projected impact on the land involved; and (c) evaluating the effects of the proposed operation on the surface and subsurface water and other environmental impacts.

ROUTINE USE: Information from the record and/or the record will be transferred to appropriate Federal, State, and local or foreign agencies, when relevant to civil, criminal or regulatory investigations or prosecution, in connection with congressional inquiries and for regulatory responsibilities.

EFFECT OF NOT PROVIDING INFORMATION: Filing of this application and disclosure of the information is mandatory only if you elect to initiate a drilling or reentry operation on an oil and gas lease.

BURDEN HOURS STATEMENT

Public reporting burden for this form is estimated to average 1 hour per response, including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding the burden estimate or any other aspect of this form to U.S. Department of the Interior, Bureau of Land Management (1004-0137), Bureau Information Collection Clearance Officer, (WO-630) MS 401 LS, 1849 C Street, N.W., Washington, D.C. 20240.

The Paperwork Reduction Act of 1995 requires us to inform you that:

This information is being collected to allow evaluation of the technical, safety, and environmental factors involved with drilling for oil and/or gas on Federal and Indian oil and gas leases.

This information will be used to analyze and approve applications.

Response to this request is mandatory only if the operator elects to initiate drilling or reentry operations on an oil and gas lease.

Sample Format for Notice of Staking

(Not to be used in place of Application for Permit to Drill Form 3160-3)

1. Oil Well _____ Gas Well _____ Other (Specify) _____	
2. Name, Address, and Telephone of Operator	
3. Name and Telephone of Specific Contact Person	
4. Surface Location of Well Attach: (a) Sketch showing road entry onto pad, pad dimensions, and reserve pit (b) Topographical or other acceptable map showing location, access road, and lease boundaries	
4a. A map (e.g., a USGS 7-1/2" Quadrangle) of the area including the proposed well location and access road	
5. Lease Number	11. Section, Township, Range, Meridian; or Block and Survey; or Area
6. If Indian, Allottee or Tribe Name	12. County, Parish, or Borough
7. Unit Agreement Name	13. State
8. Well Name and Number	14. Name and Depth of Formation Objective(s)
9. American Petroleum Institute Well Number (if available)	15. Estimated Well Depth
10. Field Name or Wildcat	16. For directional or horizontal wells, anticipated bottom hole location, if known
17. Additional Information (as appropriate; include surface owner's name, address and, if known, telephone).	

18. Signed _____ Title _____ Date _____

Note: When the Bureau of Land Management or Forest Service, as appropriate, receives this Notice, the agency will schedule the date of the onsite inspection. You must stake the location and flag the access road before the onsite inspection. Operators should consider the following before the onsite inspection and incorporate these considerations into the Notice of Staking Option, as appropriate:

(a) H_2S Potential
(b) Cultural Resources (Archeology)
(c) Federal Right-of-Way or Special Use Permit

Instructions for Preparing the Notice of Staking (NOS)

General:
This provides notice to the Bureau of Land Management (BLM) that staking has been or will be completed for well locations on Federal or Indian leases and serves as a request to schedule an onsite inspection. The original and one copy of this notice, together with a map and sketch, should be submitted to the appropriate BLM office.

Any item not completed may be justification for not promptly scheduling the onsite inspection.

Specific Considerations:
Items included herein should be reviewed and evaluated thoroughly prior to the onsite. These items affect placement of location, road, and facilities. Failure to be prepared with complete, accurate information at the onsite may necessitate later re-evaluation of the site and an additional onsite inspection.

a. H_2S Potential: Prevailing winds, escape routes, and placement of living quarters must be considered.

b. Cultural Resources: Archeological surveys, if required, should be done prior to, during, or immediately following the onsite. Changes in location due to subsequent archeological findings may require an additional onsite. Contact the involved surface management agency for detailed, site-specific requirements.

c. Federal Right-of-Way or Special Use Permit: Access roads outside the leasehold boundary, which cross Federal lands, will require a right-of-way grant or special use permit and should be discussed with the BLM or other involved surface management agencies at the time of filing the Notice of Staking.

Supplemental Checklist:
The following items, if applicable, should be submitted with or prior to the Application For Permit to Drill (APD) to ensure timely approval of the application. Contact the BLM regarding specific requirements relating to each item.

- Bonding
- Designation of Operator
- Report of Cultural Resources/Archeology
- H_2S Contingency Plan
- Status of Plan of Development and Designation of Agent for wells in Federal units
- Federal Right-of-Way (BLM) or Special Use Permit (Forest Service)

Timetable:
A future date for onsite inspection will be scheduled by the BLM within 10 days after receipt of this notice. Surface protection and rehabilitation requirements will be made known to the operator by the BLM during the onsite or no later than 7 days from the date of inspection, barring unusual circumstances. These requirements are to be incorporated into the complete APD. However, this does not exclude the possibility of additional conditions of approval being imposed.

Form 3160-5
(April 2004)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
OMB No. 1004-0137
Expires: March 31, 2007

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill or to re-enter an abandoned well. Use Form 3160 - 3 (APD) for such proposals.

SUBMIT IN TRIPLICATE- *Other instructions on reverse side.*

5. Lease Serial No.

6. If Indian, Allottee or Tribe Name

7. If Unit or CA/Agreement, Name and/or No.

1. Type of Well
☐ Oil Well ☐ Gas Well ☐ Other

8. Well Name and No.

2. Name of Operator

9. API Well No.

3a. Address

3b. Phone No. *(include area code)*

10. Field and Pool, or Exploratory Area

4. Location of Well *(Footage, Sec., T., R., M., or Survey Description)*

11. County or Parish, State

12. CHECK APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION			
☐ Notice of Intent	☐ Acidize	☐ Deepen	☐ Production (Start/Resume)	☐ Water Shut-Off
☐ Subsequent Report	☐ Alter Casing	☐ Fracture Treat	☐ Reclamation	☐ Well Integrity
☐ Final Abandonment Notice	☐ Casing Repair	☐ New Construction	☐ Recomplete	☐ Other _____
	☐ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon	
	☐ Convert to Injection	☐ Plug Back	☐ Water Disposal	

13. Describe Proposed or Completed Operation (clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recomplete horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports shall be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompletion in a new interval, a Form 3160-4 shall be filed once testing has been completed. Final Abandonment Notices shall be filed only after all requirements, including reclamation, have been completed, and the operator has determined that the site is ready for final inspection.)

14. I hereby certify that the foregoing is true and correct
Name *(Printed/Typed)*

Title

Signature

Date

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved by

Title

Date

Conditions of approval, if any, are attached. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.

Office

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Instructions on page 2)

GENERAL INSTRUCTIONS

This form is designed for submitting proposals to perform certain well operations, and reports of such operations when completed, as indicated on Federal and Indian lands pursuant to applicable Federal law and regulations. Any necessary special instructions concerning the use of this form and the number of copies to be submitted, particularly with regard to local area, or regional procedures and practices, either are shown below or will be issued by, or may be obtained from the local Federal office.

SPECIFIC INSTRUCTIONS

Item 4 - Locations on Federal or Indian land should be described in accordance with Federal requirements. Consult the local Federal office for specific instructions.

Item 13 - Proposals to abandon a well and subsequent reports of abandonment should include such special information as is required by the local Federal office. In addition, such proposals and reports should include reasons for the abandonment; data on any former or present productive zones, or other zones with present significant fluid contents not sealed off by cement or otherwise; depths (top and bottom) and method of placement of cement plugs; mud or other material placed below, between and above plugs; amount, size, method of parting of any casing, liner or tubing pulled and the depth to top of any left in the hole; method of closing top of well and date well site conditioned for final inspection looking to approval of the abandonment.

NOTICE

The Privacy Act of 1974 and the regulation in 43 CFR 2.48(d) provide that you be furnished the following information in connection with information required by this application.

AUTHORITY: 30 U.S.C. 181 et seq., 351 et seq., 25 U.S.C. 396; 43 CFR 3160.

PRINCIPAL PURPOSE: The information is used to: (1) Evaluate, when appropriate, approve applications, and report completion of subsequent well operations, on a Federal or Indian lease; and (2) document for administrative use, information for the management, disposal and use of National Resource lands and resources, such as: (a) evaluating the equipment and procedures to be used during a proposed subsequent well operation and reviewing the completed well operations for compliance with the approved plan; (b) requesting and granting approval to perform those actions covered by 43 CFR 3162.3-2, 3162.3-3, and 3162.3-4; (c) reporting the beginning or resumption of production, as required by 43 CFR 3162.4-1(c) and (d) analyzing future applications to drill or modify operations in light of data obtained and methods used.

ROUTINE USES: Information from the record and/or the record will be transferred to appropriate Federal, State, local or foreign agencies, when relevant to civil, criminal or regulatory investigations or prosecutions in connection with congressional inquiries or to consumer reporting agencies to facilitate collection of debts owed the Government.

EFFECT OF NOT PROVIDING THE INFORMATION: Filing of this notice and report and disclosure of the information is mandatory for those subsequent well operations specified in 43 CFR 3162.3-2, 3162.3-3, 3162.3 - 4.

The Paperwork Reduction Act of 1995 requires us to inform you that:

This information is being collected to evaluate proposed and/or completed subsequent well operations on Federal or Indian oil and gas leases.

Response to this request is mandatory.

BLM would like you to know that you do not have to respond to this or any other Federal agency-sponsored information collection unless it displays a currently valid OMB control number.

BURDEN HOURS STATEMENT

Public reporting burden for this form is estimated to average 25 minutes per response, including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding the burden estimate or any other aspect of this form to U.S. Department of the Interior, Bureau of Land Management (1004-0137), Bureau Information Collection Clearance Officer, (WO-630), Mail Stop 401 LS, 1849 C St., N.W., Washington D.C. 20240

Sample Format for Spill Report

To: (Appropriate BLM or FS Office) _____

From: (Oil & Gas Operator) _____

Subject: Report of Undesirable Event (NTL-3A; CDM 642.3.36)

Date of Occurrence: _____ Time of Occurrence: _____ a.m./p.m.

Date Reported to BLM: _____ Time Reported to BLM: _____ a.m./p.m.

Date Reported to FS: _____ Time Reported to FS: _____ a.m./p.m.

Other Federal, State, and Local Government Agencies Notified and Date(s) _____

Location: State _____ County _____

_____ 1/4 _____1/4 Section _____T. _____ _____ , R. _____ _____ ; _____ Meridian

Operator: _____

Surface Ownership [Federal (FS, BLM, Other), Indian, Fee, State]: _____

Lease Number: _____ Unit Name or C.A. Number _____

Type of Event: Blowout, Fire, Fatality, Injury, Property Damage, Oil Spill, Saltwater Spill, Toxic Fluid Spill, Oil and Saltwater Spill, Oil and Toxic Fluid Spill, Saltwater and Toxic Fluid Spill, Gas Venting, or Other (Specify)

_____

Cause of Event: _____

Volumes of Pollutants I. Discharged or Consumed: _____
II. Recovered: _____

Time Required to Control Event (in hours): _____

Action Taken to Control Event, Description of Resultant Damage, Clean-up Procedures, and Dates: _____

Cause and Extent of Personnel Injury: _____

Sensitive Areas or Surface Waters Potentially Affected: _____

Action Taken or Planned to Clean Up and Prevent Recurrence: _____

General Remarks: _____

Signature _____ ***Date*** _____

Title _____

FOR BLM OR FS USE ONLY

District _____ Date Reported to BLM or FS _____

Optional _____ Event Classification _____

Date of Onsite Inspection _____ Remarks _____

Operators are encouraged to substitute less toxic, yet equally effective products for conventional drilling products. All spills or leakages of oil, gas, salt water, toxic liquids or waste materials, blowouts, fires, personal injuries, and fatalities shall be reported by the operator to the BLM and the surface management agency in accordance with the requirements of *Notice to Lessees NTL-3A; Reporting of Undesirable Events*,and in accordance with any applicable local requirements.

The BLM requires immediate reporting of all Class I major events, such as spills of more than 100 barrels of fluid/500 MCF of gas released; fires that consume 100 bbl or more oil or 500 MCF gas; life threatening or fatal injury/loss of well control; release of reportable quantities of hazardous substances; spill, venting, or fire in sensitive areas, such as parks, recreation sites, wildlife refuges, lakes, reservoirs, streams, and urban or suburban areas. Volumes discharged during any of the above incidents will be estimated as necessary. Operators must take immediate action to prevent and control spills and the BLM, the surface management agency, and other applicable regulatory authorities must be consulted prior to treating or disposing of wastes and spills. Operators should become familiar with local surface management agency requirements for reporting and managing spills and leaks.

Form 3160-4
(April 2004)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
OMB NO. 1004-0137
Expires: March 31, 2007

WELL COMPLETION OR RECOMPLETION REPORT AND LOG

5. Lease Serial No.

1a. Type of Well ☐ Oil Well ☐ Gas Well ☐ Dry ☐ Other
b. Type of Completion: ☐ New Well ☐ Work Over ☐ Deepen ☐ Plug Back ☐ Diff. Resvr, .
Other _____

6. If Indian, Allottee or Tribe Name

7. Unit or CA Agreement Name and No.

2. Name of Operator

8. Lease Name and Well No.

3. Address

3a. Phone No. *(include area code)*

9. AFI Well No.

4. Location of Well *(Report location clearly and in accordance with Federal requirements)**

At surface

At top prod. interval reported below

At total depth

10. Field and Pool, or Exploratory

11. Sec., T., R., M., on Block and Survey or Area

12. County or Parish

13. State

14. Date Spudded

15. Date T.D. Reached

16. Date Completed
☐ D & A ☐ Ready to Prod.

17. Elevations (DF, RKB, RT, GL)*

18. Total Depth: MD
TVD

19. Plug Back T.D.: MD
TVD

20. Depth Bridge Plug Set: MD
TVD

21. Type Electric & Other Mechanical Logs Run (Submit copy of each)

22. Was well cored? ☐ No ☐ Yes (Submit analysis)
Was DST run? ☐ No ☐ Yes (Submit report)
Directional Survey? ☐ No ☐ Yes (Submit copy)

23. Casing and Liner Record *(Report all strings set in well)*

Hole Size	Size/Grade	Wt. (#/ft.)	Top (MD)	Bottom (MD)	Stage Cementer Depth	No. of Sks. & Type of Cement	Slurry Vol. (BBL)	Cement Top*	Amount Pulled

24. Tubing Record

Size	Depth Set (MD)	Packer Depth (MD)	Size	Depth Set (MD)	Packer Depth (MD)	Size	Depth Set (MD)	Packer Depth (MD)

25. Producing Intervals

Formation	Top	Bottom
A)		
B)		
C)		
D)		

26. Perforation Record

Perforated Interval	Size	No. Holes	Perf. Status

27. Acid, Fracture, Treatment, Cement Squeeze, etc.

Depth Interval	Amount and Type of Material

28. Production - Interval A

Date First Produced	Test Date	Hours Tested	Test Production →	Oil BBL	Gas MCF	Water BBL	Oil Gravity Corr. API	Gas Gravity	Production Method
Choke Size	Tbg. Press. Flwg. SI	Csg. Press.	24 Hr. Rate →	Oil BBL	Gas MCF	Water BBL	Gas/Oil Ratio	Well Status	

28a. Production - Interval B

Date First Produced	Test Date	Hours Tested	Test Production →	Oil BBL	Gas MCF	Water BBL	Oil Gravity Corr. API	Gas Gravity	Production Method
Choke Size	Tbg. Press. Flwg. SI	Csg. Press.	24 Hr. Rate →	Oil BBL	Gas MCF	Water BBL	Gas/Oil Ratio	Well Status	

(See instructions and spaces for additional data on page 2)

28b. Production - Interval C									
Date First Produced	Test Date	Hours Tested	Test Production →	Oil BBL	Gas MCF	Water BBL	Oil Gravity Corr. API	Gas Gravity	Production Method
Choke Size	Tbg. Press. Flwg. SI	Csg. Press.	24 Hr. Rate →	Oil BBL	Gas MCF	Water BBL	Gas/Oil Ratio	Well Status	

28c. Production - Interval D									
Date First Produced	Test Date	Hours Tested	Test Production →	Oil BBL	Gas MCF	Water BBL	Oil Gravity Corr. API	Gas Gravity	Production Method
Choke Size	Tbg. Press. Flwg. SI	Csg. Press.	24 Hr. Rate →	Oil BBL	Gas MCF	Water BBL	Gas/Oil Ratio	Well Status	

29. Disposition of Gas *(Sold, used for fuel, vented, etc.)*

30. Summary of Porous Zones (Include Aquifers):

Show all important zones of porosity and contents thereof: Cored intervals and all drill-stem tests, including depth interval tested, cushion used, time tool open, flowing and shut-in pressures and recoveries.

31. Formation (Log) Markers

Formation	Top	Bottom	Descriptions, Contents, etc.	Name	Top Meas. Depth

32. Additional remarks (include plugging procedure):

33. Indicate which itmes have been attached by placing a check in the appropriate boxes:

☐ Electrical/Mechanical Logs (1 full set req'd.) ☐ Geologic Report ☐ DST Report ☐ Directional Survey
☐ Sundry Notice for plugging and cement verification ☐ Core Analysis ☐ Other:

34. I hereby certify that the foregoing and attached information is complete and correct as determined from all available records (see attached instructions)*

Name *(please print)* _____ Title _____

Signature _____ Date _____

Title 18 U.S.C Section 1001 and Title 43 U.S.C Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

INSTRUCTIONS

GENERAL: This form is designed for submitting a complete and correct well completion/recompletion report and log on all types of wells on Federal and Indian leases to a Federal agency, pursuant to applicable Federal laws and regulations. Any necessary special instructions concerning the use of this form and the number of copies to be submitted, particularly with regard to local, area, or regional procedures and practices, either are shown below or will be issued by, or may be obtained from, the local Federal office.

If not filed prior to the time this summary record is submitted, copies of all currently available logs (drillers, geologists, sample and core analysis, and all types electric), formation and pressure tests, and directional surveys, should be attached hereto, to the extent required by applicable Federal laws and regulations. All attachments should be listed on this form, see item 33.

ITEM 4: Locations on Federal or Indian land should be described in accordance with Federal requirements. Consult local Federal office for specific instructions.

ITEM 17: Indicate which reported elevation is used as reference (where not otherwise shown) for depth measurements given in other spaces on this form and in any attachments.

ITEM 23: Show how reported top(s) of cement were determined, i.e. circulated (CIR), or calculated (CAL), or cement bond log (CBL), or temperature survey (TS).

PRIVACY ACT

The Privacy Act of 1974 and the regulation in 43 CFR 2.48 (d) provide that you be furnished the following information in connection with information required by this application.

AUTHORITY: 30 U.S.C. 181 et seq., 351 et seq., 25 U.S.C. et seq.; 43 CFR 3160.

PRINCIPAL PURPOSE: The information is to be used to evaluate the actual operations performed in the drilling, completing and testing of a well on a Federal or Indian lease.

ROUTINE USES: (1) Evaluate the equipment and procedures used during the drilling and completing/recompleting of a well. (2) The review of geologic zones and formation encountered during drilling. (3) Analyze future applications to drill in light of data obtained and methods used. (4)(5) Information from the record and/or the record will be transferred to appropriate Federal, State, local or foreign agencies, when relevant to civil, criminal or regulatory investigations or prosecutions.

EFFECT OF NOT PROVIDING INFORMATION: Filing of this report and disclosure of the information is mandatory once a well drilled on a Federal or Indian lease is completed/recompleted.

The Paperwork Reduction Act of 1995 requires us to inform you that:

This information is being collected to allow evaluation of the technical, safety, and environmental factors involved with drilling and completing/recompleting wells on Federal and Indian oil and gas leases.

This information will be used to analyze operations and to compare equipment and procedures actually used with those proposed and approved.

Response to this request is mandatory only if the operator elects to initiate drilling and completing/recompleting operations on an oil and gas lease.

BLM would like you to know that you do not have to respond to this or any other Federal agency-sponsored information collection unless it displays a currently valid OMB control number.

BURDEN HOURS STATEMENT

Public reporting burden for this form is estimated to average 60 minutes per response, including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding the burden estimate or any other aspect of this form to U.S. Department of the Interior, Bureau of Land Management (1004-0137), Bureau Information Collection Clearance Officer, (WO-630), MS 401 LS, 1849 C Street, N.W., Washington, D.C. 20240.

BLM Form 3150-4
FS Form 2800-16
(May 2006)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
DEPARTMENT OF AGRICULTURE
FOREST SERVICE

FORM APPROVED
OMB NO. 1004-0162
Expires: February 28, 2009

NOI Case File No.

NOTICE OF INTENT AND AUTHORIZATION TO CONDUCT OIL AND GAS GEOPHYSICAL EXPLORATION OPERATIONS

Lessee or Operator		Project Name	
Address		Do you have a bond on file with the Agency? ❑ Yes ❑ No	
City	State	Which Agency? ❑ BLM ❑ Forest Service	
Zip Code	Phone No. *(Include area code)*	Bond No.	Bond Amount: $
E-Mail Address			

Geophysical Co.		Geophysical Co. Representative	
Address		Address	
City	State	City	State
Zip Code	Phone No. *(Include area code)*	Zip Code	Phone No. *(Include area code)*
E-Mail Address		Cellular Phone No. *(Include area code)*	

Local Rep./Party Chief

1. Legal Description: Give the legal and land description of the lands involved using Meridian, Township, Range, and Section(s), or metes and bounds as appropriate:

You must also submit a map with a minimum scale of one-half inch per mile showing the general area and project location. We recommend a 7 1/2-minute USGS quadrangle or the scale commonly used in the area. For seismic operations, your maps should include source and receiver lines, surface ownership, and any Federal lands under lease. When survey lines are along property boundaries between Federal and private lands, indicate which side of the line you will use.

2. Do you hold any Federal leases within the project area? ❑ Yes ❑ No (If yes, indicate location and lease numbers on an attached map.) Note: There is no fee for operations on your Federal lease.

3. If you are proposing seismic exploration, how many miles of source line (2-D), or acres (3-D) (to the nearest 10 acres) of survey are on:

   a. Your Federal Lease _____ b. Other Federal lands _____

4. When do you expect to start exploration? _____ How long will the project last? _____ days.

   Describe any of your critical time frames associated with the proposed project, such as equipment or contractor availability.

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any Department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Continued on page 2)

Description and Type of Operations *(check all that apply)*:

a. Survey Type: ❑ 2-D ❑ 3-D ❑ Gravity/Magnetic ❑ Other *(explain)*: _____

Describe the survey type:

b. Survey Method: ❑ Surface charge ❑ Shothole ❑ Vibroseis ❑ Other *(explain)*: _____

What type and amount of explosives per source point will you use? _____

What shotpoint pattern and spacing will you use? _____ What will be the shothole depth? _____

Did you attach or display a diagram of the shotpoint pattern on the project map? ❑ Yes ❑ No

Describe the survey method:

c. Transport Method: ❑ Vibrator Trucks ❑ Pick-up Truck ❑ Buggy/ATV ❑ Backpack ❑ Helicopter

Describe your transportation plans, including types and numbers of vehicles and how you will access the project area:

d. Operating Procedures: Describe your operating procedures, including how you will minimize surface impacts. Describe support facilities you need, such as helispots, camps, or powder magazines; construction of roads or trails; proposed plugging procedures for shotholes; and general clean-up procedures.

(Printed name of authorized company representative)	(Authorized company representative signs here to indicate this application is complete)	(Date)

(Continued on page 3)

Terms and Conditions

1. The Bureau of Land Management or Forest Service (Agency) must approve any surface disturbing activities in addition to those approved in this NOI, such as route changes, placement of magazines, towing with a tractor, blading, dozing, snow removal, and vegetation removal. I will notify the Agency in writing of any changes in the original proposal and have Agency approval in writing for the changes before proceeding with them. Stacking sourcepoints to avoid sensitive resources or areas does not require prior Agency approval.
2. This NOI expires on _____, unless the Agency extends it in writing before that date.
3. I understand that this NOI does not grant any exclusive right to the described lands for geophysical exploration, or other purposes. The land area described above is at all times subject to any other lawful uses by the United States, its lessees, permittees, licensees, and assigns.
4. I will notify the Agency at least _____days, but no more than _____, prior to initiating the project and entering upon the public lands.
5. In the field each seismic crew must have with it a copy of the approved NOI and its terms and conditions.
6. The Agency may suspend or terminate this NOI if there is a violation of any of its conditions.
7. I will suspend operations when the operations may unnecessarily damage the surface, such as when rutting would occur due to wet soil conditions.
8. I will indemnify the United States for any liability for damage to life or property resulting from the occupancy or use of public lands under the NOI.
9. I will take all reasonable precautions to prevent and suppress fires. The Agency may specify in writing the fire prevention and firefighting equipment I need. At my expense, I will extinguish all fires set or caused as a result of operations under this NOI and will report all fires to the Agency.
10. I will diligently protect from unnecessary damage United States land and property covered by this NOI. I will pay the United States for any damage resulting from my or my agents' or employees' violation of the terms of this NOI or any law or regulation applicable to the lands involved.
11. I will store and handle powder magazines and explosives according to U.S. Bureau of Alcohol, Tobacco and Firearms standards (see 27 CFR Part 55). I will properly secure loaded shotholes.
12. I will complete shothole plugging under Agency guidelines and the guidelines of any other local, Federal or State regulatory authority.
13. I will remove all materials and equipment I placed on the premises and restore the site to the Agency's satisfaction immediately after I complete the project unless the Agency approves other arrangements.
14. I will file a Notice of Completion Form within 30 days after completing operations and reclamation. If the location of the project is different from that in the approved NOI, I will submit a revised map with the NOC (1:24,000 scale, where available), including source points.
15. I will pay to the United States $ _____ per _____, according to the Agency's regulations.
16. This geophysical exploration project is subject to the attached Conditions of Approval _____through _____ and Exhibits _____.

WARNING: If you purposely give false or misleading information, you may be fined $10,000, sent to prison, or both (see Title 18 U.S.C. 1001 statement on page 1).

I agree that I and my agents will conduct the geophysical exploration under all Federal, State and local laws, and applicable regulations and will comply with this NOI and any attached terms and conditions.

(Printed Name of Authorized Company Representative)	(Signature of Authorized Company Representative)	(Date)

(Printed Name of Agency Signing Officer)	(Signature of Agency Signing Officer)	(Title of Agency Signing Officer)	(Date)

NOTICE AND PAPERWORK REDUCTION ACT STATEMENT

The Privacy Act of 1974 and the regulation in 43 CFR 2.48(d) provide that you be furnished the following information in connection with information required by this Notice of Intent and Authorization to Conduct Oil and Gas Geophysical Exploration Operations.

AUTHORITY: 30 U.S.C. 181 et seq.

PRINCIPAL PURPOSE: We use the information to process your Notice.

ROUTINE USES: (1) The processing of the operator's Notice of Intent and Authorization to Conduct Oil and Gas Geophysical Exploration Operations. (2) To determine that mitigating measures are made to protect the environment. (3) Transfer to appropriate Federal agencies when concurrence is required prior to granting a right in public lands or resources. (4) Information from the record and/or the record will be transferred to appropriate Federal, State, local or foreign agencies when relevant to civil, criminal or regulatory investigations or prosecutions.

EFFECT OF NOT PROVIDING INFORMATION: Disclosure of the information is voluntary. If all the information is not provided, your right to conduct geophysical exploration activities may be revoked.

The Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.) requires us to inform you that:

BLM will collect this information under 43 CFR 3150.

FS will collect this information under 36 CFR 251.15.

BLM/FS will use this information to process geophysical exploration notices.

No Federal agency may collect or sponsor a collection of information unless it displays a currently valid OMB control number.

Response to this request is required to obtain a benefit.

BURDEN HOURS STATEMENT

Public reporting burden for this form is estimated to average 1 hour per response, including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing of the form. Direct comments regarding the burden estimate or any other aspect of this form to the U.S. Department of the Interior, Bureau of Land Management (1004-0162), Bureau Information Collection Clearance Officer (WO-630), Mail Stop 401LS, 1849 C Street, N.W., Washington, D.C. 20240.

BLM Form 3150-5
FS Form 2800-16a
(May 2006)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
DEPARTMENT OF AGRICULTURE
FOREST SERVICE

FORM APPROVED
OMB NO. 1004-0162
Expires: February 28, 2009

NOI Case File No.

NOTICE OF COMPLETION OF OIL AND GAS GEOPHYSICAL EXPLORATION OPERATIONS

Lessee or Operator		Geophysical Co. Representative	
Address		Address	
City	State	City	State
Zip Code	Phone No. *(Include area code)*	Zip Code	Phone No. *(Include area code)*
E-Mail Address		Cellular Phone No. *(Include area code)*	

1. If different from the Notice of Intent and Authorization to Conduct Oil and Gas Geophysical Exploration Operations (NOI), list the lands that you actually used for geophysical activities. Describe the lands by Meridian, Township, Range, and Section(s), or metes and bounds as appropriate:

2. Miles of source line or acres of survey on: a. Your Lease _____ b. Other Federal lands _____

3. If your operations were different from those proposed in the approved NOI, attach shotpoint or field maps showing actual line locations and access routes. (The map(s) must be a minimum scale of 1:24,000 (7 1/2-minute USGS quadrangle or equivalent.) The maps must indicate public lands you crossed.

4. Describe how you plugged any shotholes.

5. If the Bureau of Land Management (BLM) or the Forest Service (FS) requests it, attach a copy of the "Hole Plugging Log" describing each shothole, including whether holes were wet or dry, the static water level, flowing holes, breached or caved holes, or lost hole locations.

6. Describe any surface disturbance and how you reclaimed it.

I CERTIFY that the oil and gas explorations approved under the NOI were completed on _____ (Date) and that the operations complied with all terms and conditions of the approved NOI.

(Printed Name of Authorized Company Representative)

(Signature of Authorized Company Representative)

(Title of Authorized Company Representative)

(Date)

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any Department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Continued on page 2)

NOTICES

The Privacy Act of 1974 and the regulation in 43 CFR 2.48(d) provide that you be furnished the following information in connection with information required by this Notice of Completion of Oil and Gas Geophysical Exploration Operations.

AUTHORITY: 30 U.S.C. 181 et seq.

PRINCIPAL PURPOSE: We use the information to process your Notice.

ROUTINE USES: (1) To determine that mitigating measures are made to protect the environment. (2) Transfer to appropriate Federal agencies when concurrence is required prior to granting a right in public lands or resources. (3) Information from the record and/or the record will be transferred to appropriate Federal, State, local or foreign agencies when relevant to civil, criminal or regulatory investigations or prosecutions.

EFFECT OF NOT PROVIDING INFORMATION: Disclosure of the information is voluntary. If all the information is not provided, your right to conduct geophysical exploration activities may be revoked.

The Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.) requires us to inform you that:

BLM will collect this information under 43 CFR 3150.

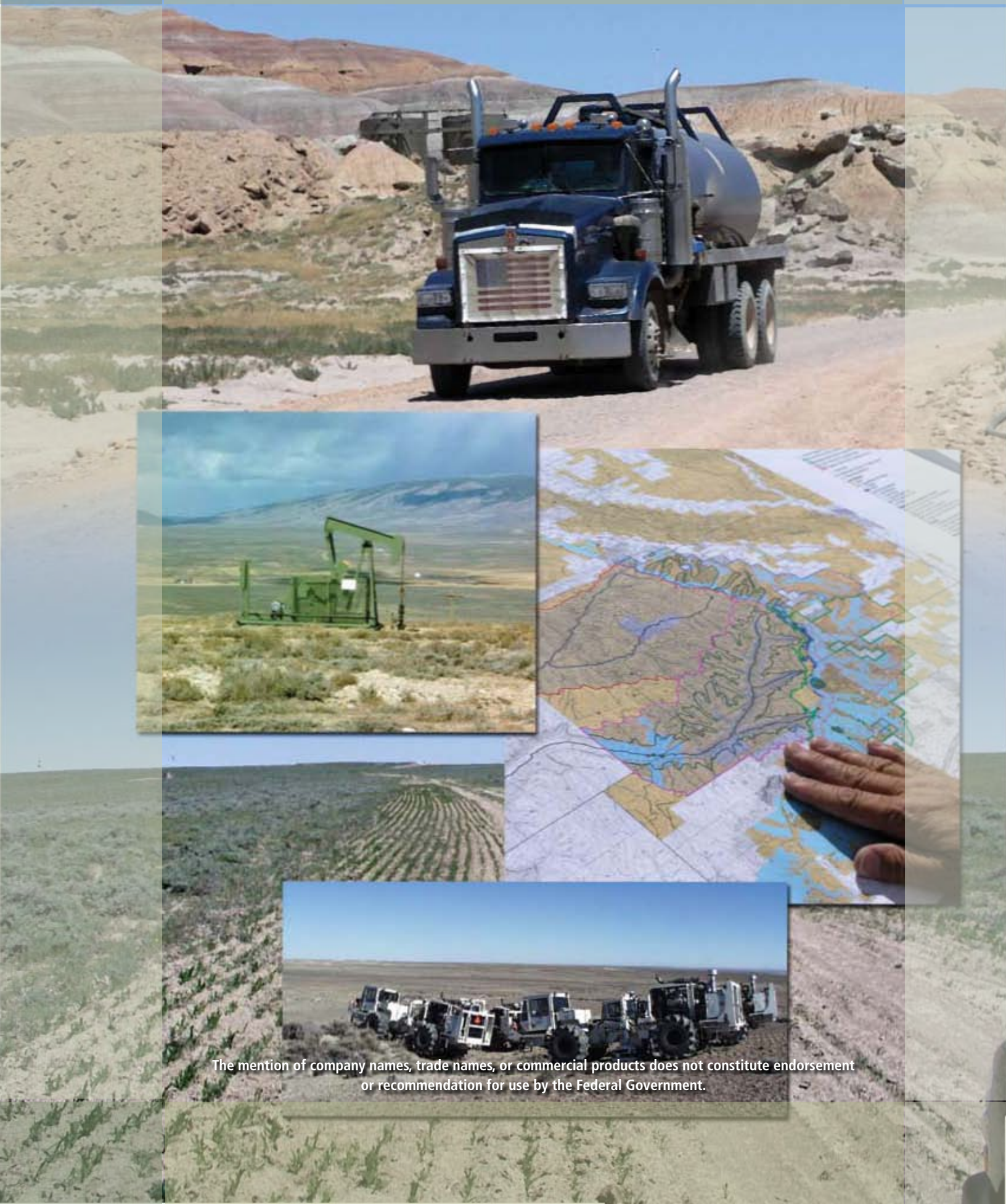
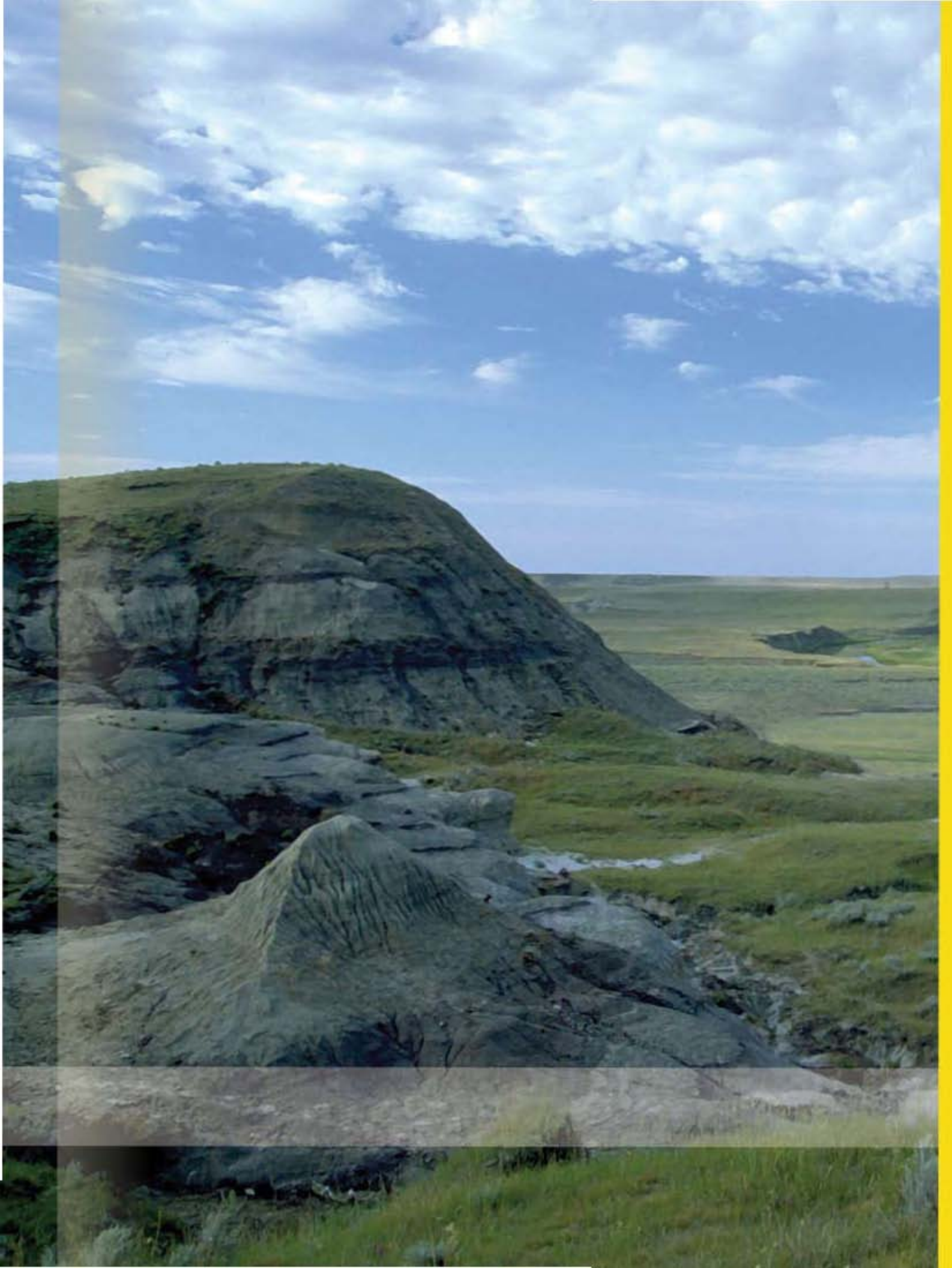
FS will collect this information under 36 CFR 251.15.

BLM/FS will use this information to process geophysical exploration notices.

Response to this request is required to obtain a benefit.

BLM would like you to know that you do not have to respond to this or any other Federal agency-sponsored information collection unless it displays a currently valid OMB control number.

BURDEN HOURS STATEMENT: Public reporting burden for this form is estimated to average 20 minutes per response, including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing of the form. Direct comments regarding the burden estimate or any other aspect of this form to the U.S. Department of the Interior, Bureau of Land Management (1004-0162), Bureau Information Collection Clearance Officer (WO-630),1849 C Street, N.W., Mail Stop 401LS, Washington, D.C. 20240.



The mention of company names, trade names, or commercial products does not constitute endorsement or recommendation for use by the Federal Government.