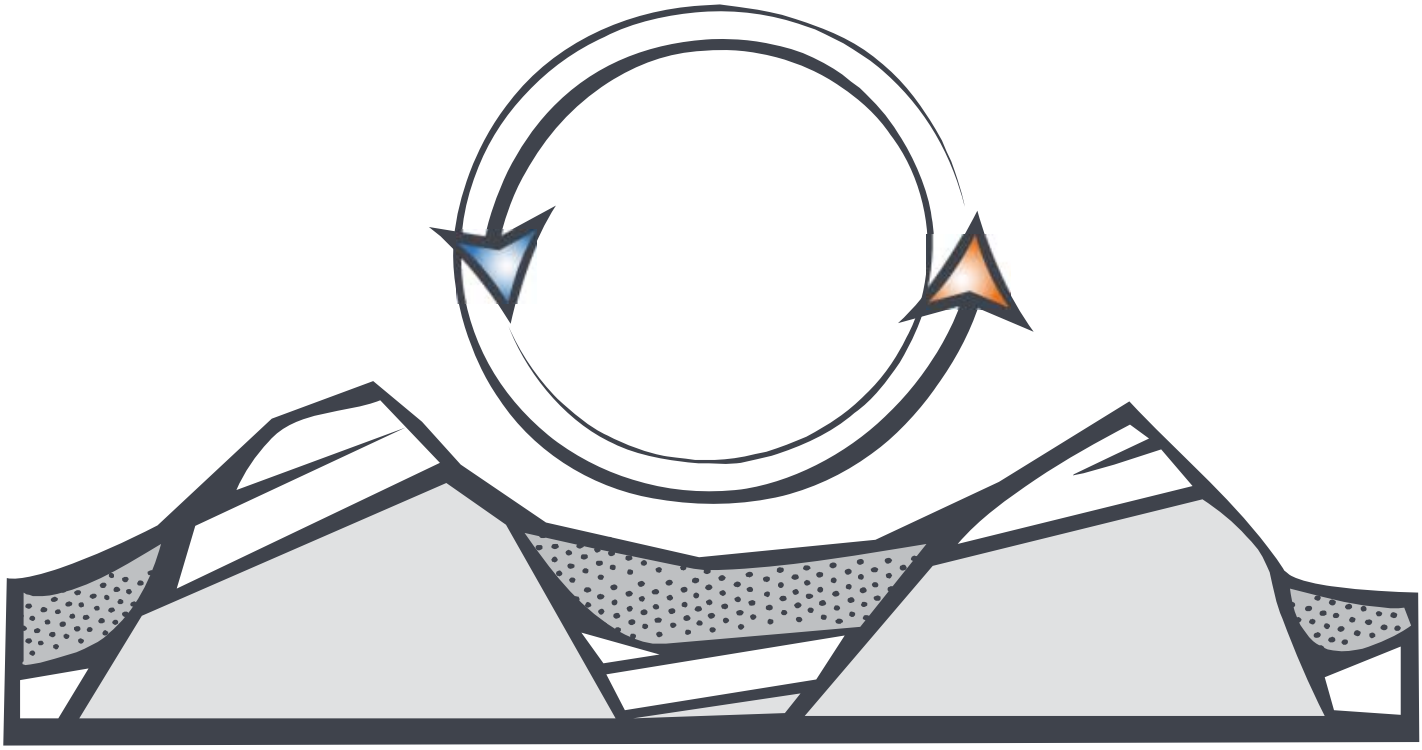

Executive Summary

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EXECUTIVE SUMMARY

ES.1 INTRODUCTION

Recent government policies and advances in technology have increased the demand for accessing geothermal resources on federal lands in the western United States (US). About 530 million acres in the 12 western states of Alaska, Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming have geothermal potential for electrical generation or direct heat applications (such as heating buildings, spas, and greenhouses). Of this area, approximately 143 million acres are lands administered by the US Department of the Interior (DOI), Bureau of Land Management (BLM) and 104 million acres are within the National Forest System (NFS) administered by the US Department of Agriculture (USDA) Forest Service (FS). This represents about 47 percent of all western lands that have geothermal potential. Tribal lands and federal lands within units of the National Wildlife Refuge System and National Park System are closed to geothermal leasing, and adjacent public and NFS lands require special analysis prior to issuance of geothermal leases.

The BLM has the delegated authority to issue geothermal leases on federal mineral estate, such as that underlying lands administered by the FS. A geothermal lease is for the earth's heat resource where there is federal mineral estate. The BLM currently (at the end of fiscal year 2007) administers approximately 480 geothermal leases that covered over 700,000 acres. Of those, 57 are producing geothermal energy, 54 are for electrical generation and three for direct use (BLM 2008b). Leasing geothermal resources by the BLM vests with the lessee a non-exclusive right to future exploration and an exclusive right to produce and use the geothermal resources within the lease area subject to existing laws, regulations, formal orders, and the terms, conditions, and stipulations in or attached to the lease form or included as conditions of approval in permits. Lease issuance alone does not authorize any ground-disturbing activities to explore for or develop geothermal resources without site specific approval for the intended operation. Such approval could include additional environmental reviews and permits.

ES.2 PROPOSED ACTION

The Energy Policy Act (EPAct) of 2005 (Public Law 109-58, August 8, 2005) recognizes the increasing demand for geothermal resources and the need to facilitate leasing decisions. In accordance with the EPAct, the BLM and the FS are proposing to make geothermal leasing decisions on pending lease applications submitted prior to January 1, 2005 and to facilitate geothermal leasing decisions on other existing and future lease applications and nominations.

To achieve this, the BLM and FS are proposing to do the following:

1. Identify public and NFS lands with geothermal potential as being legally open or closed to leasing.
2. Issue or deny geothermal lease applications pending as of January 1, 2005.

Under the proposal, the BLM would also do the following:

3. Identify public lands that are administratively closed or open to leasing, and under what conditions.
4. Develop a comprehensive list of stipulations, best management practices, and procedures to serve as consistent guidance for future geothermal leasing and development on public and NFS lands.
5. Amend BLM land use plans to adopt the resource allocations, stipulations, best management practices, and procedures.

All lands that are currently closed by statute to geothermal leasing would remain closed and would not be affected by the proposal. Examples of these lands include but are not limited to National Park System lands, wilderness areas, wilderness study areas, National Recreation Areas, Indian trust or restricted lands, and the Island Park Geothermal Area in Wyoming and Montana.

ES.3 PURPOSE OF AND NEED FOR ACTION

The purpose of the proposed action is threefold:

1. To complete processing active pending geothermal lease applications and nominations by deciding whether, and under what stipulations, to issue geothermal leases on NFS and BLM administered lands.
2. To amend BLM land use plans to allocate BLM-administered lands with geothermal resource potential as closed, open, or open with major or moderate constraints to geothermal leasing. This includes establishing a projected new level of potential geothermal development with existing planning level decisions, termed reasonably foreseeable development (RFD) scenario, and identifying appropriate stipulations, best management practices, and

procedures to protect other resource values and uses while providing sufficient pre-leasing analysis to enable the BLM to make future competitive geothermal leasing availability decisions.

3. To provide suitability information to the FS to facilitate its subsequent consent decision to the BLM for leasing on NFS lands. Provide environmental analysis to assist future NFS land use decisions by providing possible land use allocations and stipulations for geothermal leasing.

There are three needs for the federal action:

1. To issue decisions on pending lease applications in accordance with the EPAct of 2005. Specifically, Section 225 requires that the Secretary of Interior and Secretary of Agriculture establish a program for reducing by 90 percent the backlog of geothermal lease applications that were pending as of January 1, 2005. The EPAct of 2005 mandates that action be taken by August 8, 2010.
2. To address other provisions of the EPAct of 2005 (Sections 211 and 222[d][1]); respond to other policy directives calling for clean and renewable energy (see Section 1.8 Renewable Energy Policies); and to meet the increasing energy demands of the nation while reducing reliance on foreign energy imports, reducing greenhouse gas emissions, and improving national security.
3. To facilitate geothermal resource leasing in an environmentally responsible manner to help meet the increasing interest in geothermal energy development on public and NFS lands in the western US (EPAct Section 211).

ES.4 PLANNING AREA AND DOCUMENT SCOPE

This programmatic environmental impact statement (PEIS) analyzes the potential environmental, social, and economic effects of these actions in accordance with the National Environmental Policy Act of 1969 (NEPA), the Council on Environmental Quality's (CEQ) regulations for implementing NEPA (40 Code of Federal Regulations [CFR] 1500–1508), and applicable BLM and FS authorities.

The project area is defined as the 12 western states, including Alaska. The planning area is defined as the 530 million acres within the 12 western states that have the potential for geothermal resources. The planning area includes BLM- and FS-administered surface lands with minerals under federal ownership that have geothermal potential and the subsurface federal geothermal mineral estate on other lands. Surface lands administered by other federal agencies, such as the National Park Service and US DOI, Fish and Wildlife Service (USFWS), and state agencies are not assessed in this document unless their administrative boundaries overlap with public or NFS lands. If these lands have subsurface federal geothermal mineral estate, the BLM would apply the management

direction provided in this PEIS, with the surface management agency's consent, for lease nominations or applications. Lands that are not administered by the BLM or FS, or that are closed to geothermal leasing by statute are not part of the analysis, including National Park System lands.

ES.5 ALTERNATIVES

Three alternatives are evaluated in detail in the PEIS: the no action alternative and two action alternatives. A comparison of the different allocations between the action alternatives is presented in Table ES-1.

Table ES-1
Comparison of Geothermal Resource Allocations between the Action Alternatives

	Alternative B: Proposed Action (acres)	Alternative C: Leasing Near Transmission Lines (acres)
Public Lands in Planning Area	143,154,205	143,154,205
NFS Lands in Planning Area	103,582,163	103,582,163
Public Lands Open to Indirect Use[1]	118,007,636	61,202,746
Public Lands Open to Leasing for Direct Uses	118,007,636	118,007,636
NFS Lands Open to Leasing for Indirect Use[1]	79,217,147	37,870,654
NFS Lands Open to Leasing for Direct Uses	79,217,147	79,217,147
Public Lands Closed to Indirect Use[1]	25,146,569	81,951,459
Public Lands Closed to Leasing for Direct Uses	25,146,569	25,146,569
NFS Lands Closed to Leasing for Indirect Use[1]	24,365,016	65,711,509
NFS Lands Closed to Leasing for Direct Uses	24,365,016	24,365,016

[1] Indirect use includes commercial electrical generation.

Alternative A: No Action

Alternative A is the No Action Alternative. Under this alternative, no BLM land use plans would be amended, and the existing plan decisions, stipulations, and allocations would not change as a direct result of the PEIS process. Therefore, any plans that do not address geothermal leasing would not be amended and the public and NFS lands would not be allocated as open or closed to geothermal leasing.

Processing of pending geothermal lease applications would continue; however, they would be evaluated on a case-by-case basis using analysis in the existing land use plans. Likewise, future lands nominated for leasing would be evaluated using analysis in existing land use plans. This could require additional NEPA documentation and possibly amendments to the plans. Many plans currently do not adequately address geothermal leasing, do not have allocation decisions for geothermal leasing, and do not have appropriate RFDs on geothermal leasing.

Taking no action would not facilitate the leasing process and does not meet the stated purpose and need; however, this alternative is analyzed in detail to provide a baseline from which to evaluate the other alternatives in accordance with CEQ guidance.

Alternative B: Proposed Action

Approximately 117 million acres of BLM administered public land would be allocated as open and 75 million acres of NSF land would be legally open to geothermal leasing for direct and indirect use subject to existing laws, regulations, formal orders, stipulations attached to the lease form, and the terms and conditions of the standard lease form. The authorized officer retains the discretion to issue leases with stipulations that impose moderate to major constraints on use of surface of any leases in order to mitigate the impacts to other land uses or resources objectives as defined in the guiding resource management plan. The 118 million acres of public land and 79 million acres of NFS land that would be open to geothermal leasing under the Proposed Action represent about 80 percent of public lands and NFS lands within the planning area. The remaining 25 million acres of BLM administered public land and 24 million acres of NFS lands in the planning area would be closed to geothermal leasing. The closed areas encompass non-discretionary and discretionary (BLM only) determinations, including the statutorily closed Island Park Geothermal Area. Island Park encompasses over 470,000 acres of NFS and public lands around the west and southwest boundary of Yellowstone National Park for the explicit purpose of protecting the geothermal features of the Park. The BLM would amend 122 land use plans to adopt the allocations, RFDs, and specific stipulations, best management practices, and procedures. Based on the analysis contained in the PEIS and public comments on the Draft PEIS, the BLM has selected Alternative B as the Preferred Alternative.

Alternative C: Leasing Lands near Transmission Lines

Under Alternative C, the BLM and FS would only consider leasing lands for commercial electrical generation if they are within a 20-mile corridor (10-mile from centerline) from existing transmission lines and lines currently under development at 60kV to 500kV. All lands within this corridor would be designated as closed or open with moderate to major constraints to leasing using the criteria outlined for the Proposed Action. Island Park Geothermal Area would also be closed (as with Alternative B); however, the area would be expanded to include no leasing within 15 miles of the boundary of Yellowstone National Park boundary. Given the limited transmission line grid and demand for localized power sources for remote communities, the lands available for geothermal leasing in Alaska would be the same as for Alternative B - Proposed Action. Leases for direct use would be considered for the entire planning area and would not be constrained by the location of transmission lines. Therefore, direct use leasing would be the same as the Proposed Action.

Under Alternative C, approximately 61 million acres of public land and 38 million acres of NFS lands would be open for geothermal leasing for commercial electrical generation. These lands would be subject to moderate to major constraints as detailed in the Proposed Action. This alternative would increase the amount of land that would be unavailable for geothermal leasing with in the planning area; specifically, about 81 million acres of public land and 66 million acres of NFS lands would be closed. Other lands outside the corridor would not be closed to leasing, but would require evaluation on a case-by-case basis as described under the No Action Alternative.

ES.6 REASONABLY FORESEEABLE DEVELOPMENT SCENARIO

An RFD for commercial electrical generation and direct use was developed to serve as a basis for analyzing environmental impacts resulting from future leasing and development of federal geothermal resources within the western US over the next 20 years. It is estimated that within the planning area there are 5,540 megawatts (MW) of geothermal potential considered viable for commercial electrical generation by 2015, with a further 6,660 to 6,670 MW being forecast by 2025. This capacity is expected to be realized through approximately 110 additional power plants by 2015, and a further 132 more power plants by 2025. Using these values, it is estimated that the average viable capacity at any particular site is 50 MW by 2025. Most of the development would likely occur in northern Nevada, California, and Idaho, with the least amount in Wyoming and Montana.

It is estimated that by 2015, direct use applications could be developed in the amount of 1,600 thermal MW, and by 2025, this number is estimated to be 4,200 thermal MW. This development could occur anywhere within the planning area.

ES.7 IMPACT ANALYSIS

Designating lands for geothermal leasing potential and amending land use plans, in and of itself, does not cause any direct impacts as defined by CEQ regulations, which states that such effects "are caused by the action and occur at the same time and place" (40 CFR 1508.8[a]). It is reasonable, however, to foresee that on-the-ground impacts would occur if the BLM issues geothermal leases but that the impacts would not occur until some point in the future. Therefore, the analysis in the PEIS addresses both direct and indirect impacts based on the foreseeable on-the-ground actions, including exploration, drilling, and utilization. These impacts cannot be analyzed site-specifically, but they are analyzed for the planning area based on the RFD scenario. Additional site-specific analysis would be conducted during the permitting review process for subsequent exploration, drilling, and utilization applications.

A typical geothermal electrical generation plant has a surface disturbance of between 53 to 367 acres for all associated activities, such as exploration, drilling, and construction, depending on site conditions and the type of geothermal plant. Reclamation is done on areas that are no longer needed for these activities, so the actual area of disturbance for an operating power plant is generally much less. Geothermal resources also provide a wide range of direct use applications, which can require land disturbances of less than one acre to more than 50 acres. Geothermal development has similar short-term impacts as other land disturbing activities but has fewer long-term impacts compared to other energy generation activities. If geothermal leases were developed, the following general adverse impacts would be expected:

- Long-term loss of vegetation, habitat, and soil.
- Short-term and intermittent noise impacts from construction and maintenance activities. Operations would have minimal noise impacts in most areas on federal lands; however, areas with minimal noise sources (i.e., remote areas) would experience a greater change in the noise characteristics.
- Loss of some recreational opportunities from energy infrastructure, although new roads could provide access for additional recreational opportunities.
- Long-term visual impact from power plants and infrastructure.
- Short-term impact to ground water during drilling.
- Loss of other land uses, such as livestock grazing, on lands occupied by geothermal facilities.
- Short-term increase in air emissions from drilling and construction activities. Compared to nonrenewable energy sources, electrical

generation with geothermal resources has minimal emissions. Therefore, on a megawatt basis, geothermal production would have a beneficial long-term impact in reducing emissions and greenhouse gases.

The cumulative impacts associated with geothermal development, such as erosion, habitat loss and fragmentation, propagation of invasive species, and viewshed degradation, would occur but would be relatively minor. At the maximum projected build out in 2025, up to 89,500 acres could be disturbed from exploration, drilling, and utilization and operational activities. This represents less than 0.01 percent of the 17 million areas of public land that have other commercial uses. Geothermal developments also tend to have relatively small operational footprints compared to other uses (such as wind farms and oil and gas fields) and are generally compatible with other uses, such as livestock grazing.

The subsequent impacts from geothermal leasing are relational to the areas that are available for leasing. Alternative C would limit the areas open to geothermal leasing to 99 million acres while Alternative B proposes about 197 million acres as open to leasing. The No Action Alternative does not formally identify geothermal resources as open or closed for leasing; instead it relies on existing plans for determining any allocations on a case-by-case basis, if such allocations have been decided in the plan. If such determinations are not made, additional NEPA and a possible land use plan amendment would be required. Therefore, Alternative C would result in less future development and ground-disturbing activities compared to Alternative B. However, Alternative C would forego opportunities to use geothermal resources as a renewable energy source and to offset some of the impacts from conventional energy sources.

Under both Alternatives B and C, a comprehensive list of stipulations, best management practices, and procedures would be adopted through the land use amendment process and subsequent permitting to avoid, minimize and mitigate impacts associated with geothermal leasing, exploration, drilling, utilization, and reclamation and abandonment.