

THE LAW OF LAVA
Just Starting Out:
—Leasing, Siting, and Permitting Geothermal Projects—

Jerry R. Fish
Stoel Rives LLP
900 SW Fifth Avenue, Suite 2600
Portland, OR 97204-1268
503-294-9620
jrfish@stoel.com

Geothermal energy is often praised for producing sustainable, base load power with minimal environmental impacts. Despite this, geothermal projects have rarely received preferential leasing and permitting treatment. With the enactment of the Energy Policy Act of 2005, adoption of the Bureau of Land Management's ("BLM") Geothermal Strategic Plan, completion of the Geothermal Leasing Programmatic Environmental Impact Statement ("PEIS"), and the opening of four Renewable Energy Coordinating Offices throughout the West, the winds of change may be beginning to blow in a more favorable direction.

The Energy Policy Act directed the Secretaries of Interior and Agriculture to reduce the backlog of pending geothermal lease applications, prioritize timely completion of administrative actions relating to geothermal development, and consider geothermal leasing and development in future forest and resource management plans for areas with high geothermal resource potential. Likewise, the BLM Geothermal Strategic Plan aims to improve the agency's effectiveness and efficiency in processing lease and permit applications.

The Geothermal Leasing PEIS, completed at the end of 2008, provided the environmental analysis necessary for BLM to issue decisions on numerous pending lease applications and analyzed environmental impacts associated with geothermal leasing on 530 million acres of land administered by BLM and the U.S. Forest Service in 12 Western states. The PEIS also produced a comprehensive list of stipulations, best management practices, and procedures to guide future BLM decisions on geothermal leasing and development. Analysis in the PEIS will be tiered with analysis of site-specific environmental impacts necessary for development on individual leases. BLM hopes to expedite these decisions and analyses with the opening of its Renewable Energy Coordinating Offices, announced in May 2009.

Despite these changes, geothermal developments still raise local land use, environmental, and community concerns similar to those raised by other commercial and industrial projects. Several of the country's largest proposed geothermal developments have faced such concerted local opposition that their schedules and pro formas have been affected, leaving their futures in doubt. This has sensitized project financiers, who scrutinize permitting and environmental issues closely.

In this climate, project developers can achieve a significant competitive advantage by doing leasing and permitting the right way: imposing a disciplined focus on site assessment, due diligence, early land control, project design, and strategic consultation with interested agencies, communities, and interest groups.

I. Geothermal Development on Federal Lands. Approximately 90 percent of geothermal resources in the United States are located on federal lands, particularly those within eastern Oregon, western Utah and Idaho, and much of Nevada and California. Therefore, successful development of geothermal resources requires a keen understanding of federal leasing and permitting.

A. Obtaining Leases. The Secretary of the Interior has delegated authority to the BLM to issue geothermal leases under a leasing program similar to that employed under the federal Mineral Leasing Act. Developers with experience in federal oil and gas leasing will likely be familiar with many parts of the geothermal leasing process.

Actual ownership of geothermal resources beneath federal lands is retained in the federal mineral estate. The BLM grants access to this resource primarily through a competitive leasing process established by the Geothermal Steam Act of 1970, as amended. Formerly, exploration leases were awarded through a competitive bidding process only in BLM-designated Known Geothermal Resource Areas ("KGRAs"). Following the enactment of the Energy Policy Act, all geothermal leases (except some direct use leases) are offered on a competitive basis. The Energy Policy Act directed the Secretary of the Interior to accept nominations for land to be leased at any time

from any qualified company or individual. Competitive lease sales must be held at least once every two years in states where nominations are pending. Parties may submit bids pursuant to a BLM-established bidding process through which leases are awarded to the highest responsible qualified bidder. Rents and royalties are then assessed in addition to the bonus bid. If a competitive lease sale is held for a land tract, but no competitive lease sale bids are received, then that land tract will be available for noncompetitive leasing for a two-year period. Likewise, lands subject to existing mining claims may also be available for noncompetitive leasing.

Leases may also be available for competitive bidding as a block. If a geothermal resource can reasonably be expected to underlie more than one nominated parcel, the several parcels that encompass the common geothermal resource may be offered for bidding as a block in a competitive lease sale.

Not all land is available for lease. In general, leases may be issued only on land administered by the BLM or the U.S. Forest Service, or land that the federal government has conveyed to a private party but in which it has retained mineral rights. Geothermal leases may not be issued in national parks, monuments, wildlife refuges, national recreation areas, wilderness areas, wilderness study areas, and similar protected areas, as well as Indian trust lands and reservations. Additionally, no permits can be issued that would cause an adverse impact on significant thermal features of the National Park System, including the Crater Lake, Mount Rainier, and Lassen Volcanic national parks. Upon the establishment of new protected areas (for example, the Mount St. Helens and Newberry national volcanic monuments), the BLM has exchanged geothermal leases originally within the monuments for leases outside the monuments.

B. Cooperative Agreements. Cooperative resource development is essential when a common geothermal reservoir or field underlies several leaseholds. When this occurs, issuance of stand-alone leases may result in unnecessarily rapid resource depletion, as lessees compete to appropriate a greater share of the resource. Subject to BLM approval, lessees in such areas are allowed to bundle their leases into “unit agreements” in order to cooperatively develop the underlying resource. When a common geothermal resource is especially at risk of being overdeveloped and the public interest so requires, the Secretary of the Interior may require the formation of a unit agreement between lessees. The Secretary must review all unit agreements every five years and may remove any land not necessary for unit operations.

C. Lease Acreage Limitations. Previously, the Geothermal Steam Act limited geothermal leases to a “reasonably compact area” of 2,560 acres per lease. The Energy Policy Act has expanded this acreage limitation to 5,120 acres. Additionally, the limitation on total control and ownership of geothermal leases within any one state has been expanded from 20,480 acres to 51,200 acres. Acres that are committed to a unit do not count against the 51,200-acre limit. Developers must pay careful attention to these limits, because the BLM may cancel leases of parties holding more than the maximum.

D. Lease Terms. Geothermal leases are issued for a primary term of 10 years. For leases issued before August 8, 2005, if geothermal steam is produced or used in commercial quantities within the primary term of the lease, the lessee may extend the primary term for up to an additional 40 years. If, at the end of the 40-year term, geothermal steam continues to be commercially produced and used, the lessee has a preferential right to renew the lease for a second 40-year term.

For leases issued after August 8, 2005, if the lessee does not reach commercial production within the 10-year primary term, the lessee may qualify for two five-year primary term extensions if the lessee either (1) meets a minimum annual work requirement, quantified as a dollar expenditure per acre, or (2) makes minimum annual payments. In addition to these two five-year extensions, if at the end of either the primary term or a primary term

extension the lessee is drilling a well for the purpose of commercial energy production, the lessee may also qualify for a five-year drilling extension. Once the lessee either begins producing geothermal resources in commercial quantities or makes diligent efforts to use a well capable of producing geothermal resources in commercial quantities, the lessee may qualify for a production extension of up to 35 years. So long as the lessee continues to produce or use geothermal resources in commercial quantities during the production extension, the lessee may qualify for a lease renewal period of up to an additional 55 years.

All lessees holding leases issued after August 8, 2005 must pay an annual rent in advance of the year for which rental is due. For leases issued on a competitive basis, the annual rental is not more than \$2 per acre during the first year and not more than \$3 per acre for the remainder of the primary term (years 2-10). For leases issued on a noncompetitive basis, the annual rental is not more than \$1 per acre for the entire primary term (years 1-10). For each year after the 10th year, the annual rental may be increased to not more than \$5 per acre, regardless of whether the lease was initially issued through a competitive or noncompetitive process. Rental fees paid before the first day of the year for which the rental is owed may be credited against the amount of royalty that is required under a lease for that year.

All geothermal leases must allow for a readjustment of lease terms and conditions at no greater frequency than every 10 years. Rent and royalty stipulations may also be adjusted after 35 years from the date geothermal steam is produced. Leases may be terminated for nonpayment of rental fees.

E. Royalties. The Energy Policy Act amended the Geothermal Steam Act to reduce lease royalty percentages to between 1 and 2.5 percent of gross proceeds from the sale of electricity during the first 10 years of production under a lease. After that period, royalty payments cannot exceed 5 percent of gross proceeds. Current BLM regulations provide for a 1.75 percent royalty during the first 10 years of electricity production and 3.5 percent thereafter. The BLM allows lease applications that were either effective or pending on August 8, 2005 to be converted to these new royalty rates.

If, after a lessee achieves commercial production, production ceases for any reason, a lease may remain in full force for up to 10 years so long as the lessee pays royalties in advance at a monthly average rate equal to the royalty that was paid during the period of production. Only under limited exceptions will the requirement to pay royalties be waived after a halt in production.

As an additional incentive for existing leaseholders, leases in effect before August 8, 2005 may qualify for a 50 percent reduction in royalty payments during the first four years of commercial production if commercial production is achieved within six years of Energy Policy Act enactment. This also applies to “qualified expansions” of existing facilities. An expansion qualifies if it increases net electric generation by 10 percent within six years of the Energy Policy Act’s enactment and if such production increase is greater than 10 percent of the average production by the facility during the prior five-year period.

F. Lands Administered by Other Agencies. Although the BLM issues all geothermal leases on federal land, including land managed by the U.S. Forest Service, the BLM may not authorize the lease of Forest Service lands without the consent and incorporated conditions of the U.S. Forest Service Chief. Because the Geothermal Leasing PEIS did not provide the environmental analysis necessary to amend forest management plans, these plans are being amended by the Forest Service individually for each forest. Additional environmental analysis may be required before the BLM can issue a lease on Forest Service lands. In addition, lands located within hydropower project areas may be leased only with the consent of the Department of Energy. All leasing is discretionary, and each of these agencies may condition the grant of a lease issued on its respective land. For

example, geothermal leases typically specify the degree to which a lessee may use surface lands in developing and producing underlying geothermal resources.

G. Relation to Other Federal Resource Laws. A geothermal lease does not grant a developer an exclusive right to develop a parcel of land. Although a developer gains an exclusive right to develop geothermal resources within a leasehold, the developer does not acquire the right to develop minerals unassociated with geothermal production and does not acquire the right to prohibit others from developing minerals present within a leasehold. To the contrary, a parcel of land subject to a geothermal lease may be concurrently subject to leases issued pursuant to other federal mining and mineral extraction laws. When multiple leases attach to the same parcel of land, each lessee is under a duty not to unreasonably interfere with the development rights of others.

A geothermal lease grants a developer the right to produce and use valuable by-products obtained in the production, use, or conversion of geothermal steam. However, the production or use of such by-products is subject to the rights of preexisting leases, claims, and permits covering the same land. Extraction and use of by-products may also subject the lessee to additional royalty payments.

The Geothermal Steam Act expressly disclaims any preemption of state water law, so if water is to be evaporated or consumed as part of the geothermal resource's use, a lessee may need to obtain water rights under the law of the state in which a lease is sought. Some states have created laws and regulations applicable specifically to water use in geothermal exploration or production with the goal of facilitating the development of geothermal resources. Water use is a critical aspect of geothermal development and is discussed in greater detail in Chapter 2.

H. Federal Environmental Review. Under the National Environmental Policy Act ("NEPA"), the BLM is required to review the environmental consequences of granting leases and permits necessary for geothermal development. The BLM issues either an Environmental Assessment ("EA") to support a Finding of No Significant Impact on the environment, or an Environmental Impact Statement ("EIS") detailing all of the alternatives to permit issuance and their associated impacts on the environment.

The level of federal environmental review of a geothermal lease depends on the degree of surface disturbance that will accompany geothermal development. "No surface occupancy" leases generally do not require full review under NEPA, and the BLM will usually issue an EA with, if applicable, a Finding of No Significant Impact on the environment. The granting of a surface-occupancy lease, however, often requires the preparation of an EIS under NEPA. The EIS must enumerate reasonable alternatives to the proposed action. NEPA does not, however, require the government to accept or reject specific lease applications.

Further developments beyond surface leasing (*i.e.*, issuance of exploration, drilling, utilization, and commercial use permits) may require an EIS if, in the judgment of the BLM, such developments would have a significant impact on the environment. Thus, if the terms of a surface lease do not include the ability to construct buildings, issuance of a construction permit can trigger additional review.

I. Permit Requirements. BLM permits are required along each step of the geothermal leasing process: exploration, drilling, utilization (facility construction), and commercial use. Permit applications generally require a detailed identification of the land to be affected, procedures and equipment to be used, and buildings to be constructed (if applicable). The BLM may require additional information at its discretion. In general, an applicant may make minor changes to a permit application by filing a notice with the BLM instead of submitting a new permit application. All applicants must have a bond on file with the BLM.

J. Exploration Permits. An exploration permit is required for any geothermal exploration activity when federal lands may be adversely affected and when a developer is present on the land. Exploration activities covered by permits include geophysical operations, drilling temperature gradient wells, drilling holes used for explosive charges for seismic exploration, and core drilling. Exploration permits are also required for related road construction or surface travel in explored areas.

Although most exploration permit applicants will hold a geothermal lease, a geothermal lease is not required to apply for an exploration permit. However, the land must be open to leasing to be open to exploration. One can even apply for a permit on lands leased to others so long as the exploration does not interfere with ongoing exploration or production. Activities also must not cause “unnecessary or undue degradation” of the lands in keeping with the BLM’s general duty to protect the public domain. If exploration is to occur on leased land administered by the U.S. Forest Service or another surface management agency, that agency must also approve the exploration permit.

Applications for exploration permits must describe in detail the lands, procedures, and equipment to be used; must identify potential effects on geothermal resources; and must identify mitigation measures for surface disturbance. The applicant must also identify environmental protection measures it will take throughout the exploration process. The BLM may impose additional conditions before issuing the permit.

Exploration operations must be conducted so as to afford the maximum protection to natural resources. Noise must be kept to a level that will not disturb recreation or wildlife. Most developers are required to share data collected on the leased land with the BLM annually.

K. Drilling Permits. Drilling permits are necessary for drilling wells and conducting activities related to performing flow tests, producing geothermal fluids, and injecting fluids into a geothermal reservoir. A drilling permit is also required for the construction of well pads or roads to access drilling operations. Unlike exploration permits, drilling permits require the applicant to hold a geothermal lease. If the drilling is to take place on land administered by an agency other than the BLM, that agency must also approve the permit. Drilling operations must in general comply with the same environmental standards as exploration operations.

A separate permit application must be submitted for each well. Drilling permit applications must include a detailed plan of operations, including a description of all planned facilities ancillary to the drilling operations and a description of planned environmental protection and surface reclamation measures. A plan of operations must be submitted before any surface disturbance is made. Additionally, an applicant must submit a drilling program that describes its plan to drill, complete, and test a well. This plan may be submitted before a permit application is filed. Once a well is complete, data collected from the well must be submitted to the BLM within 30 days. Wells may not be abandoned without BLM approval.

L. Utilization Permits. Utilization permits are required for construction and operation of electrical generation facilities, direct-use steam plants, and related facility and well field operations, including well field production and injection. (“Utilization” is a catchall term that includes construction permits.) Either a site license or a lease and construction permit is required before beginning site preparation work for a facility.

Facilities must be built on land encumbered by a geothermal lease, but the operator/applicant does not have to be the leaseholder. However, a separate site license is required if the operator is not a party to the geothermal lease. A utilization permit applicant must submit a utilization plan along with its facility construction permit application. This plan should describe the facilities that will be constructed and any expected environmental

impacts, along with a plan for mitigating those impacts. It also must include, among other information, projected production rates, water usage data, and a plan for minimizing visual impacts of the facility.

M. Commercial Use Permits. Once a facility has been constructed, a commercial use permit is required before commercial operations may begin. A commercial use permit application must include a description of the methods and rates of production and injection. An applicant must also inform the BLM of any existing power purchase agreements for the sale of electricity from the generating facility.

II. Geothermal Development on State or Private Lands. Geothermal resources that are not located on federal land are subject to state law. Developers often encounter hurdles developing this land because states have different ways of defining the resource, determining ownership, and issuing permits. Nevertheless, leasing of private lands has increased in recent years and such leases offer both developers and landowners a chance to vary many of the terms that are set under federal leases.

A. Mineral or Water. Many states do not clearly delineate geothermal resources from mineral or water resources. This can create confusion for developers because the ownership of mineral or water rights may also entail the right to develop geothermal resources. Washington State, for example, defines the geothermal resource for other than direct use to include only the heat energy in extracted water that is practical for use in commercially producing electricity. Under this definition, the resource is neither mineral nor water, but a resource unto itself. In contrast, Wyoming characterizes geothermal resources as a water resource. Hawaii and California consider geothermal resources to be part of the mineral estate. Utah treats geothermal fluids as a special kind of underground water resource, but ownership of the geothermal resource derives from an interest in land and not from an appropriative right to geothermal fluids.

B. Geothermal Resource Ownership. States have taken different approaches to determining ownership, depending on how the geothermal resource is characterized. Often, a landowner will own the rights to both the surface land and the underlying geothermal resources, but sometimes surface ownership is severed from ownership of the underlying geothermal resource. In the latter case, a developer generally must negotiate with both the surface and subsurface resource owner before drilling can begin. In Washington, geothermal rights are vested in the surface owner, while in Wyoming geothermal rights are a public resource and are only available through appropriation. In Alaska, the state claims ownership of all geothermal resources but priority to develop the resource is given to the surface owner. In Oregon, the owner of the surface property also retains ownership of geothermal resources.

C. Exploration and Drilling. Many states have adopted provisions for the issuance of exploration and prospecting permits for geothermal resources on state lands. In Oregon, the Department of Geology and Minerals Industries is responsible for overseeing the drilling, abandonment, and reclamation of geothermal wells. California vests oversight of geothermal well drilling, operation, maintenance, plugging, and abandonment with the Division of Oil, Gas & Geothermal Resources within the state's Department of Conservation. In California, issuance of these permits is subject to the state's environmental review process and the Division of Oil, Gas & Geothermal Resources is the lead agency for environmental review. In Nevada, applicants seeking to drill or operate an individual geothermal well must submit an application to the Division of Minerals of the Commission on Mineral Resources.

D. State Environmental Review. Some states have comprehensive environmental review statutes similar to NEPA. Washington and California, for example, require such a review. Washington's review is pursuant to its State Environmental Policy Act ("SEPA") and California's is pursuant to its California

Environmental Quality Act (“CEQA”). Oregon, Nevada, Idaho, Utah, Wyoming, and New Mexico do not have comprehensive environmental review statutes akin to NEPA. The net effect of state statutes such as SEPA and CEQA is increased processing time, additional cost, and often the imposition of additional mitigation requirements. Nevada’s environmental review of geothermal developments is less stringent; usually only an environmental assessment is required and the permitting process generally takes from three months to one year, regardless of whether drilling is on private or public lands.

E. Power Facility Permitting. A few states – Oregon, Washington, and California included – have state siting councils or boards with mandatory siting jurisdiction over the siting of geothermal power production facility development. Oregon’s siting body has jurisdiction over geothermal energy facilities with a peak generating capacity of 38.85 MW or greater. California’s siting body exercises jurisdiction over geothermal energy facility siting for plants with a generating capacity of 50 MW or greater. Washington’s siting council may exercise jurisdiction over the siting of geothermal energy facilities of any size, but only if it is requested to do so by the applicant. In each of these states, siting permits are binding on state and local political bodies, except that in Oregon a developer may choose to obtain permits directly from local land use boards. In both California and Washington, siting body determinations incorporate environmental reviews, and Washington’s siting council has the authority to issue state permits under the federal Clean Air Act and Clean Water Act. Neither Idaho nor Nevada coordinates facility siting at the state level. In these states, developers must obtain necessary permits from separate state and local boards and agencies.

F. Local Permitting. For local siting applications, an applicant may be required to work with local planning commissions, zoning boards, and county boards. The county governing board, typically a board of commissioners, generally must approve and issue a permit, usually a conditional use permit. In most counties throughout the United States, a geothermal project is conditionally allowed in rural land use zones; it is not expressly allowed or prohibited, but rather subject to a discretionary review by the appropriate local authority.

To secure a conditional use permit, an applicant typically must show that a project will be compatible with adjacent land uses (usually farming or ranching). Conditional use ordinances often require review by and consultation with state or federal agencies in the permitting process. For instance, if the project could negatively impact wildlife species listed by state or federal agencies as threatened or endangered, the appropriate state or federal agencies must be consulted. State and federal wildlife agency review may also occur as a matter of course through the environmental review process.

III. Key Substantive Issues.

A. Water Impacts. In early geothermal developments, wastewater was disposed of in surface ponds or rivers. Today, in almost every geothermal development worldwide, water obtained from wells is injected back into the subsurface. Not only does this minimize surface water disturbance, it also replenishes geothermal wells to help sustain the hydrothermal system. Despite this minimization of impact to surface waters, pollution discharge and consumptive use permits may still be necessary, depending on local hydrologic conditions, solute levels, and state and federal legal requirements.

Geothermal fields may also present an opportunity for disposal of urban and agricultural wastewater. Even if water obtained from a geothermal system is reinjected, steam pressure typically declines as a geothermal well matures. To forestall this decline, wastewater from nearby communities can be injected into production wells in order to recover lost pressure.

B. Air Impacts. Typically, geothermal power plants emit no nitrogen oxides, very low amounts of sulfur dioxide, and about one-sixth the carbon dioxide of a natural gas power plant. Moreover, airborne emissions from binary geothermal plants are essentially nonexistent, because geothermal gases are not released into the atmosphere. Nevertheless, most geothermal development still requires air discharge permits. Air discharge permits may be obtained either through a coordinated permitting body or through a state or regional board.

C. Land Use Compatibility. Compliance with applicable land use criteria is typically required. If a state has a coordinated permitting body, that body's permit may operate in lieu of local permits. If no such body exists, developers may have to negotiate permits directly with local land use boards. Each county has its own land use criteria, which may be dictated by statewide land use requirements. County land use codes often have vague standards and criteria, requiring (or allowing) highly discretionary determinations of public need, public safety, and "compatibility" with other land uses. Typically, geothermal power plants take up little land space, using only 5 to 10 percent of the land in a project area, and, with careful design, can easily blend into the surrounding environment. Therefore, in addition to supporting a power plant, surface land often can still be used for other purposes, such as livestock grazing.

D. Wildlife Impacts. Geothermal energy projects can disturb wildlife and plant species. It is important to assess whether any of the species present in a project area are listed as federal or state threatened or endangered species or species of concern. This is generally determined through a database inventory of species likely to occur in a project's vicinity, combined with site visits that typically require a spring survey for plants and some animal species.

E. Visual Impacts. Geothermal resource areas are often located in remote locations. Frequently, associated energy production facilities represent the only development in otherwise undisturbed natural areas. As such, they can often draw the attention of environmental groups in spite of their significant environmental benefits compared with other forms of energy production. Visual impacts can be greatly minimized by using air cooling, a low profile, colors that match the natural landscape, and natural landscaping.

F. Cultural Resources. Geothermal fields are sometimes associated with Native American cultural sites. When appropriate, early and constant involvement of local Native American tribes is advisable. Mitigation may also be necessary. Mitigation typically requires avoiding protected sites or moving protected sites if they cannot be avoided. In addition, it may be necessary to have an expert in native culture or paleontology on site during construction to protect identified sites and alert work crews to additional sites that may be unearthed during construction.

G. Transmission Access. Because the heat energy of steam dissipates rapidly, it cannot be transported and must be used where it occurs. Resources are often located in remote areas beyond the reach of the existing power grid, and construction of power lines can be an expensive and contentious endeavor.

IV. Conclusion. Siting a geothermal energy facility on federal, state, or private land requires a keen understanding of legal requirements and issues. As with any proposed development, a key strategy for the specific issues presented in this chapter is early, meaningful contact with interested local, state, and federal agencies as well as other stakeholders.