

***Appendix H:
Surface Operating Standards and Guidelines for Oil and Gas Exploration and
Development (Only includes section on Reclamation and Abandonment)***

**Surface Operating
Standards and Guidelines
for
Oil and Gas
Exploration and Development**

Gold Book

**Fourth Edition
2006**

**United States Department of the Interior
Bureau of Land Management**

**United States Department of Agriculture
Forest Service**

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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 surface previously disturbed that is not necessary for continued production operations. The operator should submit a new 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. 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 by application. 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 natural condition that blends with the rest of the reclaimed pad area. In addition, the reclaimed pit must be restored to a safe and stable condition. In most cases, if it was necessary to line the pit with a synthetic liner, the pit should not be trenched (cut) or filled (squeezed) while still containing fluids. Pits must be free of oil and other liquid and solid wastes, allowed to dry, be pumped dry, or solidified in-situ prior to filling. 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 or restored to the original contour 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 should 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 reseeding to be delayed until soil moisture conditions become favorable or may require additional cultural techniques such as mulching, fertilizing, 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 enclosure 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. 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, the 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 should 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 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.



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.

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, placing 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.

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 has no further abandonment responsibility if the private landowner or surface management agency accepts all liability for the final plugging and reclamation of the water well and wellsite. Documentation of liability release will be issued to the responsible party.

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 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.

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.

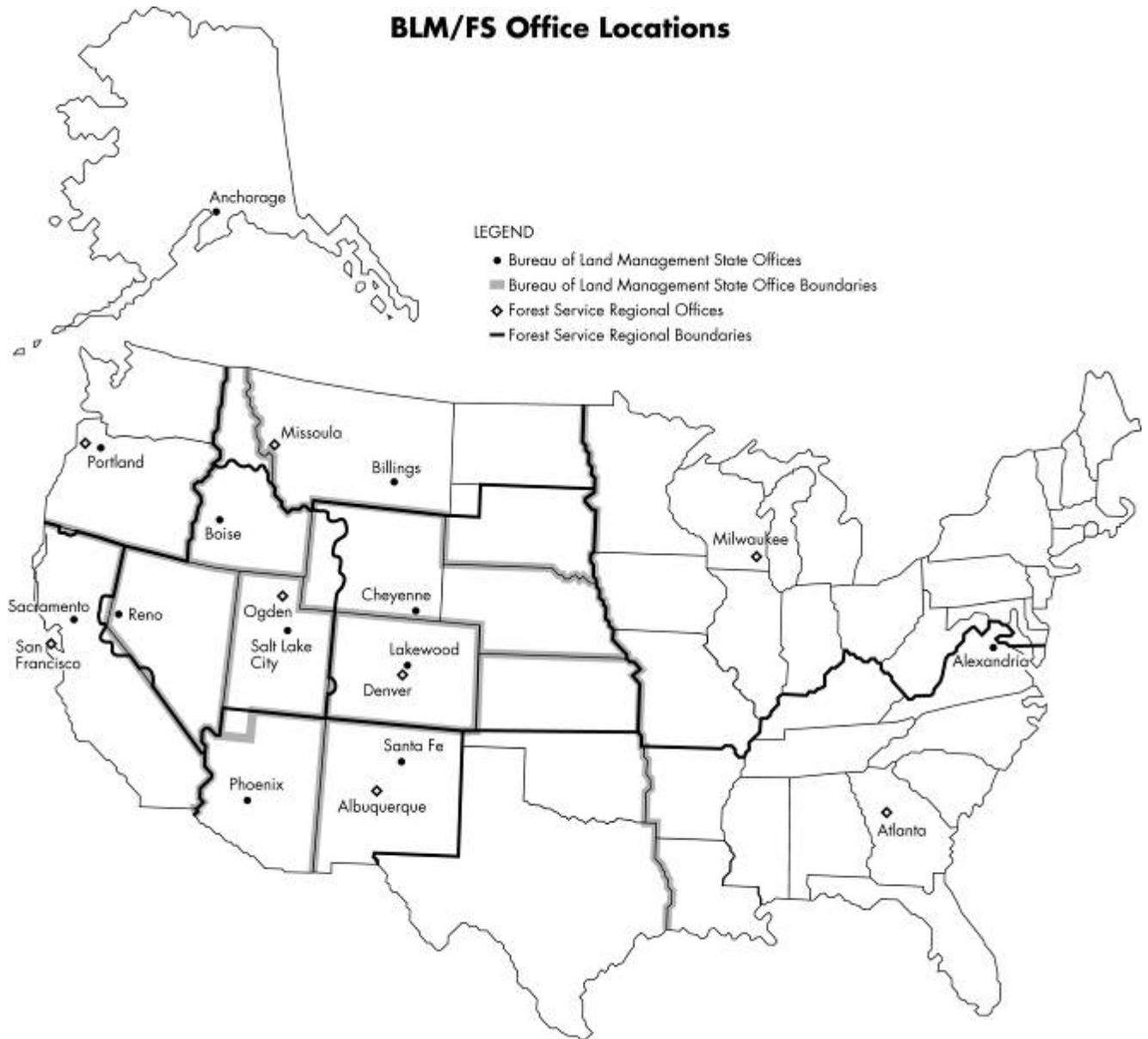
Release of Bonds

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 request termination of the bond on the Final Abandonment Notice.

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



NOTE: Current BLM and FS Office addresses and phone numbers to be added to final print publication

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