

REASONABLY FORESEEABLE DEVELOPMENT SCENARIO
FOR
OIL AND GAS DEVELOPMENT
IN THE
FOUR RIVERS FIELD OFFICE
IDAHO

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SUMMARY

Based on the geology of the Four Rivers Field Office (i.e., the planning area) and drilling activity that to-date has been unsuccessful in discovering oil or gas in commercial quantities, the potential for discovery and development of oil or natural gas in the majority of the planning area has been determined to be zero to low, with the exception of the general area west of Caldwell and Emmett and south of Weiser, where the potential for natural gas (methane) is determined to be medium (see Oil and Gas Potential Map, Figure 1).

Given that new techniques are currently being developed to explore for oil and gas in areas that were not considered viable in the past, and the current emphasis on energy development, it is anticipated that the western Snake River Plain will experience some sporadic oil and gas exploration activity during the life of the land use plan, especially in the Payette area. The level of activity would be highly dependent on economic and political conditions. This report describes the likely exploration and development operations that could occur, based on mineral potential, in order to comply with the Supplemental Program Guidance for Fluid Minerals (BLM Manual Section 1624-2).

It is assumed that making the BLM-administered public lands in the planning area available for oil and gas leasing could result in total surface disturbance over the next 20 years of approximately 113 acres. It is anticipated that six to ten exploratory wells may be drilled during that time, resulting in up to 75 acres of disturbance (2.5 acres/drill pad + 5 acres/one mile of access road = 7.5 acres/drill site x 10 drill sites = 75 acres). Of these, it is assumed that one of the wells drilled would be capable of commercial production (the rest of the holes would be plugged and abandoned and the sites reclaimed). Based on this assumption, a five-well field would be developed in an area of approximately two square miles (assuming well spacing of 160 acres per well). While it is likely that directional or horizontal drilling would be used, thereby minimizing surface disturbance, this report assumes that an additional 38 acres would be disturbed by development/production activities. It is anticipated that four to six geophysical exploration programs would occur and that they would likely be conducted along existing roads or trails or by overland travel, thereby causing minor impacts to surface resources.

These activities are most likely to occur in Payette County in the Payette-New Plymouth area, however some exploration activities should also be expected to occur anywhere within the medium potential area.

INTRODUCTION

This report, describing a Reasonably Foreseeable Development Scenario (RFDS), accompanies the Oil and Gas Potential Report (BLM, 2009) prepared for the planning area. This report describes the anticipated level of oil and gas exploration and development activity associated with oil and gas leasing. These projections are necessary for assessing the anticipated impacts of oil and gas related activity in the Environmental Impact Statement for the Four Rivers Resource Management Plan (RMP); for determining which lands within the field office area will be available for oil and gas leasing; and for determining what stipulations, in addition to those on the standard lease form and those required by BLM policy, may be necessary to attach to leases in order to protect the surface resources. These anticipated impacts are for the BLM-administered public lands described above during the next 20 years (2010-2030).

ASSUMPTIONS AND DISCUSSION

The following assumptions for oil/gas leasing, exploration, and development in the planning area during the next 20 years are based on the oil/gas development potential, the regional geology, the historical drilling activity for southwest Idaho and surrounding area, topography, the existing access situation, and the requirements of the Supplemental Program Guidance for Fluid Minerals:

- The area most likely to experience demand for leasing and possible exploration activity is the western Snake River Plain, specifically the Payette-New Plymouth area, determined to have moderate potential for natural gas development. This assumption is based on exploration history and the geology of the planning area, which is described in detail in the Oil and Gas Potential Report (BLM, 2009).
- It is anticipated that 150 to 200 federal leases will be offered over the next 20 years, likely in the extreme western end of the planning area (Canyon, Payette, and southern Washington Counties). Only lands with federally-available oil and gas resources would be leased by BLM, including private surface/federal minerals (referred to as split estate lands). There are currently 181,000 acres (75 parcels) nominated for leasing on BLM and split estate lands between Caldwell and Weiser, west of Emmett. Some of these lands were nominated by more than one entity (see Lease Nomination Map, Figure 2). No surface disturbance is associated with mineral leasing, however leasing is considered an irretrievable commitment of resources, since a lease gives the lessee the right to develop the oil and gas resource according to the terms and conditions of the lease. Stipulations developed during the land use planning process may be placed on a lease when it is offered, that restrict the lessee from conducting activities during certain times of the year, or in sensitive areas within the lease boundaries.
- It is predicted that one of the exploratory wells would encounter natural gas in sufficient quantity to justify production expenses, resulting in the drilling of 5 additional production wells in the area of discovery. It is not anticipated that any wells would encounter commercial quantities of oil. The remaining exploration wells would be plugged and abandoned immediately.
- Given the general road density in the planning area, it is assumed that up to one mile of access road construction/reconstruction would be required per well.

ANTICIPATED SURFACE DISTURBANCE DUE TO OIL AND GAS ACTIVITIES

The following phases of oil and gas exploration/development are typical in searching for and developing an oil and gas resource:

1. Geophysical Exploration
2. Drilling Phase
3. Field Development and Production
4. Plugging and Abandonment

These phases are discussed in detail below.

Phase One: Geophysical Exploration

It is anticipated that four to six geophysical exploration programs would be conducted over the next 20 years. Geophysical techniques are often implemented to identify subsurface geologic structures and determine drilling targets. The BLM reviews and approves geophysical operations on a case by case basis, and a lease is not necessary for such work. Gravity, magnetics, and seismic reflection are the most common techniques used. Both gravity and magnetic surveys cause very little disturbance as the instruments used are small and easily transportable in light vehicles or OHVs. These surveys can cover large areas and take only weeks to conduct. It is preferable to use existing roads, yet some overland travel is sometimes necessary. In addition, both gravity and magnetic surveys can be completed from aircraft, virtually eliminating surface disturbance.

Seismic reflection surveys are the most commonly used geophysical tool. They require a seismic energy source and an array of receptors. Shock waves are created either through the use of small explosive charges or by vibrating or thumping the ground. Explosive charges are the preferred method and are used when access, road conditions, or population centers are not an issue. Two to six-inch diameter shot holes are drilled by a truck-mounted drill rig to depths between 25 and 200 feet, where explosive charges between 5 and 50 pounds are detonated. Reflected seismic waves are recorded by a series of surface equipment along a 3- to 5-mile line. In situations where explosives are not used, the ground surface is mechanically vibrated using truck-mounted equipment. Both operations generally utilize a crew of 10 to 15 people with five to seven vehicles. Seismic surveys may be supported by aircraft.

Based on the occurrence potential of the planning area, it is anticipated that two or three geophysical exploration programs would be conducted to aid in identifying potential exploration drilling targets during the life of the plan. It is likely that ATVs or other rubber-tired rigs would be utilized for access, and no construction of roads would be required. Impacts from such exploration would be temporary (several weeks in duration) but somewhat intensive (i.e., 2 to 3 vehicles/personnel in the area), such that seasonal restrictions may be necessary to avoid conflicts with some sensitive wildlife.

Phase Two: Drilling Phase

It is assumed that 6 to 10 exploration wells would be drilled in the planning area, most likely in the Payette-New Plymouth area, in order to test geologic targets. An oil and gas lease must first be obtained in order to drill exploration wells on Federal mineral estate. The lessee must then submit an application for permit to drill for each well site. Each of the proposed drilling sites would be analyzed through the NEPA process, separate from the leasing analysis. Site-specific Conditions of Approval are developed and attached to the drilling permit. A bond is required.

Exploration holes range in depth from a few thousand feet to many thousands of feet, but in southwest Idaho would probably be 4,000 to 7,000 feet deep. The wells are approximately 9 inches in diameter. In order to drill these deep holes, a large drilling rig would be utilized. The top of the drill rig derrick could be as much as 155 feet above the ground surface, and the rig floor could be at least 25 feet above the ground surface. These rigs are typically equipped with diesel engines, fuel and drilling mud storage tanks, mud pumps, and other ancillary equipment.

Blow-out prevention equipment would be utilized while drilling to prevent uncontrolled flow at the surface if a pressurized thermal pocket is encountered.

Temporary roads would likely be needed to transport and maintain the drill rig and other heavy equipment. Either existing roads would be improved or new roads would be constructed to accommodate the traffic. Typically, roads are constructed with a 20-foot wide graveled running surface with adjacent ditches and berms, for a total disturbance width of about 40 feet. It may be necessary to haul in gravel to obtain a good road base, as well as a base for the well pad. Based on the road density in the planning area, it is assumed that access to the drill pads may require up to one mile of road construction or improvement. Surface disturbance from construction of one mile of road would equal about 5 acres.

Getting the rig and ancillary equipment to the site may require 15 to 20 trips by full-sized tractor-trailers, with a similar amount for de-mobilizing the rig. There would be 10 to 40 daily trips for commuting and hauling in equipment. Drilling operations would likely occur 24 hours a day and seven days a week. It takes approximately one month to drill one well. A drilling operation generally has from 10 to 15 people on-site at all times, with more people coming and going periodically with equipment and supplies.

A drill pad to accommodate the rig and equipment would be required at each well location. A drill pad is usually 2.5 acres in size (300' x 350'). In order to obtain a level pad, cut and fill of the site may be required. Topsoil would first be removed from the well pad site and stored on site for reclamation. In addition to the drill rig, the well pad may house a reserve pit for storage or disposal of water, drill mud, and cuttings; several mud pits and pumps, a tool shed, drill pipe rack, a fuel tank, a water tank, a generator and several compressors, equipment storage, and several trailers for temporary lab and office quarters. Depending on the contents of the reserve pit and environmental sensitivity of the site, it may be lined or unlined.

Well drilling also requires water. As much water as possible is recycled on site, yet about 5,000 to 15,000 gallons of water may be needed each day depending on well conditions. Initially, water would need to be provided, either by wells or trucked in, to meet demands. Many oil or gas wells encounter water at depth when drilling for oil and/or gas, as it may be part of the oil and gas reservoir, and can be utilized when production is ongoing. Any water rights required would likely need to be filed in the name of the BLM.

At the conclusion of well testing, if paying quantities of oil and gas are not discovered, the operator is required to plug the well according to Federal and State standards. Cement plugs are placed above and below water-bearing units with drilling mud placed in the space between plugs. When abandonment is complete, the site is reclaimed, which includes pad and road recontouring, topsoil replacement, and seeding with approved mixtures. Erosion control measures would be incorporated into the reclamation design as needed.

The drilling site could be active for approximately one year, from the start of drill pad and access road construction; through drilling and well testing; to completion of plugging the hole and reclamation. Total surface disturbance expected from the drilling of ten exploratory wells and the construction of one mile of access road to each well, would be up to 75 acres.

Phase Three: Field Development and Production

If a producible quantity of oil or gas is discovered, additional development wells would be drilled to confirm the discovery, establish the limits of the field, and drain the field. Depending on the field characteristics, well spacing may be from 40 to several hundred acres per well.

The speed at which a field is developed is dependent on the anticipated productivity. It may take from one to three years to fully develop an oil or gas field. Large fields with several operators may be unitized to reduce surface impacts. In addition, directional drilling may allow for drilling more than one well per pad.

During field development, the road system is greatly expanded. Temporary roads are usually improved to accommodate more traffic and increased duration of use. Improvements may include crowning, capping, and implementing additional erosion controls. New roads would also be constructed. Depending on well location and topography, a main access road is built with smaller secondary roads running to each pad. In addition to roads, other facilities may also be installed including power lines, tank farms, pipelines, oil/water separators, and injection wells. The production phase of an oil or gas field begins soon after discovery, and may coincide with development. Temporary facilities are often used initially, but as the extent of the field is determined, permanent facilities would be installed.

Where oil and gas flow to the surface naturally, control valves and collection pipes are attached to the well head. Otherwise pumps are installed. Oil is typically produced along with water and gas. Separation facilities are constructed on site to remove water, carbon dioxide, and hydrogen sulfide. The oil and natural gas are then separated. Water, usually saline, is disposed of either through surface discharge, evaporation ponds or re-injection into the producing formation.

If gas is present in economic quantities and a pipeline is located within close proximity, a network of pipelines would likely be constructed to collect and transport the gas. If not, gas would likely be re-injected into the reservoir. Oil would be collected in a similar manner and stored in tanks in a central location. Well operators would likely have service operations (e.g., cementing, logging, bits, testing, etc.) provided by established oil field service companies in Wyoming or Utah.

The producing life span of an oil or gas field varies depending on field characteristics. A field may produce for a few years to many decades. Commodity price, recovery technique, and the political environment also affect the life of a field. Abandonment of wells may begin as soon as they are depleted or wells may be rested for a period of time and put back into production.

For the purposes of this report, it is assumed that one of the exploration wells would potentially encounter hydrocarbons in sufficient quantities to warrant field development. Based on this discovery, a five-well field would be developed. Multiple wells can be drilled from one drill pad by utilizing directional or horizontal drilling. However for the purposes of this report, it is assumed that each well would require a drill pad and access road. Disturbance for the additional

roads, pads, pipelines, and storage tanks may total over 38 acres. Depending on the size of the field, oil would either be trucked or piped to a refinery.

Phase Four: Abandonment

If paying quantities of oil and gas are not discovered, or at the end of the producing life span of a producing well or field, the operator is required to plug the well according to Federal and State standards and reclaim the disturbed areas. To plug a well, cement plugs are placed above and below water-bearing units with drilling mud placed in the space between plugs. When well abandonment is complete, equipment and surface facilities are removed, and the site is reclaimed. In a producing field, underground pipelines are often plugged and left in place in order to avoid re-disturbing these areas. Site reclamation includes pad and road obliteration and recontouring, topsoil replacement, and seeding with approved mixtures. Erosion control measures would be incorporated into the reclamation design as needed.

CONCLUSION

Total surface disturbance associated with the anticipated oil/gas-related activity in the planning area as a result of making the lands available for lease equals about 113 acres during the next 20 years. This figure is based on drilling six to ten exploration wells, one of which is assumed will be productive and could lead to development of a producing field of 5 additional wells in that area. Disturbance is based on construction of a drill pad (about 2.5 acres) + one mile of access road (about 5 acres) = 7.5 acres per drill site x 10 wells = 75 acres for exploration drilling. Pad and access road construction, drilling and well testing, and reclamation would take an estimated 4-6 months, depending on well depth and drilling conditions encountered. It is likely that well testing would not be favorable for production and the sites would be immediately reclaimed. Assuming, however, that oil or gas resources are discovered at one of these wells, an additional 38 acres would be disturbed in that vicinity by the drilling of five additional wells, spaced at one well per 40 to 160 acres, depending on reservoir characteristics. This disturbance would not be reclaimed until the resource is depleted, which could take 1 to 10 years. It is anticipated that four to six geophysical survey programs would be completed during the life of the plan. This disturbance would be temporary, on the order of weeks, and would result in minor to negligible surface impacts.

This RFDS meets the requirements of BLM's Manual Section 1624-2 in describing potential surface impacts that could occur as a result of oil and gas leasing activity in the Four Rivers Field Office.

Figure 1

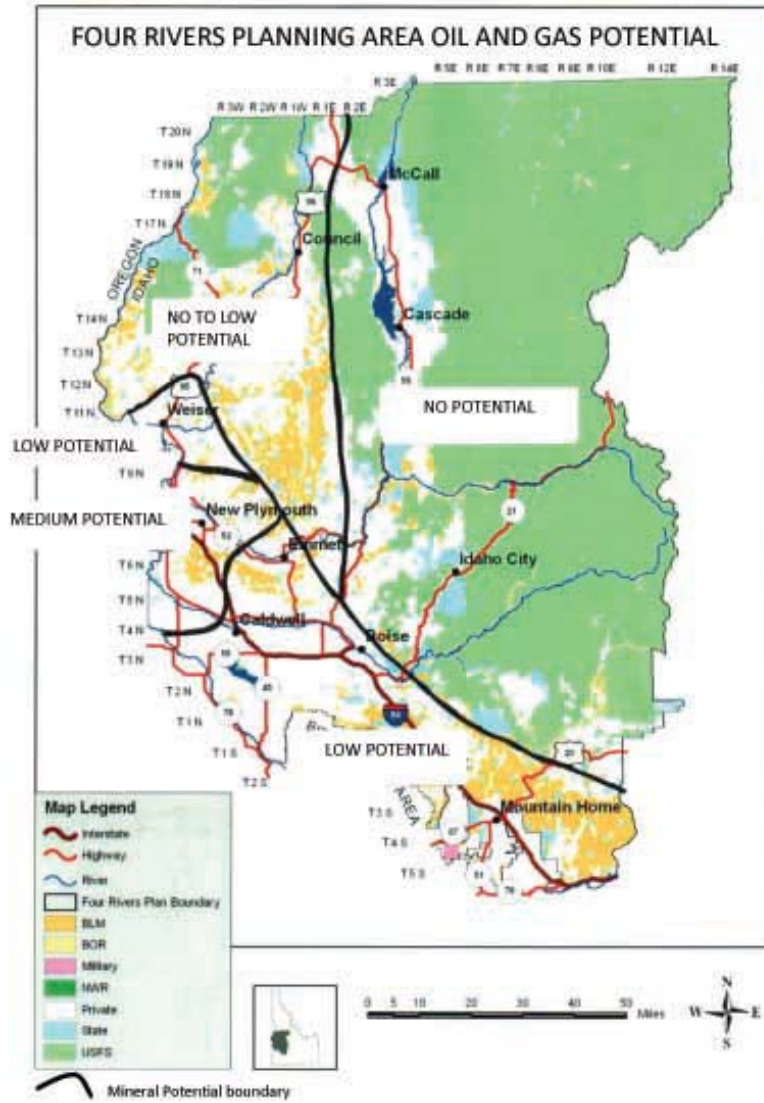


FIGURE 2-
FOUR RIVERS PLANNING AREA OIL AND GAS LEASE NOMINATIONS

