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GEOTHERMAL ENERGY DEVELOPMENT
IN WASHINGTON STATE

A GUIDE TO THE
FEDERAL, STATE, AND LOCAL
REGULATORY PROCESS

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ABSTRACT

Washington State's geothermal potential is wide spread. Hot springs and five strato volcanoes existing throughout the Cascade Range, limited hot spring activity on the Olympic Peninsula, and broad reaching, low temperature geothermal resources found in the Columbia Basin comprise the extent of Washington's known geothermal resources.

Determination of resource ownership is the first step in proceeding with geothermal exploration and development activities.

The federal and state processes are examined from pre-lease activity through leasing and post-lease development concerns.

Plans, permits, licenses, and other requirements are addressed for the federal, state, and local level. Lease, permit, and other forms for a number of geothermal exploration and development activities are included.

A map of public lands and another displaying the measured geothermal resources throughout the state are provided.

INTRODUCTION

Geothermal energy development in Washington State is in its infancy, even though development of hot springs as spas occurred as early as the late 1800s and early 1900s at such places as Lester, Ohanapecosh, Carson, Sol Duc, and Olympic. Many of these early developments have since been returned to their original natural state. Advancements in geothermal electrical generation technologies and escalating energy costs have created a renewed interest in the development of geothermal electrical and direct use resources. Developments at hot springs, together with other geothermal indicators, such as the volcanoes, and thermal and mineral springs, may represent only a fraction of the geothermal energy potential of Washington State.

Geothermal development can create valuable socioeconomic benefits for society. However, such development has the potential for environmental impact. In order to achieve an appropriate balance of environmental protection and desired development, the leasing, permitting, and licensing process has been established in accordance with appropriate state and federal environmental statutes. This regulatory process also serves other fundamental purposes, such as protecting public safety, public resources, and public and private property rights.

Development of a geothermal resource involves the coordinated efforts of geologists, economists, and engineers; and attorneys to deal with the leasing, permitting, licensing, and environmental regulations.

Numerous laws enacted over the years at the local, state, and federal levels have resulted in a large number of lease, permit, and license requirements which must be satisfied before a geothermal project can be built and put on-line. This guidebook together with the details provided in the appendices of this publication identify leases, permits, licenses, and other miscellaneous approvals which may be necessary during the course of a geothermal project. Most projects will not require all of those listed. Small direct use projects, in particular, are likely to be exempt from most regulation.

It is important for the prospective developer to regard the various regulatory requirements not as barriers to be surmounted (or circumvented) with minimum effort, but as a useful list of milestones which will be associated with a particular site or project design. Agencies responsible for leases, permits, and licenses should be consulted early in

the development process so that all appropriate project requirements can be met in a timely manner. In this way, last minute misunderstandings and unnecessary delays can be avoided.

WASHINGTON'S GEOTHERMAL POTENTIAL

Geothermal occurrences in Washington can be divided into three distinct geographic areas: the Cascade Range, the Olympic Peninsula, and the Columbia Basin (see map in accompanying packet).

The Cascade Range

Of the three areas, the Cascade Range Geothermal Province must be considered to hold the greatest potential as evident from the number of thermal and mineral springs, and the five major stratovolcanoes. (Bloomquist, 1979; Schuster, et al., 1978)

The Cascade Range is topographically dominated by five major andesitic stratovolcanoes. In addition, a series of basaltic volcanic centers are found in the southern part of the range.

Recent volcanic activity associated with Mt. Saint Helens dramatically illustrates that hot rock and magma exist at depth beneath Washington stratovolcanoes. Thermal springs as well as fumarole activity are additional evidence of the geothermal potential of the Cascades. (Bloomquist, et al., 1980)

The Cascade Range Geothermal Province has received a great deal of attention from potential developers. Geothermal lease applications have been filed on over 700,000 acres of U.S. Forest Service lands in Washington since 1974. (Clark, 1985) The filing of lease applications has continued to present, with new filings being made almost monthly.

The Olympic Peninsula

The Olympic Peninsula, although historically famous geothermally due to the existence of plush spas at Olympic and Sol Duc Hot Springs in the early 1900s, must be considered to have little developable geothermal potential.

Both above mentioned spring systems are now found in Olympic National Park and are protected from exploitation. (Bloomquist, 1979)

The Columbia Basin

Of the three geographic areas, the Columbia Basin must be considered to be the most exciting in terms of near-term direct utilization development potential.

Large areas in the Columbia Basin have been identified as having above normal groundwater temperatures and above normal geothermal gradients. Groundwater temperatures of 18°C (65°F) to 40°C (104°F) are common, as are geothermal gradients above 50°C (122°F) per kilometer. (Korosec and Kaler, 1980) (see map in accompanying packet.)

These widespread resources are available at a moderate depth (less than 610 meters (2,000 feet)). Many irrigation and municipal wells in the Columbia Basin deliver water at temperatures between 18°C (65°F) to 40°C (104°F).

Although these resources may not hot enough to be used directly for industrial processing or space heating, they can be economically utilized by boosting the temperature through the use of heat pumps.

Deep wells drilled in search of oil and gas in the Columbia Basin and bordering areas to the west have confirmed much higher temperature resources. Although these deeper resources are probably not economically exploitable at this time, they may be in the future.

A map, entitled "Geothermal Resources of Washington," displays many of the known geothermal resources in the state (see accompanying packet).

DETERMINING RESOURCE OWNERSHIP

After a site for geothermal resource development has been identified, land surface and subsurface ownership must be determined. In many cases, ownership of the surface and geothermal or mineral rights is the same. However, in some instances, the geothermal or mineral estates have been severed from the surface ownership. When the estates have been separated, the potential developer will have to negotiate with both owners. (Bloomquist, 1985)

In any case, a competent title search and ownership determination is essential to secure the necessary development rights. It is best to consult a qualified attorney.

The would-be geothermal developer must identify and secure all resource rights required for the proposed project. This task is not as simple as it may appear since geothermal resources are akin to water, to gases, and to minerals. This complexity makes it difficult to relate geothermal to other established resource categories. Existing water rights, mineral titles, surface and subsurface estates form an intricate tangle, and attachment of geothermal rights to one of them will often disturb the rest.

Legal definitions of geothermal resources serve to distinguish geothermal resources from other natural resources, in particular: water, dissolved gases, and minerals. It is important to consider the legal definitions of geothermal resources at the state and federal level. (Bloomquist, 1985)

THE FEDERAL PROCESS

Federal Definition of a Geothermal Resource

A "geothermal resource" as described in the Code of Federal Regulations Title 43 CFR Part 3200 means geothermal steam and associated geothermal resources which include:

1. All products of geothermal processes, embracing indigenous steam, hot water, and hot brines;
2. Steam and other gases, hot water and hot brines resulting from water gas, or other fluids artificially introduced into geothermal formations;
3. Heat or other associated energy found in geothermal formations; and
4. Any by-products derived from them (exclusive of oil, hydrocarbon gas, and helium).

Obtaining Access to Geothermal Resources on Federal Lands

Surface access and the priority right to explore, develop, and use geothermal resources on federal lands are acquired through an "Offer to Lease and Lease for Geothermal Resources" (see accompanying packet) issued by the U.S. Bureau of Land Management (BLM). Pursuant to the Geothermal Steam Act of 1970, the Secretary of the Interior can issue leases for the development and use of geothermal resources on certain federal lands. Exempted from leasing are lands within the National Park System, national recreation areas, fish hatcheries, identified wildlife areas (e.g., refuges, ranges, management areas, waterfowl production areas), Indian lands, Department of Defense lands, and other lands selected by the Secretary. Wilderness areas, designated after 1970 subsequent to the 1970 Geothermal Steam Act, may be leased in accordance with terms of the Wilderness Act of 1964. (Clark, 1985)

Pre-Lease Activity

Limited exploration involving "casual use" activities may be conducted before securing a lease by notifying the local BLM District Office or the Forest Supervisor's Office. Casual

use refers to activities such as geologic mapping and spring sampling that are transitory and do not appreciably disturb the land. The principal pre-lease activities of the federal leasing process are summarized in Figure 1. (Bloomquist, 1980)

Pre-lease exploration activities, including test drilling up to 152 meters (500 feet), unless otherwise authorized by the BLM, may begin upon approval of a "Notice of Intent and Permit to Conduct Exploration Operations" (Form 3200-9, Appendix A) from the authorized officer of BLM, who coordinates with the appropriate Surface Management Agency (SMA). The notice requires site-specific information concerning exploration plans and a \$5,000 bond (Form 3200-11, Appendix A) or other bond assurance. The approved notice requires compliance with all applicable federal and state laws and local ordinances. When the exploration activities are complete, a "Notice of Completion of Exploration Operations" (Form 3200-10, Appendix A) must be filed with the BLM.

Exploration under a Notice of Intent gives the nonexclusive right to conduct operations on federal land, but no preference for a lease.

FIGURE 1: Principal Pre-Lease Activities
FEDERAL GEOTHERMAL REGULATORY PROCESS

Principal Pre-Lease Activities

PRE-LEASE EXPLORATION

NONCOMPETITIVE LEASING

COMPETITIVE LEASING

Leasing Activities

The BLM and other SMAs are responsible for the review and processing of geothermal lease applications. The major role of these agencies in the federal leasing program is outlined below:

Bureau of Land Management

- Receive and process lease applications for non-competitive areas.
- Designate "Known Geothermal Resource Areas."*
- Publish lease sale notices and receive bids for competitive lands.
- Prepare environmental assessments on suitability of BLM lands for geothermal leasing purposes.
- Prepare lease stipulations governing special surface management programs.
- Supervise land uses on BLM leased land outside areas of operations.
- Award all leases.
- Administer lease.
- Supervise activity within the area of operation on leased lands for all phases of exploration, development, and utilization.
- Prepare post-lease environmental assessments on site-specific exploration and development plans. The surface management agency, or Forest Service, provides input.

* KGRA is defined as "an area in which the geology, nearby discoveries, competitive interest, or other indications would, in the opinion of the Secretary of the Interior, engender a belief in men who are experienced in the subject matter that the prospects for extracting of geothermal steam or associated geothermal resources are good enough to warrant expenditures of money for that purpose," United States Geological Survey, 1979.

- Issue Geothermal Resource Operational Orders.

Forest Service or Other Surface Management Agency

- Prepare environmental assessments on suitability of National Forest lands or land managed by that agency for geothermal leasing purposes.
- Provide input to BLM on surface considerations for post-lease environmental evaluations.
- Prepare lease stipulations for governing surface management.
- Supervise land uses on leased land outside areas of operation.
- Issue special use permits for surface occupancy.

The procedure for obtaining a federal geothermal lease depends upon the competitive interest classification of the land. Lands may be classified as "Known Geothermal Resource Areas" (KGRA) and leased on a competitive bid basis. Non-KGRA acreage is offered through a noncompetitive lease to the first qualified applicant.

Competitive Leasing

Lands designated by the BLM as being in a KGRA may only be leased through competitive bidding. In Washington, 13,381 hectares (33,065 acres) have been so classified, most of which resides in Wilderness areas. These areas are shown on the Geothermal Resources of Washington map (see accompanying packet).

A competitive bidding situation may also result if over one-half of the lands in one application are covered by another application filed during the same lease period.

The BLM State Office manages leasing on KGRA lands. The appropriate surface management agency; BLM, Forest Service, or other SMA; conducts the necessary pre-lease environmental review and determines which areas will be available for leasing. The BLM sets the lease sale date and publishes public notices. On the day of the sale, each bidder must submit a statement of qualifications for leasing and a sealed bid which

includes payment for at least one-fifth of the bid amount. Leases generally are awarded to the highest bidder. The federal government reserves the right to reject any and all bids.

Figure 2 illustrates the pre-lease activities of the federal regulatory process concerning competitive leasing on KGRA lands. (Fugimoto, 1985)

Regulations governing KGRA status and access to federal lands are found in Title 43, Chapter II of the Code of Federal Regulations (43 CFR Part 3200).

Noncompetitive Leasing

Federal lands which have not been excluded from leasing or classified as being in a KGRA are available to the first qualified applicants on a noncompetitive basis. The procedure begins with the filing of an "Offer to Lease and Lease for Geothermal Resources" (see accompanying packet). The offer requires: a site description; that an individual, corporation, or municipality is qualified to hold a lease; and other specified information. Each application must be filed with the BLM State Office in a sealed envelope marked "Application for a Lease Pursuant to 43 CFR Part 3200" and accompanied by a \$75 filing fee. Lease applications will be considered on the basis of priority by date of filing and contingent on an environmental assessment in place or to be conducted. Leases are awarded for lands found suitable for geothermal development.

The pre-lease activities of the federal regulatory process for noncompetitive leasing are shown in Figure 3. (Fugimoto, 1985)

FIGURE 2: Competitive Lease Process

GEOHERMAL REGULATORY PROCESS Pre-Lease Activities

(FIGURE 2 continued)

COMPILED FROM GEOTHERMAL STEAM ACT OF 1970, FEDERAL RULES
AND REGULATIONS 43 CFR PART 3200, AND MEMORANDUM OF UNDER-
STANDING FOR THE GEOTHERMAL PROGRAM - BLM, FWS

ABBREVIATIONS

BLM	Bureau of Land Management
BLM-DO	Bureau of Land Management, District Office
BLM-SO	Bureau of Land Management, State Office
FWS	Fish and Wildlife Service
FWS-RO	Fish and Wildlife Service, Regional Office
FWS-AO	Fish and Wildlife Service, Area Office
EA	Environmental Analysis (prepared by BLM)
EIS	Environmental Impact Statement (prepared by BLM)
R/C	Agency Review and Comment
DOE	Department of Energy
ASA	Appropriate State Agencies
ALA	Appropriate Local Agencies
SMA	Surface Management Agency

FIGURE 3: Noncompetitive Lease Process

GEOTHERMAL REGULATORY PROCESS Pre-Lease Activities

Noncompetitive Leasing

Primary Responsibility - BLM

(FIGURE 3 continued)

COMPILED FROM GEOTHERMAL STEAM ACT OF 1970, FEDERAL RULES AND REGULATIONS 43 CFR PART 3200, AND MEMORANDUM OF UNDERSTANDING FOR THE GEOTHERMAL PROGRAM - BLM, FWS

ABBREVIATIONS

BLM	Bureau of Land Management
BLM-DO	Bureau of Land Management, District Office
BLM-SO	Bureau of Land Management, State Office
FWS	Fish and Wildlife Service
FWS-RO	Fish and Wildlife Service, Regional Office
FWS-AO	Fish and Wildlife Service, Area Office
EA	Environmental Analysis (prepared by BLM)
EIS	Environmental Impact Statement (prepared by BLM)
R/C	Agency Review and Comment
DOE	Department of Energy
ASA	Appropriate State Agencies
ALA	Appropriate Local Agencies
SMA	Surface Management Agency

Salient features of the federal lease terms include:

- o Lease Limitations

A geothermal lease can not exceed 2,560 acres.

The minimum area for a lease application is all available land within a section (approximately 640 acres) except at the discretion of the Secretary (Department of the Interior).

The maximum total holdings within any one state is 51,200 acres.

- o Primary Term

All federal leases are issued for a primary term of ten years.

- o Lease Extension

A lease that is being "diligently" drilled before the end of the primary term will be extended for five years and for the duration of commercial production up to 35 years. This also applies to a lease committed to a cooperative plan, communitization agreement, or a unit plan.

- o Lease Renewal

Leases may be continued for the extent of commercial production up to an additional 40 years. Leases may be renewed for a second 40 year term if commercial production continues and the acreage is not required for other use.

- o Annual Rental Fees

The minimum rental payment (exact amount set in lease) is \$1 per acre, and \$2 per acre for KGRA lands.

After the fifth year of the lease, in addition to the \$1 per acre rental, expenditures for exploration shall be made in accordance with the following table unless commercial production is established:

TABLE I
Lessee Exploration Expenditure Requirements

Lease Year	Expenditure Per Acre
6	\$ 4
7	6
8	8
9	10
10-15	12

The lessee may exercise the option of paying an additional \$3 per acre rental in lieu of performing the minimum diligence requirements.

Exploration expenditures during the first five years, and all subsequent years, may be credited to the escalated portion of rent due.

o Royalties

Royalty payments are made in lieu of rentals once commercial production occurs.

- 10 percent minimum and 15 percent maximum of the value of geothermal production. The absolute minimum payment, however, is set at \$2 per acre.
- 5 percent maximum of the value of any by-product produced.
- 5 percent maximum on the value of commercially demineralized water.

Information

For additional information, copies of applicable rules and regulations, and application forms, contact:

Bureau of Land Management
Minerals Leasing Section
Oregon State Office
P. O. Box 2965
Portland, OR 97208
(503) 231-6291

U.S. Forest Service
Regional Office
Mineral Leasing Section
P. O. Box 3623
Portland, OR 97208
(503) 221-2877

Federal requirements for exploration, development, and utilization of geothermal resources, as issued under the Geothermal Steam Act of 1970, are discussed in detail in the Geothermal Resources Operational (GRO) Orders which were published by the Geological Survey. The GRO Orders are currently being updated by the BLM to reflect internal federal agency responsibility shifts. The items covered by the GRO Orders will, however, remain the same despite these shifts in responsibility:

- GRO Order 1 Exploratory Operations
- GRO Order 2 Drilling, Completion, and Spacing of Geothermal Wells
- GRO Order 3 Plugging and Abandonment of Wells
- GRO Order 4 General Environmental Protection Requirements
- GRO Order 5 Plans of Operation, Permits, Reports, Records, and Forms
- GRO Order 6 Pipelines and Surface Production Facilities
- GRO Order 7 Production and Royalty Measurement, Equipment, and Testing Procedures

A majority of the responsibilities now lie with the BLM. The BLM has primary responsibility for supervising geothermal leases on all available federal lands. The SMA also has review responsibilities governing the issuance and administration of federal geothermal leases.

When a lease has been secured for a particular geothermal resource area, exploration and development may follow. Before initiating any activity, the geothermal developer must obtain the necessary permits from the appropriate local, state, and federal regulators. The length of permit application review time and the number and type of permits required will vary depending upon the size of the project and the environmental sensitivity of the area. For example, a commercial geothermal greenhouse will require fewer permits and less processing time than a geothermal electric generating facility.

Principal post-lease activities of the federal regulatory process are shown in Figure 4.

FIGURE 4: Principal Post-Lease Activities

FEDERAL GEOTHERMAL REGULATORY PROCESS

Principal Post-Lease Activities

SMA - Surface Management Agency, e.g., Forest Service, Bureau of Reclamation

BLM & SMA - Bureau of Land Management has the lead role in NEPA compliance, i.e., has lead responsibility for Environmental Assessment or Environmental Impact Statements concerning leasehold operations.

Plans, Permits, Notices, Records, and Reports Required in Post-Lease Activities

Any persons desiring to conduct exploration, development, and utilization operations shall, prior to entry on the lands, file for approval with the authorized officer of the BLM.

Orderly development of a geothermal resource involves six major phases. These phases shall be covered in the Plan of Exploration, Plan of Baseline Data Collection, Plan of Development, Plan of Injection or Disposal, Plan of Utilization, and Plan for Production. Plans may be submitted separately or combined. A plan will also be required for any subsequent operations involving major surface disturbance in addition to that approved under a previous plan. Plans must be approved by the authorized officer and surface management agency before permits which authorize commencement of activities can be issued. A plan may not be approved without receipt of a satisfactory cultural resource report and approval of an Environmental Assessment.

The following plans, permits, notices, records, and reports are required for post-lease exploration, development, and utilization operations:

Exploration

- o Designation of Geothermal Operator (Form 9-1955) - Identifies the operator and local agent with full authority to act on behalf of lessee.
- o Plan of Operations (POO) - Exhibit I specifies information applicable to all required plans of operation except for the Plan of Baseline Data Collection. Plans may be submitted combined or separately.
- o Notice of Intent and Permit to Conduct Exploration Operations (Form 3200-9) - Pertains to exploration activities such as geophysical surveys and gradient well drilling to 152 meters (500 ft.).
- o Plan of Exploration (POE) - Pertains to exploration drilling which involves major surface disturbances.

- o Geothermal Exploration Permit (Form 9-1956) - Required for any exploration operations such as geophysical surveys and drilling of temperature gradient holes to 610 meters (2,000 ft.).
- o Geothermal Drilling Permit (Form 9-1957) - Required for deeper drilling 610+ meters (2,000 ft. +) to determine the presence of, test, develop, produce, or inject the geothermal resource.
- o Daily Drilling Report and Record - A permanent drilling record available at the worksite.
- o Well Logs and Surveys - During operations, field prints or working copies of all downhole logs, temperature and fluid surveys, and mud logging results must be submitted to the authorized officer.
- o Geothermal Sundry Notice (Form 9-1958) - Pertains to certain miscellaneous activities such as drill site preparation, subsequent well operations, or construction activities.
- o Monthly Report of Geothermal Operations (Form 9-1963) - Report covering all lease activities (exploration, drilling, injection, production, etc.) starting with the month in which operations begin under an exploration or drilling permit.
- o Notice of Completion of Exploration Operations (Form 3200-10) - Pertains to completion of exploration operations submitted under Form 3200-9, Notice of Intent and Permit to Conduct Exploration Operations.
- o Completion of Exploration Operations - A completion report must be submitted for exploration operations permitted under Form 9-1956, Geothermal Exploration Permit.

- o Geothermal Well Completion Report (Form 9-1960) - Pertains to details of drilling, cementing, formation, and production tests, etc. Also, any geophysical, geochemical, or temperature surveys performed in the well.
- o Annual Report of Expenditures for Diligent Exploration Operations - Applicable only if a diligent exploration credit is desired for subsequent years of exploration on a lease.

Development

- o Plan of Development (POD) - Pertains to drilling and construction (excluding utilization facility construction) which is necessary for initiation of commercial production. A POD may be combined with a Plan of Injection or Disposal (POI) and/or the Plan of Utilization (POU), to expedite processing.
- o Geothermal Drilling Permit (Form 9-1957) - See Exploration
- o Daily Drilling Report and Record - See Exploration
- o Well Logs and Surveys - See Exploration
- o Geothermal Sundry Notice (Form 9-1958) - See Exploration
- o Geothermal Well Completion Report (Form 9-1960) - See Exploration
- o Plan of Baseline Data Collection (PBDC) - The lessee must collect environmental data for a period of at least one year before a Plan for Production (PFP) can be submitted. To ensure acceptability of data gathered, it is recommended that a PBDC be submitted soon after a potentially produceable resource is identified.
- o Plan of Injection or Disposal (POI) - Pertains to the injection and disposal of geothermal effluent and associated by-products.
- o Monthly Report of Geothermal Operations (Form 9-1963) - See Exploration

- o Environmental Quarterly Report (If required by the authorized officer of the BLM) - Pertains to environmental data collected during development and subsequent operating activities.

Utilization

- o Plan of Utilization (POU) - A POU should present a general overview of the proposed facility and its operation, and must be submitted prior to construction of either an electric or direct use utilization facility.
- o Geothermal Utilization Permit (Form 9-1968) - A two step approval is required. First, authorizes construction and pre-start-up testing. The second approval authorizes operation of the facility.
- o Geothermal Sundry Permit (Form 9-1958) - See exploration
- o Baseline Data Report - Pertains to environmental data collected as covered in the PBDC. This report must be submitted prior to the Plan for Production (PFP), and before commercial production begins.
- o Plan for Production (PFP) - The PFP covers production procedures, monitoring, and any operations to be conducted after completion of drilling, construction, and installation of all wells and facilities needed to commence commercial production.
- o Monthly Report of Geothermal Operations (Form 9-1963) - See Exploration
- o Monthly Report of Sales and Royalties - Beginning with the month in which production first is sold or utilized, the lessee must file a monthly report of sales and royalties.
- o Environmental Quarterly Report (If required) - See Development

Other Reports

- o Geothermal Pollution Incident Report (Form 9-1961) - Must be submitted within 30 days of any blowout, spill, leak, toxic or noncondensable gaseous emissions, or other incident which may have a significant impact on the environment.
- o Geothermal Accident and Injury Report (Form 9-1962) - All accidents and injuries must be reported to the authorized officer within 24 hours of the occurrence. A written report must be filled no later than 15 days after the incident.

Other Records

- o Servicing Records - Must be available at the worksite. Pertains to cementing, stimulation, perforation, acidizing, and formation fracturing reports, casing, drill pipe, and other downhole component measurements.
- o Safety Records - Records of safety meetings, safety devices installed at the worksite, and work crew drills on contingency plan procedures must be available at the worksite.
- o Company Records - Copies of all geologic, geophysical, stratigraphic, structural, engineering, and environmental studies, reports, and records must be made available upon request of the authorized officer.

The post-lease activities of the federal process are shown in Figure 5. (Fugimoto, 1985)
Copies of the forms indicated in the post-lease operations can be found in Appendix A.

Table 2 shows which applications are needed for various geothermal activities and approximate time for processing.

FIGURE 5: Post-Lease Process

GEOTHERMAL REGULATORY PROCESS

Post - Lease Activities

(FIGURE 5 continued)

To facilitate the EA process the BLM prepares a detailed EA when the first deep exploratory drilling is proposed on a lease (or unit). Environmental baseline information of the entire lease (or unit) is gathered for that EA and may be used again in the preparation of subsequent EAs.

ABBREVIATIONS

BLM	Bureau of Land Management
BLM DO	Bureau of Land Management District Office
BLM SO	Bureau of Land Management State Office
FWS	Fish and Wildlife Service
FWS RO	Fish and Wildlife Service Regional Office
FWS AO	Fish and Wildlife Service Area Office
EA	Environmental Analysis (prepared by BLM)
RC	Agency Review and Comment
SMA	Surface Management Agency

TABLE 2
Applications and Representatives Processing Times
for Various Geothermal Activities

ACTIVITY	MUST BE ADDRESSED IN						ACTIVITY AUTHORIZED BY				PROCESS TIME
	POE	PBDC	POD	POI	POU	PFP	GEP	GDP	GUP	SN	
Casual Use							Advance notice required for expenditures to qualify as diligent exploration expenditures				None
Aerial Surveys											
Geologic Mapping											
Surveying											
Water Sampling											
Exploration Operations							x				30 days maximum
Areal Geophysical Surveys							x				
Temperature Gradient Hole Drilling & Coring (max. 3,000 ft.)							x				
Exploration Drilling and Testing											30 days maximum
Geotechnical Site Study							x				
With trenching or road construction							x				3-6 months
No trenching or road construction							x				
Well Pad & Access Road Construction	x							x		x	
Exploratory Well Drilling	x							x			
Well Testing											3 months maximum
Additional surface disturbance	x									x	
No additional surface disturbance										x	15 days max.
Development											30 days maximum
Geotechnical Site Study											
With trenching or road construction				x			x				
No trenching or road construction							x				4-6 months
Well Pad & Access Road Construction				x	x			x		x	
Injection Well Drilling					x			x			
Production Well Drilling				x				x			
Pipeline Construction				x						x	
Well Testing (production & injection)											3 months maximum
Additional surface disturbance				x	x					x	
No additional surface disturbance										x	15 days max.
Injection Facilities Construction					x					x	2-6 months
Production Facilities Construction				x						x	
Later construction on same site										x	15 days max.
Alteration											
Production & Utilization											30 days maximum
Geotechnical Site Study						x		x			
With trenching or road construction								x			3-18 months
No trenching or road construction								x			
Site Construction					x				x	x	
Facility Construction					x				x	x	
Power Transmission Line Construction					x				x	x	
Facility Operation					x				x		
Production						x					45 days
Injection or Disposal (incl. byproducts)				x							4-6 months
Environmental Data Collection											45 days maximum
Baseline Data Collection (pre-development operations-one year minimum)		x									
Environmental Monitoring (post development operations)					x	x					
Miscellaneous Activities											15-30 days
Abandonment					x					x	
Utilization facility											7 days
Well									x	x	
Changes to Approved Plans or Permits										x	7 days
Subsequent Well Operations											
Acidize										x	
Casing changes										x	
Convert to injection well										x	7-15 days
Deepen								x			
Directionally drill								x			1-15 days
Fracture test										x	7 days
Perforate										x	
Plug back								x			7-15 days
Redrill								x			
Repair										x	

KEY - POE = Plan of Exploration, PBDC = Plan of Baseline Data Collection, POD = Plan of Development, POU = Plan of Utilization, PFP = Plan for Production, GEP = Geothermal Exploration Permit, GDP = Geothermal Drilling Permit, GUP = Geothermal Utilization Permit, SN = Geothermal Sundry Notice.

Note: Where more than one Plan or Permit is checked off, the activity may be addressed in either Plan and authorized by either Permit.

Many of the itemized activities are processed together under one Plan rather than individually. Processing times shown are those for the entire Plan, and are based on submittal of a complete application. Processing of the Plans of Development, Injection or Disposal, and Utilization may be done concurrently, and submittal of these Plans together is encouraged.

Additional Federal Permits and Licenses

National Environmental Policy Act (NEPA)

Federal agencies making decisions on geothermal projects are required to comply with the National Environmental Policy Act for all projects on federal lands.

If the project is determined to be environmentally significant, a full EIS is required. Major projects usually require a full EIS. When a full NEPA EIS is required, it is written by the surface management agency (SMA) staff. When necessary, the SMA will require additional studies and information be provided.

Federal Communications Commission (FCC)

Geothermal projects utilizing remote radio operation will require a FCC permit. For more information, contact the FCC office listed in Exhibit 4.

Federal Aviation Administration (FAA)

Determination of No Hazard. Approval of this permit requires approximately two months. The FAA has forms which must be completed and reviewed to determine if any project feature (e.g., transmission towers) constitutes a hazard to aviation. A project layout showing elevation contours should be turned in with the application, and information on microwave towers and existing airports in the project area may be required.

INDIAN TREATY RIGHTS

Underlying Rights and Principles: The Stevens Treaties

In the 1850s a series of treaties were negotiated between the United States and a number of the Indian tribes in the Washington Territory. The chief negotiator for the United States was Isaac Stevens. The United States Congress gave Stevens a mandate to sign treaties with the Indians in order to extinguish their aboriginal title to the land to open it to settlement by American citizens.

In the Puget Sound and coastal regions of the state, the Indian peoples were primarily reliant on anadromous fisheries. In the Columbia River Basin salmon and steelhead were important, but hunting for game was also significant. In exchange for giving the United States title to most of their land, the Indians retained reservations for homelands as well as a right to continue hunting and fishing at their usual and accustomed places, both on and off the reservation.

All of the Stevens treaties were negotiated, executed and ratified by Congress well before Washington became a state. In the ensuing decades, the treaties were interpreted by the federal courts. The court rulings followed earlier Supreme Court rules concerning Indian treaties and established several basic principals. Most fundamentally, the rights retained by the tribes are reserved rights, that is they are rights retained by them at the time of treaty-making, and not given to them by the United States.

The right to take fish and wildlife under treaty is a property right. Each tribe which signed a treaty has a property right to the use of the resources in question. As a property right retained from before statehood, treaty rights are in the nature of easements on other real property interests and when necessary protect the right to take fish and wildlife.

Treaty rights have also been found by the federal courts to include an environmental right. The courts have held that the resource must be protected in order to effectuate the right to take fish and wildlife. For example, court decisions have forbidden actions which would inundate usual and accustomed fishing sites, dewater fish habitat, or degrade water quality to the detriment of the fishery.

Finally, and perhaps most significantly, the tribes as governmental entities have a right to manage the resource. This means that the tribes set their own seasons, and undertake all other activities necessary to adequately manage the resource, including protecting the environment necessary to sustain the resource. The tribes work cooperatively with the state and federal management agencies and are viewed as co-managers of the resource.

Indian Cultural and Archaeological Concerns

Indian groups and individuals have an interest in archaeological resources which may be adversely affected by development. Indians have lived here for thousands of years. Evidence of their occupancy is found in such places as a shelter on the Hoko River, petroglyphs at Vantage, and numerous village sites. Many archaeological resources are not yet discovered or are not adequately researched by trained professionals.

As the descendants of the people who occupied these sites, present day Indian tribes have a strong interest in their protection. It is a matter of great cultural pride. The tribes are becoming increasingly active in protection and interpretation of archaeological resources. Some tribes have even opened museums of the highest caliber.

A number of laws are designed to protect archaeological resources. The National Historic Preservation Act requires consultations with the State Historical Preservation Office. The Archaeological Resources Protection Act protects sites on federal and Indian lands. State laws govern non-federal sites and removal of human remains.

These laws require that the developer determine what, if any, resources are present in the project area. The BLM and Forest Service routinely include in their permit and licensing orders a requirement that the developer consult with the State Historic Preservation Officer (SHPO) to determine what resources are present. In most cases, the SHPO requires the developer to conduct surveys to accomplish this objective.

In recent years, as tribes have become better organized to protect their interests, the BLM and Forest Service have also required that developers consult with the tribes. If the

SHPO determine that there is a probability of resources being present, it would certainly be in the developer's best interest to seek out the local Indian tribes to determine their interests.

Areas of high geothermal potential may also be places of high religious significance to various Indian groups and are protected through provisions of the American Indian Religious Freedom Act (Public Law No. 95-341, (United States Forest Service, 1981)). If development is contemplated on federal or state lands, appropriate land management agencies should be contacted concerning the existence of American Indian Religious Freedom Sites. If such sites exist in the immediate vicinity of the proposed work, representatives of the Indian people should be contacted so that location of such sites can be determined and significance and usage patterns established.

The use of such sites is guaranteed to the Indians by statutes and only through closely working with Indians can conflict be avoided or minimized. (A list of the federally recognized tribes in Washington State is found in Exhibit 5.)

Federal and State Regulatory Acts Protecting Indian Cultural and Archaeological Sites

National Historic Preservation Act, 16 U.S.C., Section 470.
Archaeological Resources Protection Act, 16 U.S.C., Section 470.
American Indian Religious Freedoms Act, 42 U.S.C., 1996.
State Archaeological Sites and Resources Act, RCW 27.53.
Indian Graves Law, RCW 27.44.

THE STATE PROCESS

State Definition of a Geothermal Resource

Washington State has taken a different approach than the federal government in the definition of a "geothermal resource." The definition reads as follows:

'Geothermal resource' means only that natural heat energy of the earth from which it is **technologically practical to produce electricity commercially** and the medium by which such heat energy is extracted from the earth, including liquids or gases, as well as any minerals contained in any natural or injected fluids, brines, and associated gas, but excluding oil, hydrocarbon gas, and other hydrocarbon substances (RCW 79.76.). (Emphasis added.)

The principal difference in the Washington definition is that it restricts geothermal resources to those **"from which it is technologically practical to produce electricity commercially."** Geothermal resources were so defined in Washington State to provide for a clear division of responsibilities for purposes of regulation. The Department of Natural Resources, which normally regulates oil and gas drilling, was, by this mechanism, given the responsibility for the regulation of the high temperature and pressure resources, while the Department of Ecology, which normally regulates groundwater, was given the responsibility for low temperature and pressure resources. Unfortunately, because no definite cut off temperature was set but instead let to float, the Department of Natural Resources may be required to regulate resources with temperatures down to approximately 100°C (212°F). This is because advances in technology have made the generation of electricity possible at temperatures much below that which was anticipated at the time the Act was passed into law.

Washington has declared "geothermal resources" to be the property of the surface owner (Bloomquist, et al., 1980), but it is presently unclear, because of the impractical way in which the state has defined geothermal resources, what is truly included in this assignment, and what remains available for appropriation as groundwater. The state claims ownership of all groundwater underlying state and school lands. In order to gain access to low temperature geothermal resources below these lands, a commercial lease would have to be obtained. It is likely that the assignment of "geothermal resources" to the surface estate owner in Washington will result in a number of court challenges by

those who have maintained an interest in the mineral estate when estates have been severed. Ironically, the state of Washington is one of the largest owners of mineral rights on lands where the mineral and surface estates have been severed.

Obtaining Access to Geothermal Resources on Private Lands

Access to private land can be obtained by sale, lease, permit, option, or any other mutual agreement with the owner of the surface property and geothermal estate. If the land and resources are purchased outright, it is important that the developer secure clear title to the surface and subsurface rights.

In most instances, access to private land is obtained through a geothermal lease. Leasing terms generally include length of lease, royalty payments, lease fees, and stipulations governing exploration and development activities. This mechanism is often based on oil and gas leasing procedures.

Landowners may permit access prior to a lease or purchase option. This allows the developer to conduct agreed upon preliminary exploration activities. Such activities could include geological and geophysical investigations which do not disturb the surface and temperature gradient hole drilling. A state well drilling permit would be required for exploratory drilling on private land. Additional federal, state, and/or local permits would be required for continued development. These will be covered in the subsequent sections.

If the area of interest is already under lease for other purposes such as farming or grazing, the developer must secure permission from the lessee for surface access rights.

Both the developer seeking access rights and the landowner interested in leasing resource title would be wise to invest in competent title assistance. In addition to this legal advice, consultation with a qualified accountant regarding royalty payments and applicable tax laws is advised. (Bloomquist, 1980)

Obtaining Access to Geothermal Resources on State Lands

The Department of Natural Resources (DNR) manages the majority of the state lands, with the exceptions of Department of Game lands, Parks and Recreation Commission lands, and small holdings by other state agencies. Access to these lands for the purpose of

geothermal exploration, which has a nonsignificant impact, may be permitted by obtaining a permit from the local office of the agency managing the lands (Exhibit 4). The exploration permitted includes such activities as geologic mapping and spring sampling.

The DNR is also responsible for the issuance of leases on state trust lands for the purpose of geothermal exploration and development whether it be for electrical generation or direct utilization. A Plan of Operation is required by DNR for such exploration and development activities. Due to lack of interest by developers, leasing rules and regulations have not been adopted. (Parsons, 1985) However, draft rules and regulations were drafted in 1982. (Bloomquist, 1985)

Geothermal Development on State and Private Lands

The Department of Natural Resources (DNR)

Rules and regulations governing geothermal drilling have been adopted by DNR. The DNR is responsible for the processing and issuance of geothermal well drilling permits. Chapter 332-17 WAC discusses the requirements for the drilling of geothermal wells on both state and private lands (see Appendix B). As part of the requirements under the geothermal drilling rules and regulations, an operator or owner proposing to drill must first obtain a drilling bond (see Exhibit 2 and Appendix B).

The DNR has also established a policy with regards to the awarding of a right-of-way over state trust lands for the purpose of making roads or transmission interties. RCW sections 79.01.384 and 79.01.388 allow the state to grant rights-of-way to municipal, private corporations, associations, or individuals for the purpose of constructing ditches, flumes, pipelines, or transmission lines for the purpose of generating or transmitting electricity. The applicant is required to complete a survey of the involved land and append plats to an Application for Right-of-Way or Road Use Permit Over Lands. DNR may charge a one-time payment for permanent development rights which is based upon the fair market value of the land involved, or may require a base annual rental plus a percentage of gross income.

RCW Section 79.01.096 gives the DNR the authority to lease state trust land for the purpose of geothermal well drilling and power plant construction.

The Department of Ecology (WDOE)

As the state environmental management and protection agency, it is the responsibility of the WDOE to ensure that the water and related land resources of the state are protected and fully utilized for the greatest benefit to the people of the state. Furthermore, it is the policy of the WDOE to ensure that prior to the approval of water rights for projects, that the affected stream or reach shall be provided with minimum instream flows necessary to provide for the preservation of wildlife, fish, scenic, recreation, aesthetic, and other environmental values, including water quality.

WDOE administers several state permits (see Exhibit 2) designed to ensure environmentally sound geothermal projects. These permits must be obtained prior to beginning construction of a project in the state of Washington. The WDOE regulates the drilling of all water wells regardless of land ownership with the exception of federal land. In Washington, regulatory responsibilities for water wells, i.e., all wells for hydrothermal resources not capable of being utilized for electrical generation, lies with the Department of Ecology. The WDOE processes water right permits which are required for the construction of any water well. A water right, if needed, should be applied for well in advance of construction. WDOE will inspect the site, require publication of a public notice, and attempt to resolve any protests filed. If water is available, no existing water rights are affected, and the project would not be detrimental to the public welfare, a permit may be issued allowing construction of the project. A final certificate of water right is issued after the project is completed and water is put to use. The construction of a water well must conform to RCW 18.104 for the protection of domestic water supplies and other aquifers.

The National Pollutant Discharge Elimination System (NPDES) or State Waste Discharge Permit, Water Quality Certification and/or Short-Term Modification of the Water Quality Standards, and the Wastewater Facilities Plan Approval ensure that the water quality will not be adversely affected by the project. The State Environmental Policy Act requires that proposed development in the state of Washington be evaluated to identify the environmental impacts that will result before state and local permit decisions are made.

To assist developers in obtaining information on state permits, WDOE has established the Environmental Permit Information Center (EPIC). Additional information pertaining to the EPIC will be covered in a subsequent section.

Washington Department of Fisheries (WDF)

Under state law, WDF is charged to preserve, protect, perpetuate, and manage the food fish (salmon, smelt, sturgeon) and shellfish in state and offshore waters (RCW 75.08.012). To ensure the department can carry out its responsibilities, the law requires that water diversion devices be equipped with a well maintained fish guard (RCW 75.20.050), that where practical, dams and other obstructions across or in a stream be equipped with a durable and efficient fishway (RCW 75.20.060) and finally, any person, desiring to conduct work that will use, divert, obstruct, or change the natural flow or bed of any stream will secure written approval from the department (Fisheries or Game) having jurisdiction of the site. This might apply to generation projects which would require cooling water. The WDF is actively involved in consulting and conducting feasibility studies to evaluate and mitigate impacts on the fisheries resources.

Washington Department of Game (WDG)

The WDG is mandated by the legislature to "...preserve, protect, and perpetuate wildlife..." of Washington (RCW 77). These wildlife, which are property of the state, include wild animals, wild birds, and game fish. Policies set forth by the Game Commission state that, "The first management priority will be to establish and perpetuate the highest quality wildlife habitat."

The WDG also has obligations under such federal laws as the Federal Power Act and Fish and Wildlife Coordination Act. These require developers to consult with state agencies to determine what conditions may be necessary for protection of fish and wildlife resources. The WDG commonly works together with other agencies, such as Department of Fisheries, National Marine Fisheries Service, U.S. Fish and Wildlife Service, and Indian tribes, to determine potential impacts and possible mitigation proposals.

Although each geothermal project is individually evaluated, some guiding principles are common. Replacement of losses in-kind and on-site is the objective of the department's mitigation and compensation efforts. Although this cannot be achieved exactly, it may be approached in several ways.

The WDG works with project sponsors to assure in advance that adequate measures to protect fish and wildlife are included in initial plans. Specific provisions are usually negotiated and can take a variety of forms. Funding responsibility for these measures are assumed by the project sponsor and must be incorporated into the cost/benefit analysis of the planning process.

The WDG requires studies that will determine project-specific and cumulative impacts and identify mitigation and enhancement measures. On rivers where cumulative impacts are possible, delays may occur as studies are conducted. These studies are funded by project proponents, preferably under the direction and guidance of fish and wildlife agencies. Finally, the WDG advises project sponsors throughout the planning, development, and operational phases of the project.

The Washington State Energy Office (WSEO)

It is the policy of the WSEO to promote the development and use of a diverse array of energy resources. The use and development of renewable energy resources is particularly encouraged provided that such projects are consistent with the statutory environmental policies of the state. In order to assist in the construction of environmentally acceptable and cost-effective renewable resource projects, the WSEO has established a renewable resource section. Renewable resource specialists will assist potential developers through the state and federal licensing processes, as well as provide technical assistance in the areas of financing, design, and overall project development.

The Office of Archaeology and Historic Preservation (OAHP)

The State OAHP is responsible for ensuring that a proposed development site is not listed in the National Register of Historic Places. If so, OAHP will determine the number and extent of any resources and their scientific or cultural importance. Accordingly, plans and procedures will be outlined for mitigation of impacts.

State Environmental Policy Act (SEPA)

The Washington State Environmental Policy Act (Chapter 43.21C RCW) requires state and local agencies to evaluate proposed projects for their environmental impact before issuing any permits or other approvals. Figure 6 highlights the key steps in the SEPA process and provides references to the applicable sections of the SEPA rules (Chapter 197-11 WAC).

These rules are available in booklet format from any Washington Department of Ecology (WDOE) or Department of Natural Resources (DNR) office.

FIGURE 6

THE SEPA PROCESS

See SEPA Rules, Chapter 197-11 (April 4, 1984)
for more detailed information

Numbers Refer to Sections of the SEPA Rules

When a developer submits a permit application, the agency receiving the application determines whether or not the project is exempt from SEPA. If it is not, the agency then determines which agency requiring a permit is the "lead agency." The SEPA lead agency is responsible for complying with SEPA for a particular project. For any proposal involving a geothermal electrical generation project that is 250 MW or greater, the lead agency is the Energy Facility Site Evaluation Council (EFSEC) RCW section 80.50.020. A public agency proposing a geothermal project will most likely be the SEPA lead agency for that project. In most other cases, the lead agency will be the city or county in which the project is located.

When SEPA compliance is required for a project, the developer must complete an Environmental Checklist (see Appendix B), unless the developer and a lead agency agree that an environmental impact statement (EIS) will be prepared. The lead agency will give the checklist to the developer, who may complete it alone or together with the lead agency. The completed checklist provides specific information about the project, helps the developer and the lead agency identify impacts from the project (to reduce or avoid impacts from the project, if possible), and helps the agency decide whether an EIS is required.

When the lead agency receives the completed environmental checklist, it makes the Threshold Determination to determine whether an EIS is needed. If the lead agency determines the project will not have a probable significant adverse impact on the environment, it issues a Determination of Nonsignificance (DNS) and sends it to all agencies with permits or approvals to issue. These would be agencies whose services would be affected by the project, affected Indian tribes, and interested persons. The lead agency must also give public notice that the DNS has been issued; the method will vary among agencies. Any person or agency may submit written comments on the DNS to the lead agency within 15 days from the date of issuance. If comments are received, the lead agency must reconsider the DNS; the agency is not required to modify the DNS, but may, however, determine that there is a significant impact and require preparation of an EIS.

Whenever the lead agency determines that there may be a probable significant adverse environmental impact, it must prepare an EIS. The EIS provides information about a proposed project and possible alternatives to the project to agency officials, project sponsors, and interested citizens. The lead agency must use a Scoping process to narrow the contents of the EIS. During scoping, the lead agency will consult with other agencies

and the public. The draft EIS will focus on the significant adverse impacts which may result from the project and its alternatives and measures to mitigate or eliminate adverse impacts. The lead agency sends copies of the draft EIS to all agencies requiring a permit or other approval to Indian tribes which may be affected by the project, and to interested citizens. Agencies and citizens have 30 days in which to comment on the draft EIS. The lead agency must give public notice for both scoping and the draft EIS.

After considering all comments on the draft EIS, the lead agency prepares a final EIS. This document includes all comments, the lead agency's response to the comments, and either the draft EIS is revised to respond to concerns expressed in the comments or corrections are made to the draft EIS. The final EIS is sent to all agencies which must make decisions on permits or other approvals.

Preparation and distribution of the draft and final EIS and public hearings generally require three to six months to complete, but this can vary substantially. In certain cases, a joint SEPA EIS/NEPA EIS may be prepared. However, this requires close coordination with federal and state agencies. In other selected circumstances, a federal environmental assessment may be adopted by the SEPA lead agency as that agency's EIS (WAC 197-11-610).

State Permits

The Environmental Permit Information Center (EPIC) provides a centralized statewide environmental permit information service. The Center can answer general questions and provide certain services during the process of obtaining state environmental permits for activities on state as well as private lands.

The Center's address is:

Washington Department of Ecology
Headquarters Office, PV-11
St. Martin's College Campus, Lacey
Olympia, WA 98504
(206) 459-6022

The Center's Permit Information Line, (206) 459-6022, provides information on state environmental permits, public notice requirements, processing times, and appeal

procedures as well as required federal and local permits. The agencies involved and their locations can also be identified. A Permit Application Packet, tailored to the specific needs of a project, can be assembled and sent to an applicant.

Permits may be applied for individually, or a special process may be used to obtain several environmental permits as a package. The Environmental Coordination Procedures Act (ECPA) was adopted by the Washington State Legislature in 1973 to coordinate permit procedures. This process gives an applicant the option of submitting a Master Application form to assist in identifying necessary permits for the proposed development. If this service is used, the Center will act as the permit coordinator and assist the applicant from application through final disposition.

Not every geothermal project will require every state permit which is listed in Table 3. Generally, large developments will require most of these, a small facility may only need three or four of the possible permits.

TABLE 3
POSSIBLE STATE PERMITS OR EVALUATION REQUIRED
FOR DEVELOPMENT OF A GEOTHERMAL PROJECT

Permit	Agency	Comments	Fees	Approximate Time
Permit to Commence Drilling, Redrilling, or Deepening	DNR	Required for the drilling of a geothermal well.	\$200	6-12 weeks
State Environmental Policy Act Compliance	SEPA lead agency		None	3 wks.-3 yrs.
Permit to Appropriate Public Waters (Water Right)	WDOE	Required for any use of water for geothermal generation. Permit must be obtained prior to construction. In some cases an existing right may be changed to geothermal use upon approval by WDOE.	Examination fees: \$10 minimum, or for each cfs appropriated: 1-500 - \$2/cfs. 500-2,000 - 50¢/cfs. 2,000 + - 20¢/cfs. Other fees also apply. Contact any WDOE office to see RCW 90.03.470.	3+ mos.
Reservoir Permit and Dam Safety Approval	WDOE	For any man-made reservoir with a volume of 10 acre-feet or 10 feet in depth.	\$10 or cost, which ever is greater.	2+ mos.
Water Quality Certification	WDOE	Required before a federal license or permit is issued.	None	2 mos. 1 yr.
Short-term Modification to Water Quality Standards	WDOE	Required for any activity that will result in temporary violation of state water quality standards (chapter 173-201 WAC).	None	2 mos.
Flood Control Zone Permit	WDOE	Required if project is located in designated flood control zone.	None	1 mo.
NPDES and/or State Waste Discharge Permit	WDOE	Needed if pollutants, including geothermal fluid, will be discharged into surface or groundwaters. May not be required for heat pump applications.	Approximately \$1,000	2-6 mos.
Sewage and Industrial Waste Treatment Approval	WDOE	May be required if project includes sewage treatment or disposal system.	None	2 mos.
Annual Power Production License Fee	WDOE	Assessed at the beginning of every year. Based on theoretical horsepower. Less than 50 hp exempt.	0-50 hp - exempt 50-1,000 - 10¢/hp + 1,000-10,000 - 2¢/hp + 10,000 - 1¢/hp	
Hydraulic Project Approval	WDF or WDG	Required for any construction affecting surface waters or stream beds.	None	45 days
Public Water Supply Approval	DSHS	Required if public drinking water supply is needed or altered	Based on size of proposed system.	3 mos.
Archaeological Approval	OAHP	The National Historic Preservation Act requires that OAHP be contacted prior to development.	No set standard.	2 mos.
Forest Practices Application	DNR	For construction on forested, nonfederal land.	None	5-30 days
Surface Mining Permit	DNR	Operations disturbing 2 acres or 10,000 tons or greater of surface material on nonfederal land.		2-3 mos.
Burning Permit	DNR	To burn wood and debris.	None	1 wk.
Dumping Permit	DNR	Dumping 750 cu. yds. of land clearing debris on nonfederal land.	None	1 wk.
Easement to Use State Lands	DNR	Facilities, transmission lines on state lands.	Fair market value.	4 mos.
Right of Way or Road Use	DNR	For easements to cross state lands.	•	2 + mos.
Application to Purchase Valuable Material	DNR	Covers excavation and use of any stone, rock, sand, gravel, or silt from state lands.	Fair market value.	2 + mos.
Permit to Temporarily Remove or Destroy Survey Monument	DNR	Removal or destruction of any section corner or other land boundary mark or monument.	None	1 wk.
Special Motor Vehicle Permit	DOT	For any overweight or oversized vehicle.	None	1 day
New Source Construction Approval	Local Air Pollution Control Authority or WDOE for certain counties.	For dust control during use of construction machines such as concrete batch plants and asphalt plants.	Varies with individual air authorities	1-2 mos.
Hydraulic Project Approval	WDF or WDG	Required for any construction affecting surface waters or stream beds.	None	45 days

NOTE: Most projects will not require all of the permits listed. Small projects are likely to require only a few of those permits.

*See additional information on the individual permit.
cfs - cubic feet per second
hp - horsepower

Approximate time estimates given for project development are just that -- estimates. Time requirements will vary, depending on the complexity of the project and the amount of controversy involved. If several public hearings or court actions are involved in any one permit, the length of time necessary for approval will increase substantially. For more detailed information on each state permit, see Exhibit 2.

Local Permits

The permits at the local level which are applicable to geothermal development concern construction-related activities. Explanations of applicable local permits are listed in Exhibit 3.

Some local jurisdictions are developing regulations to encourage geothermal development. Such methods include:

- o Zoning ordinances which would create a more favorable heat load density for geothermal district heating.
- o A density bonus incentive which allows a greater number of homes per acre for developments using renewable resources. (Bloomquist, 1985)

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- Bloomquist, R.G., 1985, A review and analysis of the adequacy of the legal and institutional framework for geothermal development in Washington State: WSEO, U.S. DOE, DE-FG07-84ID12527, 48 p.
- Bloomquist, R. Gordon, 1985, Personal Communication.
- Bryson, J., et al., 1985, Developing Hydropower in Washington State, A Guide to Permits, Licenses and Incentives: Washington State Department of Ecology, 57 p.
- Clark, Jackie, 1985, Personal Communication.
- Fujimoto, Robert, 1985, Personal Communication.
- Geological Survey, 1976, Geothermal Resource Operational Orders 1 through 4: U.S. Department of Interior, 30 p.
- Geological Survey, 1980, Geothermal Resource Operational Order 5 Plans of Operation, Permits, Reports, Forms, and Records: U.S. Department of Interior, 37 p.
- Geological Survey, 1980, Geothermal Resources Operational Orders 6 and 7, 10 p.
- Lasmanis, Raymond, 1985, Personal Communication.
- Parsons, Lysle, 1986, Personal Communication.
- Schuster, J.E.; Blackwell, D.D.; Hammond, P.E.; Huntting, M.T., 1978, Heatflow studies in the Steamboat Mountain-Lemie Rock area, Skamania County, Washington: Washington Division of Geology and Earth Resources Information Circular 62, 56 p.
- Title 43, Chapter II of the Code of Federal Regulations (43 CFR Part 3200).
- Wallace, Gene, 1986, Personal Communication.

BASIC INFORMATION FOR PLANS OF OPERATION (FEDERAL LANDS)

1. Title Page showing:

Lease number(s) or unit agreement name;

Known Geothermal Resources Area (KGRA) name, if any;

Location (section, township, range, base, and meridian; county and state); name, address, and phone number for lessee or operator, contractor, and field representatives;

Brief description of proposed operations and objectives; and

Estimated starting and completion dates for each activity.

2. Maps:

- a. Topographic Map - Orthophoto quad or equivalent (preferred scale 1:24,000), and, if necessary, written explanation presenting:

Federal lease boundaries and serial numbers;

Fee lease boundaries, ownership, and lessees, if known;

Names, addresses, and phone numbers of private surface owners of, and those adjacent to, lands to be disturbed by proposed operations;

Proposed, existing, and abandoned wells;

Existing and planned access roads;

Water supplies and road building materials;

Campsites, airstrips, and other support facilities; and

Home and other pertinent surface facilities.

- b. Large-scale Map - Showing layout of the operations site (equipment, facilities, sumps, etc.).

- c. Detailed Engineering Plan and Profile Drawings - For any site, road, or other construction or modification located on rugged terrain, potentially unstable ground, or environmentally sensitive areas.

3. Narrative Statement containing:

Measures to prevent or control: fires; soil erosion; pollution of surface and groundwater; air, and noise pollution; hazards to public health and safety; and damage to fish, wildlife, and natural resources; and areas of cultural, historical, or archeological value;

Methods for disposing of waste materials (including sanitary facilities);

Provisions for monitoring air quality, noise, drilling mediums, and produced gases, liquids, and solids; and

Information about construction and drilling personnel (crew size, housing, and support facilities).

4. Certified Statement - The presence of or absence of any cultural, historical, or native American religious site which may be disturbed by operations. The statement must be made by a person acceptable to the surface manager, and a copy must be submitted to the surface manager and the authorized officer of the BLM. A certified statement of the presence of any rare, threatened, or endangered animal or plant species may also be required.

5. Emergency Contingency Plans including:

An Accident and Injury contingency plan for all plans; a blowout contingency plan where drilling is proposed; and when required by the authorized officer, contingency plans for the control of fires, pollution incidents, or hazards resulting from adverse weather conditions. Each contingency plan shall contain:

A description of adverse effects the emergency would have on operations, personnel, public health, and the environment;

Measures to control these effects, including shutdown procedures;

Responsibilities of each employee in an emergency situation;

Information about personnel with special training or experience with emergency procedures;

Where to obtain emergency control services and medical aid; and

Emergency notification list (names, addresses, and telephone numbers of pertinent federal, state, and local regulatory, law enforcement, and emergency service offices).

APPLICABLE REFERENCES: 43 CFR 3262.4.

6. Environmental Information - Submittal of the following information will facilitate the approval process:

Regional and local geology, hydrology, and meteorology;

Potential geologic hazards (active faults, landslide areas, etc.);

Soil, air, noise, and visual studies;

Fauna and flora (associations, communities, habitats, life patterns, etc.);

Current and prospective land uses, including recreational areas;

Local economy;

Sites of cultural, historical, or archeological value; and

Wildlife migration routes, watering holes, and habitats.

STATE PERMIT DETAILS*

Water Right -- RCW 90.03.250 and Chapter 508-12 WAC (WDOE)**

Information required for this permit application includes the following: a section map, the source of the water supply, how the water will be used, the exact location of the point of diversion or withdrawal, a legal description of the property on which the water is to be used, the signature of the legal landowner, and a description of the proposed water system. This application should be submitted as early as possible to establish a priority date. Processing will begin when the applicant requests WDOE to initiate action. SEPA compliance is required before issuance of this permit.

Water Quality Certification and Modification -- Section 401, Federal Clean Water Act; Chapter 173-225 WAC/RCW 90.48.120; WAC 173-201-035(8e) (WDOE)**

A Water Quality Certification is a statement issued by WDOE that the proposed activity will comply with applicable water quality standards and discharge limitations. Issuance of a certification is exempt from SEPA requirements.

Because most new geothermal construction activities will unavoidably violate state water quality criteria (particularly the turbidity criterion) on a short-term basis, such projects will require a Short-term Modification of Water Quality Criteria. A modification may be required before WDOE can issue a Water Quality Certification. SEPA compliance is required for a modification.

To request a certification and/or modification, a letter containing the following information should be sent to WDOE: description of the project, including location and proposed activities; the nature of any water quality violations expected, including specific criteria which will be violated, the scheduled duration and extent of these occurrences and a description of methods proposed to minimize the impact on water quality. Depending on the project, a review of plans and specifications may also be required.

- * State permits may be applied for prior to SEPA compliance, however, most permits require SEPA compliance before issuance.
- ** Applications and letters of request should be sent to the appropriate regional office of WDOE.

Permit to Commence Drilling, Redrilling, or Deepening--Ch. 332-17 WAC and RCW 79-76 (DNR)

The application to DNR for a Permit to Commence Drilling, Redrilling, or Deepening a geothermal well on state or private land requires information on: the proposed location of the well(s) including the position of any associated equipment; description of the lease, or property and owners of surface and mineral rights; existing and planned roads; methods for disposing of waste materials; and additional information addressed in the WAC. The applicant will have blowout prevention equipment installed. The applicant will be required to obtain a drilling bond (see Appendix B) prior to the commencement of drilling activity. Chapter 332-17 WAC - Geothermal Drilling Rules and Regulations, is presented in Appendix B.

Drilling Bond -- Ch. 332-17-160 WAC and RCW 79.76 (DNR)

The owner or operator who proposes to drill, redrill, or deepen a well for geothermal resources shall file with the DNR a good and sufficient bond in the sum of fifteen thousand dollars for each well or a fifty thousand dollar blanket bond for one or more wells being drilled, redrilled, or deepened at any time. The bond shall be filed with the department at the time of filing the application to drill, redrill, or deepen a well or wells. Approval of the bond by the department must be obtained prior to the commencement of drilling, redrilling, or deepening. The bond shall be made payable to the state of Washington, conditioned for performance of the duty to properly:

- (1) Drill all geothermal wells,
- (2) Operate and maintain producing wells, and
- (3) Plug each dry or abandoned well in accordance with applicable rules and regulations of the department.

The bond shall be executed by such owner or operator as principal and by a surety company authorized to do business in the state of Washington as surety, conditioned upon the faithful compliance by the principal with the laws, rules, regulations, and orders under the Geothermal Resources Act and shall secure the state against all losses, charges, and expenses incurred by the state in obtaining such compliance by the principal of the bond.

A single core-hole bond shall be in the sum of five thousand dollars and a blanket core-hole bond shall be in the sum of twenty-five thousand dollars.

Geothermal Leasing on State Trust Land Managed by the DNR -- RCW 79.01.096 (DNR)

A geothermal lease to conduct geothermal exploration and development activities on state land managed by the DNR is issued on a competitive basis. Each geothermal lease on state land is processed on an individual basis; no rules and regulations pertaining to lease fees and royalty schedules have been adopted. The DNR Division of Land Leasing and Recreation in Olympia is responsible for processing and issuing geothermal leases on state trust lands.

Underground Injection Control Program -- RCW 90.48 and Ch. 173-218 WAC (WDOE)

A permit is required for the reinjection of geothermal fluids into a well (Class V injection well). The applicant will be required to submit geothermal fluid quality data. The purpose of the program is to preserve and protect the quality of the state's groundwater as it pertains to public health and welfare.

Flood Control Zone Permit -- RCW 86.16.080 (WDOE)

This permit is required for the construction of any new structure, or the reconstruction or modification of an existing structure within designated flood control zones. Permit applications should include plans showing dimensions and elevations of planned obstructions and provisions for water passage through, around, and over works. Known high water marks and dates should also be included.

The counties of King, Cowlitz, Skagit, Kittitas, Clallam, Thurston, and Clark administer the flood control zone permit systems within their county boundaries. Applications for permits in these counties should be made through the local building or planning department, otherwise contact the nearest Department of Ecology Regional Office listed in Exhibit 4. This permit may require SEPA compliance.

National Pollutant Discharge Elimination System (NPDES) State Waste Discharge Permit - - Ch. 173-220 or 173-216 WAC (WDOE)

A NPDES permit would be required where a waste water source is discharged to "waters of the United States." In lieu of holding such a permit, a state discharge permit would be required under provisions of RCW 90.48.160-162. (Wallace, 1986)

The application requires information on waste source flow and expected characteristics, disposal method, water supply, wastewater disposal, water supply volumes, water utilization, planned improvements, storm water treatment, plant operation, materials and chemicals used, and production. Prior SEPA compliance is required.

Wastewater Facilities Plan Approval -- RCW 90.48.110 and Ch. 173-240 WAC (WDOE)

Engineering reports, plans, and specifications for construction of new sewage or industrial waste treatment or disposal systems, including systems for erosion/sedimentation control, disposal of wastewater from concrete batching and coring, etc., must be submitted for review and approval by WDOE. Prior SEPA compliance is required.

Hydraulic Project Approval -- RCW 75.20.100 (Fisheries or Game)

The application for this permit requires information on construction schedule, activities, methods, impact mitigation, total project cost, equipment, and duration of activities in and around streams and lakes. Information is also needed on any proposed changes in the channel bed or configuration, alterations of the stream bank vegetation, water quality impacts, restoration methods for vegetation and stream channel, fish protection, and siltation and erosion controls. Prior SEPA compliance is required.

Public Water Supply Approval -- Ch. 248-54 WAC (DSHS)

This approval is given in two parts. First is a preliminary design review which takes 60 days; second, a final plans and specifications review which takes 30 days. See WAC 248-54, sections 085 and 095 for details. After construction is completed, there will be a final review of the approved plans and the as-built drawings to see if there are any significant changes. Ultimate approval is subject to SEPA compliance. The preliminary design should be turned in as soon as possible, and the final plans shortly before SEPA compliance to allow for review time.

Archaeological Approval -- Executive Order 11593 (OAHP)

The State Office of Archaeology and Historic Preservation should be contacted prior to the start of a project. A historic/archaeological assessment may be required at the project site. The status of any sites or structures which are listed for the National Register of historic places will be identified. A determination will be made of the number

and extent of any resources which are present and their scientific importance. Plans and procedures will be outlined for recovery or mitigation of adverse effects. This approval is required prior to obtaining federal permits or licenses and SEPA approval.

Forest Practices -- RCW 76.09.060 (DNR)

Information is required on the location of the construction activities, the borrow and disposal areas, the construction methods and equipment, the size of needed rights-of-way, the restoration plans, the drainage plans, and an evaluation of the wildlife habitat to be removed.

Depending on the class of forest practice involved (see WAC 222-16-050), this permit may be contingent on the granting of Hydraulic Project Approval, Shoreline Substantial Development permit, Water Quality Certification, and SEPA compliance. Hydraulic approvals and must be renewed yearly.

Surface Mining Permit -- RCW 78.44.080 (DNR)

A bond may be required for reclamation activities before this permit is granted. Engineering information required includes: topographic maps, location of disposal and borrow sites, construction methods, equipment, mitigation plans for runoff and erosion, and the proposed schedule. Environmental information includes soil characterization, erosion control measures, reclamation and revegetation plans, and methods to protect surface water quality. The status of other state and local permits should also be given. SEPA compliance is required prior to issuance.

Burning Permit -- RCW 76.04.150 (DNR)

This permit should be applied for after construction, when the contractor has piled all debris for burning, and fulfilled all safety precautions. An inspector will be sent to examine the site and if it is safe, a permit will be issued at the site.

Dumping Permit -- RCW 76.04.242 (DNR)

After a dumping area has been established, the Department of Natural Resources is contacted and an inspector sent; the permit will be issued at the site. The inspector should be provided with a description of the dumping location and information regarding dumping practices and fire safety precautions.

Right-of-Way or Road Use (DNR)

Applications for the right to use state lands are available at the Department of Natural Resources headquarters or the local regional office. A separate application must be filed for each easement. The fair market value of any timber cut will be assessed and any costs incurred for a timber sale will be charged to the applicant.

Plans and sketches showing the location and design of all new construction must be submitted. Also needed are the locations, on plats, of new construction, a description of the engineering involved, and a description of the environment impacts. SEPA compliance is required prior to issuance.

Application to Purchase Valuable Material (DNR)

A standard application form can be obtained from the Department of Natural Resources. It will evaluate the fair market value for a purchase price. The legal location of the pit or quarry, excavation method proposed, the location of any timber stands or state quarries, the proposed excavation time, the planned use of the material, and the reclamation plan should also be provided with the application. SEPA compliance is required prior to issuance.

Permit to Temporarily Remove or Destroy Survey Monument (DNR)

This permit is issued by DNR subject to the provisions of Chapter 332-120 WAC which require adequate referencing and replacement of the monument or reference monuments after the development has been completed. A description of existing conditions and reason for removal are required. Coordination with the Washington Coordinate System may be required.

Special Motor Vehicle Permit -- RCW 46.44.090 (DOT)

This permit may be issued by the Department of Transportation at the time of application for activities using oversized or overweight vehicles. Information on tire size, number of tires, the weight and size of the vehicle, and the current registration must be supplied. The permit may be applied for by the contractor or by the developer.

New Source Construction Approval -- 173-400 WAC (Air Pollution Control Authority)

Approval is required for construction, installation, or establishment of a new stationary source of emissions. Within 30 days of receipt of a Notice of Construction (NOC), the reviewing authority (local Air Pollution Control Authority (APCA), WDOE regional offices, or Energy Facility Site Evaluation Council (EFSEC) may require additional information of the applicant.

Within 30 days after receipt of all required information, the reviewing authority shall make a preliminary determination. This determination will be made available in at least one location in the county(s) where the project is to be located.

The applicant is required to publish a notice to the public of the opportunity to provide written comment on the preliminary determination within 30 days of published notice.

After review of all current information, the reviewing authority issues either an order of prevention of construction or an order of approval for construction. An order of approval may contain specific requirements and conditions. The opportunity for public hearing is necessary for proposed construction where offsetting is proposed.

The WDOE Environmental Permit Information Center (EPIC) (206-459-6022) can refer applicants to specific air pollution control authorities in their area.

LOCAL PERMIT DETAILS

Shoreline Substantial Development Permit -- RCW 90.58.140

To determine whether this permit is needed, the Shoreline Master Program at the pertinent county or city office should be consulted. The plan will specify whether geothermal is an allowed use for the proposed area. The procedure for obtaining this permit varies from county to county. Generally, a public hearing is required. The Hearing Examiner will require an affidavit of public notice, a location map, a topographic map, and a site map. If a variance or conditional use permit is required, the Department of Ecology must give the final approval. SEPA compliance must be shown before final approval will be given. Fees vary, but are generally between \$100 and \$200.

Zoning Conditional Use Permit

In counties where a master plan is being implemented and where a project would conflict with planned land uses, a Conditional Use Permit or variance is required. The application is reviewed by a Hearing Examiner and requires a public hearing conducted by the Board of Commissioners. A preliminary drainage plan must be approved by the County Public Works Department prior to a public hearing for the substantial development and zoning permits. The filing fee should be between \$100 and \$200.

Surface Water Drainage Plan Approval

The exact form required for this approval can be found in the local public works department Procedures Manual. A Preliminary Drainage Review of the natural and planned drainage improvements is prepared and used to determine if a Detailed Drainage Review is necessary.

A Drainage Plan Approval is needed prior to issuance of the following permits: Building, Grading, and Shoreline Development. The Preliminary Approval is sufficient for the Shoreline Development Permit hearings. There is no fee for the Preliminary Approval. The fee for the Detailed Review is based on the fee schedule for the associated local permits and approvals requiring the Drainage Plan. Prior to any site work, an inspection fee is required.

Commercial Building Permit

The application requires detailed final design plans for structures including electrical plan, plumbing plan, floor layout, sewage facilities, drainage plan, size and shape of lot and buildings, size and shape of foundation walls, beams, air vents, window accesses, and heating or cooling plants, if included in the design. Four sets of detailed plans and specifications must be included in the application.

The Building Permit is dependent on the approval of the Drainage Plan, Shoreline Development Permit, Zoning Variance, and SEPA compliance (the last two may or may not be required).

Temporary Road Closure Permit

This permit can be granted over the counter to the contractor five days before it is needed. The application calls for a description of the proposed activity, the construction schedule, and the exact location of the proposed road closure. There are generally no fees for this permit.

Plumbing Permit

Plumbing plans prepared by a licensed plumber should be submitted along with an application card. The plans would show all fixtures and vents which will be installed, the types and sizes of pipe, and the fittings which will be used. A list of fixtures should also be included. The cost of this permit is approximately \$2, plus \$3 for each fixture including the water service line.

Interlocal Agreement for Construction on County Roads

The applicant initiates the short-term agreement by sending a letter to the director of the Department of Public Works describing the intended use and proposed upgrading and maintenance work. The letter should contain a draft contract for the agreement between the county and the applicant. The letter should include descriptions of proposed road construction, drawings illustrating materials to be used, and road bed and drainage design. A copy of the state environmental checklist or SEPA document should also be included.

Permit to Operate Overweight Vehicles on City or County Roads

This permit may be obtained by the contractor. The following information is required for each application: 1) the size and number of tires; 2) weight of vehicle; and 3) the current registration of the vehicle.

Utility Permits

A letter requesting this permit should be sent to the local Department of Public Works. It should include a set of plans relating to the transmission line leading from the powerhouse to the intertie, a description of the proposed construction of the transmission line, and a construction schedule. There are no fees for this permit.

Sewage Holding Tank Variance

An application for this permit can be obtained from the local Department of Health. The following should be included with the application: a drawing of the proposed facility including location and size; information on maintenance schedules; precautions to be taken against overflow; and a signed contract with a holding tank pumping firm which indicates a servicing schedule and a backup pumping firm. There is usually no fee required.

Grading Permit

Plans and specifications containing the following information should be submitted: the nature, extent, location, and compliance with the Uniform Building Code; existing contours, terrain, and area of drainage; limiting dimensions, contours, and proposed drainage channels after construction; plans and maps for all drainage devices, walls, cribbing, or dams; estimated area runoff, and the location of any existing or proposed building in the grading area. A Soil Engineering Report, the status of SEPA compliance and other local permits, and the Surface Water Drainage Plan should also be included.

This permit can not be issued until SEPA compliance is established. Fees are based on the total cubic yardage to be moved.

AGENCY CONTACT OFFICES

FEDERAL

Bureau of Land Management

Minerals Leasing Section
P. O. Box 2965
Portland, OR 97208
(503) 231-6291

Federal Communications Commission

3256 Federal Building
915 Second Avenue
Seattle, WA 98174
(206) 442-7653

U.S. Forest Service

Regional Office
Mineral Leasing section
P. O. Box 3623
Portland, OR 97208
(503) 221-2877

U.S. Department of Energy Headquarters

Forrestal Building
1000 Independence
Washington, DC 20451

U.S. Department of Energy

Idaho Operations Office
550 Second Street
Idaho Falls, ID 83401

U.S. Department of Energy, Region X

Richland Operations Office
P.O. Box 550
Richland, WA 99352
(509) 376-6222

Bonneville Power Administration

P. O. Box 3621
Portland, OR 97208

Power Resource Management
P. O. Box 3621 (PRSB)
Portland, OR 97208

Federal Aviation Administration

Northwest Regional Headquarters
Attn: ANW-533
9010 E. Marginal Way S.
Seattle, WA 98108
(206) 431-2052

STATE

Washington State Energy Office Services

400 E. Union, 1st Floor
Mail Stop: ER-11
Olympia, WA 98504
(206) 586-5000

Department of Ecology

Headquarters (St. Martin's Campus, Lacey)
Environmental Review Section
(Environmental Permit Information Center)
Mail Stop: PV-11
Olympia, WA 98504
(206) 459-6022

Northwest Regional Office
4350 - 150th Avenue N.E.
Redmond, WA 98052-5301
(206) 885-1900

Southwest Regional Office
7272 Cleanwater Lane
Mail Stop: LU-11
Tumwater, WA 98504-6811
(206) 753-2353

Eastern Regional Office
North 4601 Monroe, Suite 100
Spokane, WA 99205-1295
(509) 456-2926

Central Regional Office
3601 W. Washington
Yakima, WA 98903-1164
(509) 575-2491

Office of Archaeology and Historic Preservation

111 - 21st Avenue West
Mail Stop: KL-11
Olympia, WA 98504
(206) 753-4011

Department of Game

600 North Capitol Way
Mail Stop: GJ-11
Olympia, WA 98504
(206) 753-5700

Department of Social and Health Services

Water Supply and Waste Section
Mail Stop: LD-11
Olympia, WA 98504
(206) 753-5953

Department of Transportation

Highways Administration Bldg.
Mail Stop: KF-01
Olympia, WA 98504
(206) 753-6005

Utilities and Transportation Commission

Highways-Licenses Bldg., 7th Floor
Mail Stop: PB-02
Olympia, WA 98504
(206) 753-6423

Department of Natural Resources

Division of Land Leasing and Recreation
201 Public Lands Building
Mail Stop: QW-21
Olympia, WA 98504
(206) 753-5327

Division of Geology and Earth Resources
Rowe Six Building
Mail Stop: PY-12
Olympia, WA 98504

Southwest Area
Area Manager
Box 280
Castle Rock, WA 98661
(206) 577-2025

South Puget Sound Area
Area Manager
P.O. Box 68
Enumclaw, WA 98022
(206) 825-1631

Central Area
Area Manager
1405 Rush Road
Chehalis, WA 98532
(206) 748-8617

Department of Natural Resources (continued)

Northwest Area
Area Manager
919 North Township St.
Sedro Woolley, WA 98284
(206) 856-0083

Southeast Area
Area Manager
713 E. Bowers Road
Ellensburg, WA 98926
(509) 925-6131

Northeast Area
Area Manager
P.O. Box 190
Colville, WA 99114
(509) 684-5201

Air Pollution Control Authorities

Northwest Air Pollution Authority
207 Pioneer Bldg., Second and Pine
Mount Vernon, WA 98273
(206) 336-93399
(Island, San Juan, Skagit, and
Whatcom Counties)

Puget Sound Air Pollution
Control Agency
200 W. Mercer St., Room 205
P.O. Box 9863
Seattle, WA 98109
(206) 344-7330
King, Kitsap, Pierce, and
Snohomish Counties)

Spokane County Air Pollution Control Authority
West 1101 College, Room 230
Spokane, WA 99201
(509) 456-4727

Yakima County Clean Air Authority
North Second and East "B" Street
County Courthouse, Room 212
Yakima, WA 98901
(509) 575-4116

Grant County Clean Air Authority
Box 37
Ephrata, WA 98823
(509) 754-2011

Olympic Air Pollution
Control Authority
120 East State Street
Olympia, WA 98501
(206) 352-4881
(Clallam, Jefferson, Mason,
Grays Harbor, Thurston, and
Pacific Counties)

Southwest Air Pollution
Control Authority
Northeast Hazeldell Avenue
Suite 7601 H
Vancouver, WA 98665
(206) 696-2508
(Clark, Cowlitz, Lewis, Skamania,
and Wahkiakum Counties)

Tri-County Air Pollution
Control Authority
650 George Washington Way
Richland, WA 99352
(509) 946-4489
(Benton, Franklin, and
Walla Walla Counties)

Douglas County Air Pollution
Control Commission
110 Third Street N.E.
East Wenatchee, WA 98801
(509) 884-1511

FEDERALLY RECOGNIZED TRIBES IN WASHINGTON

Chehalis Tribe
P.O. Box 536
Oakville, WA 98568
(206) 273-5911

Colville Confederated Tribes
P.O. Box 150
Nespelem, WA 98155
(509) 634-4711

Hoh Tribe
Start Route 1, Box 963
Forks, WA 98331
(206) 374-6582

Jamestown Klallam Tribe
150 S. Fifth, Suite 2
Sequim, WA 98382
(206) 683-1109

Kalispell Tribe
P.O. Box 38
Usk, WA 99180
(509) 445-1147

Lummi Tribe
2616 Kwina Road
Bellingham, WA 98226
(206) 734-8180

Skagit System Cooperative
P.O. Box 368
Reservation Road
LaConner, WA 98257
(206) 466-3423

Skokomish Tribe
Route 5, Box 445-C
Shelton, WA 98584
(206) 877-5113

Spokane Tribe
P.O. Box 385
Wellpinit, WA 99040
(509) 258-4581

Squaxin Island Tribe
West 81 Highway 108
Shelton, WA 98584
(206) 426-9781

Muckleshoot Tribe
39015-172nd Avenue S.E.
Auburn, WA 98002
(206) 939-3311

Nooksack Tribe
P.O. Box 157
Deming, WA 98244
(206) 592-5176

Puyallup Tribe
2202 E. 28th Street
Tacoma, WA 98404
(206) 597-6200

Quinault Tribe
P.O. Box 189
Taholah, WA 98587
(206) 276-8211

Sauk-Suiattle Tribe
4229 - 76th N.E.
Marysville, WA 98270
(206) 659-6885

Shoalwater Bay Tribe
P.O. Box 579
Tokeland, WA 98590
(206) 267-6766

Swinomish Tribe
P.O. Box 817
LaConner, WA 98257
(206) 466-3163

Tulalip Tribe
6700 Totem Beach Road
Marysville, WA 98270
(206) 653-4585

Upper Skagit Tribe
2284 Community Plaza
Sedro Woolley, WA 98284
(206) 859-5501

Yakima Indian Nation
P.O. Box 632
Toppenish, WA 98948
(509) 865-5121

Stillaguamish Tribe
2704 State Road, 530 N.E.
Arlington, WA 98223
(206) 652-7362

Suquamish Tribe
P.O. Box 498
Suquamish, WA 98392
(206) 598-3311

Point No Point Treaty Council
7850 N.E. Little Boston Road
Kingston, WA 98346
(206) 297-3422

ACRONYMS

BLM	Bureau of Land Management
BPA	Bonneville Power Administration (U.S. Department of Energy)
CFR	Code of Federal Regulations
CFS	Cubic foot per second
DNR	Department of Natural Resources, State
DNS	Determination of Non-Significance
DOE	Department of Energy, Federal
DOT	Department of Transportation, State
DSHS	Department of Social and Health Services, State
EA	Environmental Assessment
ECPA	Environmental Coordination Procedures Act, State
EFSEC	Energy Facility Site Evaluation Council
EIS	Environmental Impact Statement
EPIC	Environmental Permit Information Center
FAA	Federal Aviation Administration (U.S. Department of Transportation)
FCC	Federal Communications Commission
FERC	Federal Energy Regulatory Commission (U.S. Department of Energy, formerly Federal Power Commission)
FONSI	Finding of Non-Significant Impact
FR	Federal Register
GRO	Geothermal Resources Operational
IRC	Internal Revenue Code
KGRA	Known Geothermal Resource Area
kW	Kilowatt
MW	Megawatt (equals 1,000 kilowatts)
NEPA	National Environmental Policy Act
NOC	Notice of Construction
NOC	Notice of Construction
NPDES	National Pollutant Discharge Elimination System
OHAP	Office of Archaeology and Historic Preservation, State
PBDC	Plan of Baseline Data Collection
PFP	Plan for Production
POO	Plan of Operation
POD	Plan of Utilization
PSD	Prevention of Significant Deterioration
PURPA	Public Utility Regulatory Policies Act, Federal
QF	Qualifying Facility
RCW	Revised Code of Washington
REA	Rural Electrification Administration (U.S. Department of Agriculture)
R/W	Right-of-Way
SEPA	State Environmental Policy Act
SHPO	State Historic Preservation Officer
SMA	Surface Management Agency
SUP	Special Use Permit
USC	United States Code
USDOE	U.S. Department of Energy
USFS	United States Forest Service (U.S. Department of Agriculture)
USGS	U.S. Geological Survey (U.S. Department of Interior)
UTC	Utilities and Transportation Commission, State
WAC	Washington Administrative Code

WDF	Washington Department of Fisheries
WDG	Washington Department of Game
WDOE	Washington Department of Ecology
WPPSS	Washington Public Power Supply System
WSEO	Washington State Energy Office
WWRC	Washington Water Research Center

APPENDIX A

Federal Permit Forms

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
OMB NO. 1004-0074
Expires: April 30, 1985

Notice Number

NOTICE OF INTENT TO CONDUCT GEOTHERMAL RESOURCE
EXPLORATION OPERATIONS

Applicant(s)	Address (include zip code)
Operator (name and telephone number) include area code	Address (include zip code)
Contractor(s)	Address (include zip code)

hereby apply for authorization to conduct exploration operations pursuant to the provisions of 43 CFR 3209 now or hereafter in force across and upon the following-described lands (give description of lands by township, attach map or maps showing lands to be entered or affected)

Type of operations to be conducted (give brief description)

Exploration operations will be conducted during the period (date) from

to

Attached ☐ \$ Surety bond ☐ Rider to Nationwide bond ☐ Rider to Statewide bond ☐ Bond to be furnished

Upon completion of exploration operations the undersigned agrees to notify the Authorized Officer that authorized exploration operations have been completed in conformance with the general and special terms and stipulations of the notice.

The undersigned hereby agrees (1) that he will not enter upon the described land until he has been informed in writing whether there are special stipulations applicable to his Notice of Intent, as to either time or method of operation or otherwise, and, if there are such stipulations, what those stipulations are, (2) that he will comply with those special stipulations, if any; and (3) that he will not enter upon the described lands until his entry has been approved by the Authorized Officer.

The undersigned agrees to be bound by the terms and conditions of this notice to conduct exploration operations when approved by the Authorized Officer.

The undersigned agrees that the filing of this Notice under the regulations (43 CFR Subpart 3209) does not vest or confer any preference right to a geothermal resources lease.

The undersigned agrees further that all exploration operations shall be conducted pursuant to the following terms and conditions:

1. Exploration operations shall be conducted in compliance with all Federal, State, and local laws, ordinances, or regulations which are applicable to the area of operations including, but not limited to, those pertaining to fire, sanitation, conservation, water pollution, fish, and game. All operations hereunder shall be conducted in a prudent manner.
2. Due care shall be exercised in protecting the described lands from damage. All necessary precautions shall be taken to avoid any damage other than normal wear and tear to improvements on the land including, but not limited to, gates, bridges, roads, culverts, cattle guards, fences, dams, dikes, vegetative cover, improvements, stock watering, and other facilities.
3. All drill holes shall be capped when not in use and appropriate procedures shall be taken to protect against

hazards in order to protect the lives, safety, or property of other persons or of wildlife and livestock.

4. All vehicles shall be operated at a reasonable rate of speed and, in the operation of vehicles, due care shall be taken to safeguard livestock and wildlife in the vicinity of operations. Existing roads and trails shall be used wherever possible. If new roads and trails are to be constructed, the Authorized Officer must be consulted prior to construction as to location and specifications. Reclamation and/or reseeding of new roads and trails shall be made as requested by the Authorized Officer.
5. Upon expiration, conclusion, or abandonment of operations conducted pursuant to this Notice, all equipment shall be removed from the land, and the land shall be restored as nearly as practicable to its original condition by such measures as the Authorized Officer may specify. All geophysical holes shall be safely plugged. The Authorized Officer shall be furnished a Notice of Completion of Geothermal Resource Exploration Operations (Form 3200-10) immediately upon cessation of all such operations and shall be further informed of the completion of reclamation work as soon as possible.
6. Location and depth of water sands encountered shall be disclosed to the Authorized Officer.

7. Operator shall contact the Authorized Officer prior to actual entry upon the land in order to be appraised of practices which shall be followed or avoided in the conduct of exploration operations pursuant to the terms of this *Notice* and applicable regulations. Operator will conduct no operations on the land unless the attached bond is in good standing.
8. Due care shall be exercised to avoid scarring or removal of ground vegetative cover.
9. All operations shall be conducted in such a manner to avoid (a) blockage of any drainage systems; (b) changing the character, or causing the pollution or siltation of rivers, streams, lakes, ponds, waterholes, seeps, and marshes; and (c) damaging fish and wildlife resources or habitat. Cuts or fills causing any of the above-mentioned problems will be repaired immediately in accordance with specifications of the Authorized Officer.
10. Vegetation shall not be disturbed within 300 feet of waters designated by the Authorized Officer, except at approved stream crossings.
11. Surface damage which induces soil movement and/or water pollution shall be subject to corrective action as required by the Authorized Officer.
12. Trails and campsites shall be kept clean. All garbage and foreign debris shall be eliminated as required by the Authorized Officer.
13. Operator shall protect all survey monuments, witness corners, reference monuments, and bearing trees against destruction, obliteration, or damage. He shall, at his expense reestablish damaged, destroyed, or obliterated monuments and corners, using a licensed surveyor, in accordance with Federal survey procedures. A record of the reestablishment shall be submitted to the Authorized Officer.
14. Operator shall make every reasonable effort to prevent, control, or suppress any fires started by the operator, and to report, as soon as possible, to the Authorized Officer location and size of fires, and assistance needed to suppress such fires. Operator shall inform the Authorized Officer as soon as possible of all fires, regardless of location, noted, or suppressed by independent action.
15. No work shall be done within one-half mile of a developed recreation site without specific written authority from the Authorized Officer. Any travel within one-half mile of a recreation site shall be over existing roads or trails.
16. Use of explosives within one-half mile of designated waters is prohibited unless approved, in writing, by the Authorized Officer.
17. If operations conducted under the provisions of this *Notice* causes any damage to the surface of the national resource lands, such as, but not limited to, soil erosion, pollution of water, injury or destruction of livestock or wildlife, or littering, operator shall, within 48 hours, file with the Authorized Officer a map showing exact location of such damage and a written report containing operator's plans for correcting or minimizing damage, if possible.
18. Violation of, or failure to comply with any of these terms and conditions shall result in immediate shutdown of field operations until deficiency is corrected. Failure to correct deficiency within the time period allowed by the Authorized Officer shall result in forfeiture of bond.
19. The Bureau of Land Management reserves the right to close any area to operators in periods of fire danger or when irreparable damage to natural resources is imminent.
20. Contractor shall be liable for assuring compliance with all terms and conditions of this *Notice* and all actions of his designated operator, agents, and employees.
21. Where continuation of the operation will result in irreparable damage to the land and other natural resources this *Notice* will be immediately cancelled by the Authorized Officer.

22. Special Stipulations:

_____ (Signature of Applicant)	_____ (Date)	_____ (Signature of Operator)	_____ (Date)
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We hereby agree to the special stipulations added and made a part of this *Notice* to conduct exploration operations.

_____ (Signature of Holder of Notice)	_____ (Date)	_____ (Signature of Operator)	_____ (Date)
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I hereby approve this *Notice* to conduct exploration operations.

_____ (Signature of Authorized Officer)	_____ (Title)	_____ (Date)
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The Paperwork Reduction Act of 1980 (44 U.S.C. 3501 et seq.) requires us to inform you that:
 This information is being collected in accordance with 43 CFR 3209.
 This information will be used to identify and communicate with the parties involved.
 Response to this request is required to obtain a benefit.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

NOTICE OF COMPLETION OF GEOTHERMAL RESOURCE
EXPLORATION OPERATIONS

Name

Address (include zip code)

Pursuant to the *Notice Number*
this is to

heretofore filed to conduct geothermal resource exploration operations,

advise that such operations were completed (*date*)
identified notice.

. on the lands described in the above

(Geophysical Operator's Signature)

(Address, include zip code)

(Date)

Instructions: Submit original and one (1) copy of completed form to proper Bureau of Land Management Office. Insert
Notice Number of *Notice of Intent to Conduct Exploration Operation* (Form 3200-2) which authorized the
exploration completed.

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY, CONSERVATION DIVISION

DESIGNATION OF GEOTHERMAL OPERATOR

The U.S. Geological Survey requires this form or other Supervisor approved form or letter to be prepared and filed in triplicate, with the Supervisor.

The undersigned is, on the records of the Bureau of Land Management, holder of lease(s)

SERIAL NO.:

State Office:

and hereby designates

NAME:

ADDRESS:

as his operator and local agent, with full authority to act in his behalf in complying with the terms of the lease and regulations applicable thereto and on whom the Supervisor or his representative may serve written or oral instructions in securing compliance with the Operating Regulations with respect to (describe acreage to which this designation is applicable)

This designation of operator does not relieve the lessee of responsibility for compliance with the terms of the lease and the Operating Regulations. This designation of operator does not constitute an assignment of any interest in the lease.

If the designated operator defaults, the lessee will promptly comply with all regulations, lease terms, or orders of the Secretary of the Interior or his representative.

The lessee agrees to promptly notify the Supervisor of any change in the designated operator

I hereby certify the foregoing is true and correct.

SIGNED _____ TITLE _____

ADDRESS _____ DATE _____

This report is required by law (30 U.S.C. 1023); and regulations: 30 CFR 270.31. Failure to report in a prescribed manner can result in shutting down operations, suspension and or recommendation of cancellation of lease (30 U.S.C. 1011, 30 CFR 270.60, 43 CFR 3244.3). The United States Criminal Code (18 U.S.C. 1001) makes it a criminal offense to make a willfully false statement or representation to any Department or Agency of the United States as to any matter within its jurisdiction.

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY, CONSERVATION DIVISIONForm Approved
Budget Bureau No. _____GEOHERMAL EXPLORATION PERMIT

The U.S. Geological Survey requires this form or other Supervisor approved form to be prepared and filed in triplicate with requisite attachments with the Supervisor. The District Geothermal Supervisor must approve this permit prior to any lease operations.

1. NAME OF LESSEE/OPERATOR		4. LEASE SERIAL NO.
2. ADDRESS OF LESSEE/OPERATOR		5. SURFACE MANAGER: BLM () FS Other ()
3. CONTRACTOR(S) ADDRESS		6. UNIT AGREEMENT NAME
12. TYPE OF OPERATIONS TO BE CONDUCTED (give brief description)		7. PERMIT NO.
13. Exploration operations will be conducted during the period (date) from: to:		8. FIELD OR AREA
		9. SEC. T., R., S. & M.
		10. COUNTY
		11. STATE
14. BOND: Surety bond for \$ () Nationwide () Statewide () Lease () Bond to be furnished Rider to Nationwide bond () Rider to Statewide bond () Bond No. _____		
15. The undersigned agrees that all exploration operations under this permit shall be conducted in accordance with regulations, GPO Orders and Special Permit Stipulations:		
1) The lessee/operator shall have copies of this Permit available on location, at all times, while operations are being conducted.		
2) Unless waived, the lessee/operator shall submit in writing to the appropriate District Geothermal Supervisor the status of activities completed or in progress at the end of each month during the term of this permit.		
3) If requested by the Supervisor the lessee/operator shall submit two copies of all available records of any operations, surveys, tests, or projects immediately after completion of such activities.		
4) Within 30 days after completion of each survey, test, analysis or activity of the permitted operations the undersigned agrees to furnish the Supervisor with two copies of the records of the operations.		
5) Special Conditions of Approval:		

The undersigned agrees: (1) to the special stipulations which may be added by the Supervisor as a condition of approval of this Geothermal Exploration Permit; and (2) that the proposed operations will not be commenced until this Permit has been approved by the Supervisor. Appeals from decisions under this Permit may be made in accordance with 30 CFR 270.90.

16. SIGNED _____ TITLE _____ DATE _____

(This space for Federal use)

I hereby approve this permit to conduct geothermal resource exploration operations. This permit is effective for one year after the approval date.

SIGNED _____ TITLE _____ DATE _____

This permit is required by law (30 U.S.C. 1023); regulations: 30 CFR 270.78; Federal Geothermal Lease Terms and Stipulations and other regulatory requirements. The United States Criminal Code (18 U.S.C. 1001) makes it a criminal offense to make a willfully false statement or representation to any Department or Agency of the United States as to any matter within its jurisdiction.

INSTRUCTIONS

GENERAL: This form shall be submitted for any application to perform exploration type operations to search for evidence of geothermal resources on Federally leased land or lands covered by a unit or cooperative agreement.

ITEM 12: For drilling operations, describe on a separate sheet the proposed operations in accordance with Geothermal Resource Operational Order No. 1. Include coordinate locations for all proposed holes from the nearest section corner. Attach a map or maps of sufficient scale to clearly show all pertinent lease boundaries outlined and all proposed locations plotted and labelled.

COMPLETED OPERATIONS: Thirty days after completion of all operations approved under this permit, a completion report in duplicate, shall be submitted to the Supervisor. The completion report shall include a copy of the approved Geothermal Exploration Permit with an attached report detailing all important exploration, completion and abandonment procedures. Copies of all records of the operations shall accompany the report if not previously submitted.

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY, CONSERVATION DIVISION

GEOTHERMAL DRILLING PERMIT

Form Approved
Budget Bureau No. _____

The U.S. Geological Survey requires this form or other Supervisor approved form to be prepared and filed in triplicate with requisite attachments with the Supervisor. The Supervisor must approve this permit prior to any lease operation.

1a. TYPE OF WORK: DRILL NEW WELL () REDRILL () DEEPEN () PLUG BACK () DIRECTIONALLY DRILL () OTHER ()		4. LEASE SERIAL NO.	
1b. WELL TYPE: PRODUCTION () INJECTION () HEAT EXCHANGE () OBSERVATION () WATER SUPPLY () OTHER ()		5. SURFACE MANAGER: BLM () FS () Other ()	
1c. WELL STATUS:		6. UNIT AGREEMENT NAME	
2. NAME OF LESSEE/OPERATOR		7. WELL NO.	8. PERMIT NO.
3. ADDRESS OF LESSEE/OPERATOR		9. FIELD OR AREA	
15. LOCATION OF WELL At surface At proposed prod. zone		10. SEC. T., R., S. & M.	
16. DISTANCE FROM PROPOSED LOCATION TO NEAREST PROPERTY OR LEASE LINE		11. COUNTY	
17. DISTANCE FROM PROPOSED LOCATION TO NEAREST WELL, DRILLING, COMPLETED, OR APPLIED FOR ON THIS LEASE		12. STATE	
18. DRILLING MEDIA AND CHARACTERISTICS: AIR () WATER () MUD () FOAM () Other ()		13. APPROX. STARTING DATE	
19. PROPOSED DEPTH MEASURED: TRUE VERTICAL:		14. ACRES ASSIGNED (WELL SPACING)	
20. ELEVATIONS: ESTIMATED () FINAL () REFERENCE DATUM: GR () MAT () OF () KB () RT () CASINGHEAD FLANGE () OTHER ()			
21. EXISTING AND/OR PROPOSED CASING AND CEMENTING PROGRAM (List existing program first, followed by proposed program, and separate by a sufficient space to clearly distinguish the two programs)			
SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	COUPLING (Collars & Threads)
			GRADE
			SETTING DEPTH Top Bottom
			QUANTITY OF CEMENT
22. PROPOSED WORK SUMMARY			

(Use additional space on reverse side of form)

23.

SIGNED _____ TITLE _____ DATE _____

(This space for Federal use)

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

This permit is required by law (30 U.S.C. 1023); regulations: 30 CFR 270.71; Federal Geothermal Lease Terms and Stipulations and other regulatory requirements. The United States Criminal Code (18 U.S.C. 1001) makes it a criminal offense to make a willfully false statement or representation to any Department or Agency of the United States as to any matter within its jurisdiction.

(See instructions on reverse side)

INSTRUCTIONS

GENERAL: This form shall be submitted for any application to drill for, test, extract, produce, dispose and/or utilize the actual geothermal resource on Federally leased lands or lands covered by a unit or cooperative agreement.

ITEM 1C: Show the current status for existing wells: I-injecting, F-flowing, P-pumping, HE-heat exchange, SI-shut-in, WS-water supply, OB-observation, O-other (explain).

ITEM 7: Number wells using the Modified Kettleman Well Numbering System (see below).

ITEM 15: Show the surface location coordinates from the nearest section corner or tract lines and if the well is to be directionally drilled, the proposed production zone coordinates (top and bottom) from the surface location.

ITEM 19: Indicate reference datum from which measurement was made (see item 20).

ITEM 20: If the reference datum shown is not the graded mat, also show the measurement from the mat surface (e.g. mat-to-derrick floor (DF) measurement, mat-to-rotary table (RT) measurement, mat-to-kelly bushing (KB) measurement, etc.).

ITEM 21: For subsequent well work the latest well conditions along with all proposed additions and changes must be shown. To show current well conditions, either fill out this item or attach the latest completion report on the subject well.

ITEM 22: Summarize other pertinent existing data such as producing and injecting zones, type, size, and density of perforations and perforated intervals, etc., in addition to the proposed work. Indicate reasons for changes undertaken.

PROCEDURE FOR NUMBERING GEOTHERMAL WELLS USING THE MODIFIED KETTLEMAN WELL NUMBERING SYSTEM

1. Subdivide the sections where the wells are to be located into 10-acre (660 feet X 660 feet) subdivisions. Number each horizontal and vertical subdivision starting in the northwest corner of each section with 1, 1 and increasing to the east and south. A regular 640-acre section contains 64 subdivisions numbered from 11 to 88 (vertical digit first, followed by horizontal digit).

2. Number the first vertical well with the number of the 10-acre subdivision in which it is located, followed by the section number. (See Examples "A", "B", and "C", below.) If the first well is directionally drilled, number it with the subdivision number of its surface location, followed by the subdivision number in which the bottom of the completion interval lies and that section number (if different from the surface section number), and followed by the surface section number. (See Example "D".)

3. Subsequent wells drilled from the same 10-acre surface location are numbered in the manner described above with an A, B, C, etc., added following the surface subdivision number. (See Examples "E" and "F".)

4. For sections with irregular boundaries, align a 10-acre grid pattern North-South, running through the westernmost section point or line, and East-West, running through the northernmost section point or line. Number wells according to the 10-acre grid, subdividing as far as possible to the east and south.

Example A 26-35 Example D Directional 88(28-36)-35
Example B 103-36 Example E Directional 33A(86-36)-6
Example C 33-6 Example F Directional 33B(52)-6

GEOHERMAL SUNDRY NOTICE

The U.S. Geological Survey requests this form or other Supervisor approved form to be prepared and filed in triplicate with requisite attachments with the Supervisor. The Supervisor must approve this permit prior to any lease operations.

1a. WELL TYPE: PRODUCTION () INJECTION () HEAT EXCHANGE () OBSERVATION () OTHER ()

1b. WELL STATUS:

2. NAME OF LESSEE/OPERATOR

3. ADDRESS OF LESSEE/OPERATOR

13. LOCATION OF WELL OR FACILITY

4. LEASE SERIAL NO.

5. SURFACE MANAGER: SLM () FS ()
Other ()

6. UNIT AGREEMENT NAME

7. WELL NO.

8. PERMIT NO.

9. FIELD OR AREA

10. SEC. T., R., S. & M.

11. COUNTY

12. STATE

14. TYPE OF WORK

CHANGE PLANS ()
SITE AND ROAD CONSTRUCTION ()
CONSTRUCT NEW PRODUCTION FACILITIES ()
ALTER EXISTING PRODUCTION FACILITIES ()CONVERT TO INJECTION ()
FRACTURE TEST ()
SHOOT OR ACIDIZE ()
REPAIR WELL ()PULL OR ALTER CASING ()
MULTIPLE COMPLETE ()
ABANDON ()
OTHER ()

15. DESCRIBE PROPOSED OPERATIONS (Use this space for well activities only. See instructions for current well conditions on reverse)

16. DESCRIBE PROPOSED OPERATIONS (Use this space for all activities other than well work)

(Use reverse side if needed)

17. I hereby certify that the foregoing is true and correct

SIGNED _____

TITLE _____

DATE _____

(This space for Federal use)

APPROVED BY _____

TITLE _____

DATE _____

CONDITIONS OF APPROVAL, IF ANY:

This permit is required by law (30 U.S.C. 1023); regulations: 30 CFR 270.34, 30 CFR 270.35, 30 CFR 270.45, 30 CFR 270.71-1, 30 CFR 270.72; Federal Geothermal Lease Terms and Stipulations and other regulatory requirements. The United States Criminal Code (18 U.S.C. 1001) makes it a criminal offense to make a willfully false statement or representation to any Department or Agency of the United States as to any matter within its jurisdiction.

INSTRUCTIONS

GENERAL: This form shall be used for applications for well work, road, site and facilities construction and other miscellaneous activities performed on Federally leased lands or lands under a unit or cooperative agreement, and are related to operations performed under an approved Plan of Operation.

ITEM 1b: Show the current status for existing wells; I=injecting, P=flowing, P=pumping, HE=heat exchange, SI=shut-in, WS=water supply, OB=observation, O=Other (explain).

ITEM 15: The latest well conditions (hole size, casing, cement, perforations, producing and injecting zones, etc.) along with all proposed additions and changes must be shown. When completing this section list existing well program first, followed by the proposed program, and separate by a sufficient space to clearly distinguish the two programs. Current well conditions may be either listed in this section or may be shown by attaching a copy of the latest completion report on the subject well.

ITEM 16: Attach all pertinent engineering plans and specifications.

COMPLETED OPERATIONS: Thirty days after completion of all operations other than construction activities, approved under this permit, a completion report must be submitted in duplicate, to the Supervisor. The completion report shall include a copy of the approved Geothermal Sundry Notice with an attached report detailing the important activities performed, and the completion and abandonment procedures undertaken. Copies of all records of the operations shall accompany the report if not previously submitted.

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY, CONSERVATION DIVISIONForm Approved
Budget Bureau No. _____

GEOTHERMAL WELL COMPLETION REPORT

The U.S. Geological Survey requires this form or other Supervisor approved form to be prepared and filed in duplicate with requisite attachments with the Supervisor within 30 days after completion of permitted operations.

4. LEASE SERIAL NO.	
5. SURFACE MANAGER: BLM () FS () Other ()	
6. UNIT AGREEMENT NAME	
7. WELL NO.	8. PERMIT NO.
9. FIELD OR AREA	
10. SEC. T., R., S. & M.	
11. COUNTY	
12. STATE	
13. SPUD DATE	DATE T.D. REACHED
14. COMPLETION DATE (Ready to produce)	
15. DIRECTIONALLY DRILLED INTERVALS	
16. SURVEYED INTERVALS	
17. CORE SIZE AND INTERVALS	

1a. WELL TYPE: PRODUCTION () INJECTION () DISPOSAL () WATER SUPPLY () OBSERVATION ()
COLD () HEAT EXCHANGE () OTHER ()

1b. COMPLETION: NEW () WORKOVER () DEEPENED () PLUGBACK () REDRILL ()
RECOMPLETED () DRILLED & ABANDONED () OTHER ()

2. NAME OF LESSEE/OPERATOR

3. ADDRESS OF LESSEE/OPERATOR

18. LOCATION OF WELL

At Surface:

At Top of Production Zone:

At Total Depth:

19. TOTAL DEPTH

Measured:

True Vertical:

20. PLUGBACK TOTAL DEPTH

Measured:

True Vertical:

21. ELEVATION: ESTIMATED () FINAL ()

REFERENCE DATUM: GR () MAT () DP () KB () RT () CASINGHEAD FLANGE () OTHER ()

22. DRILLING MEDIA: AIR () WATER () MUD () FOAM () OTHER ()

List Characteristics:

23. LOG TYPE & INTERVALS

24. CASING RECORD							
Size	Weight	Grade	Collars & Threads	Depths Set		Hole Size	Cementing Record (slurry volume)
				Top	Shoe		

25. LINER RECORD							
Size	Weight	Grade	Collars & Threads	Top	Bottom	Perforated Intervals	Cementing Record (slurry volume)

26. TUBING RECORD					27. CEMENT SQUEEZE, ACID, FRACTURE, ETC. (detail type, amount, intervals)
Size	Weight	Grade	Depth Set	Packer Depth	

28. PERFORATION RECORD				
Type	Total No.	Density (No./ft)	Size	Intervals

29. ATTACHMENTS & PREVIOUS SUBMITTALS: List all reports, surveys, tests and logs, not listed in item 23, which have resulted from drilling and completion operations. List relevant previously furnished data with date of submittal referenced.

30. WELL STATUS: PRODUCING () SHUT-IN () SUSPENDED () INJECTION () DISPOSAL () HEAT EXCHANGE () ABANDONED () WATER SUPPLY () OTHER ()

31. DO YOU CONSIDER THE WELL TO BE COMMERCIAL? EXPLAIN:

32. I hereby certify the information on this report and the attached information is complete and accurate according to the best of my knowledge.

SIGNED: _____

TITLE _____

DATE _____

This report is required by law (30 U.S.C. 1023); regulations: 30 CFR 270.37, 30 CFR 270.73; Federal Geothermal Lease Terms and Stipulations and other regulatory requirements. Failure to report in a timely prescribed manner can result in shutting down operations, suspension and or recommendation of cancellation of lease (30 U.S.C. 1011, 30 CFR 270.80, 43 CFR 324.3). The United States Criminal Code (18 U.S.C. 1001) makes it a criminal offense to make a willfully false statement or representation to any Department or Agency of the United States as to any matter within its jurisdiction.

INSTRUCTIONS

GENERAL: This form is designed for submitting a complete and accurate geothermal well completion report, and should be accompanied by a detailed chronological history of well operations and final copies of the results of any logs, surveys or tests performed on the well, which have not previously been submitted. The report shall be submitted within 30 days after the date of completion of continuous well activities, as determined by the District Geothermal Supervisor. The completion date in many cases will be the day the drilling rig is released. The Supervisor may postpone the required report submittal date if adequate justification is presented by the lessee.

ITEM 18: Show the surface location coordinates from the nearest section corner or tract line. Show production zone and total depth coordinates from the surface location if the well is directionally drilled.

ITEM 34: If the well is immediately placed into operation without testing, this section should reflect the first month's production data.

ITEMS 35 & 36: Indicate the depth(s) of subsurface pressure and temperature measurement, and include the reference datum.

WELL TEST										
13. TEST DATE		PRODUCTION METHOD: FLOWING () OTHER ()				PUMPING () - include size, type, intake depth, etc.				
34. PRODUCTION										
HOURS TESTED		TOTAL LIQUIDS (lb)			STEAM (lb)		WATER (lb)		ENTHALPY (Btu/lb)	
35. STATIC TEST DATA										
DEPTH		SURFACE PRESSURE (psig)		SUBSURFACE PRESSURE (psig)		SUBSURFACE TEMPERATURE (°F)		WATER ANALYSIS		
								Total Dissolved Solids pH		
36. FLOWING TEST DATA										
SURFACE PRESSURE		SUBSURFACE PRESSURE		SURFACE TEMPERATURE		SUBSURFACE TEMPERATURE		AVE. TOTAL MASS FLOW RATE PER HOUR		
WELLHEAD:		at _____ feet		at top of perf.		at top of perf.		at top of perf.		
SEPARATOR:										
37. SUMMARY OF POROUS ZONES: Show all important porous zones and contents of each; cored intervals with recoveries, drill stem or formation tests with depth of interval tested, time open, cushion used, and flowing and shut-in pressures, temperatures and recoveries.						38. GEOLOGIC MARKERS (TOP)				
FORMATION	TOP	BOTTOM	DESCRIPTION OF DETAILS			NAME	MEASURED DEPTH	TRUE VERTICAL DEPTH		

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY, CONSERVATION DIVISIONForm Approved
Budget Bureau No. _____GEOHERMAL POLLUTION INCIDENT REPORT

The U.S. Geological Survey requires this form or other Supervisor approved form to be prepared and filed with requisite attachments with the District and Area Geothermal Supervisors within 30 days after the pollution incident.

1. DATE OF REPORT	4. LEASE SERIAL NO.
2. NAME OF LESSEE/OPERATOR	5. SURFACE MANAGER: BLN () FS () Other ()
3. ADDRESS OF LESSEE/OPERATOR	6. UNIT AGREEMENT NAME
13. INCIDENT DATE AND TIME	7. WELL NO. 8. PERMIT NO.
14. DURATION (Days/Hours)	9. FIELD OR AREA
15. WEATHER AND WIND CONDITIONS	10. SEC. T., R., S. & M.
16. TYPE OF POLLUTION	11. COUNTY
17. EXTENT OF POLLUTION (attach map of involved area)	12. STATE
18. DESCRIPTION OF INCIDENT (Include the cause such as human error, mechanical or equipment failure, or natural event; the immediate and long range effects; and other pertinent information.)	
19. WATER BODY AFFECTED (Lake, Stream, Groundwater) WITH FLOW RATES (if applicable) (Attach analyses of unpolluted and polluted water if possible.)	
20. CORRECTIVE ACTION TAKEN (Describe fully; give date, the method used to correct the action, and the name and title of the person performing or supervising the action)	
21. PREVENTIVE ACTION TAKEN AND PROPOSAL TO PREVENT RECURRENCE (Fully detail including implementation date. Use additional pages, if needed.)	
22. REMARKS AND ADDITIONAL PERTINENT INFORMATION (Use additional pages if needed).	
23.	

USGS APPROVAL: YES _____ NO _____

(Use additional pages if needed)

SIGNED

TITLE

DATE

(This space for Federal use)

Oral report received by _____ Field Inspection by _____

Date _____ Time _____

Potential environmental damage and pertinent remarks:

This report is required by law (30 U.S.C. 1023); regulations: 30 CFR 270.30, 43 CFR 3204.1; Federal Geothermal Lease Terms and Stipulations and other regulatory requirements. Failure to report in a prescribed manner can result in shutting down operations, suspension and/or recommendation of cancellation of lease (30 U.S.C. 1011, 30 CFR 270.80, 43 CFR 3244.3). The United States Criminal Code (18 U.S.C. 1001) makes it a criminal offense to make a willfully false statement or representation to any Department or Agency of the United States as to any matter within its jurisdiction.

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY, CONSERVATION DIVISION
GEOHERMAL ACCIDENT AND INJURY REPORT

Form Approved
Budget Bureau No. _____

The U.S. Geological Survey requires this form or other Supervisor approved form to be prepared and filed with requisite attachments with the District Geothermal Supervisor and the Supervisor within 15 days after the accident or injury. If the accident is fatal or involves serious injury, report immediately to the District Geothermal Supervisor and Area Geothermal Supervisor by telephone.

1. NAME OF LESSEE/OPERATOR

2. ADDRESS OF LESSEE/OPERATOR

3. LEASE SERIAL NO.

4. SURFACE MANAGER: BLM () FS ()
Other ()

5. UNIT AGREEMENT NAME

6. WELL NO.

7. PERMIT NO.

8. FIELD OR AREA

9. SEC. T., R., S. & M.

10. COUNTY

11. STATE

THE ACCIDENT

12. TIME AND DATE OF ACCIDENT

13. LOCATION OF ACCIDENT

14. OPERATION OR WORK IN PROGRESS AT TIME OF ACCIDENT

15. DESCRIPTION OF ACCIDENT

16. NATURE AND APPARENT UNSAFE CONDITION OR ACTION WHICH CAUSED ACCIDENT

17. HAD THIS CONDITION OR ACTION BEEN REPORTED AS A HAZARD BEFORE THE ACCIDENT?

18. WHAT, IF ANY, REMEDIAL ACTION HAS BEEN RECOMMENDED?

19. HAD IT BEEN OR WAS IT BEING IMPLEMENTED AT TIME OF ACCIDENT?

20. IF NOT, EXPLAIN

21. HOW COULD THE ACCIDENT HAVE BEEN PREVENTED?

22. WHAT ACTION HAS BEEN RECOMMENDED AND/OR TAKEN TO PREVENT A SIMILAR ACCIDENT?

23. RECOMMENDATIONS FOR ADDITIONAL PREVENTIVE ACTION

EFFECTS OF THE ACCIDENT

24. WERE THERE ANY INJURIES? IF SO, FILL OUT INJURY REPORT ON REVERSE. DID A POLLUTION INCIDENT RESULT? IF SO, FILL OUT GEOTHERMAL POLLUTION REPORT, FORM USGS 9-1961. DID ACCIDENT CAUSE A SHUT-DOWN OF OPERATIONS? IF SO, FOR HOW LONG? HAS OPERATION BEEN RESUMED? IF NOT, WHEN WILL IT BE?

25. NAME, ADDRESS AND STATEMENT OF WITNESSES TO ACCIDENT INCLUDING INVOLVEMENT (IF APPLICABLE) IN THE ACCIDENT. (THESE SHOULD BE ATTACHED AS ADDITIONAL PAGES TO THIS REPORT AND BE SIGNED BY THE PERSON MAKING THE STATEMENT.)

ALL ACCIDENTS INVOLVING FAILURE OF EQUIPMENT, UNSAFE CONDITIONS OR HAZARDS WHICH HAVE RESULTED IN PERSONNEL INJURY OR SHUTTING-DOWN OF OPERATIONS MUST BE REPORTED TO THE DISTRICT SUPERVISOR AND THE SUPERVISOR IMMEDIATELY, BUT NO LATER THAN 24 HOURS AFTER THE ACCIDENT OR INJURY.

This report is required by law (30 U.S.C. 1023); regulations: 30 CFR 270.46; Federal Geothermal Lease Terms and Stipulations and other regulatory requirements. Failure to report in a timely prescribed manner can result in shutting down operations, suspension and/or recommendation of cancellation of lease (30 U.S.C. 1011, 30 CFR 270.80, 43 CFR 3244.3). The United States Criminal Code (18 U.S.C. 1001) makes it a criminal offense to make a willfully false statement or representation to any Department or Agency of the United States as to any matter within its jurisdiction.

INSTRUCTIONS

GENERAL: This form or other acceptable form shall be submitted in all cases where significant accident and/or injury related to lease operations occurs.

ITEM 13: If the accident occurred at a drill site, locate the area of occurrence in relation to the nearest structure or equipment. Accidents occurring in other lease areas may be located by the appropriate 1/4, 1/4, 1/4 section, other appropriate description, or by maps of sufficient scale to clearly show the accident area. Use additional space under remarks if needed.

ITEM 15: Submit drawings or maps if appropriate.

THE INJURY

26. NAME OF INJURED EMPLOYEE(S)	27. ADDRESS OF INJURED EMPLOYEE(S)	28. COMPANY REPRESENTING
29. OCCUPATION WHEN INJURED (Job Title)	30. DATE INJURED STOPPED WORKING (mo/day/yr)	31. WAS HE/SHE DOING HIS/HER REGULAR WORK?
32. HOW LONG ON THIS TYPE OF WORK?	33. HAD HE/SHE BEEN INSTRUCTED REGARDING HAZARDS OF THE JOB AND THE PROPER WAY TO DO THIS WORK?	34. WERE YOU A WITNESS TO THE ACCIDENT?
35. TYPE OF INJURIES		
36. NAME OF DOCTOR AND/OR MEDICAL FACILITY	37. ADDRESS OF DOCTOR AND/OR MEDICAL FACILITY	
38. WAS PROPER SAFETY PROTECTIVE EQUIPMENT PROVIDED?	39. WAS IT BEING PROPERLY USED AT THE TIME OF THE ACCIDENT?	

40. WHAT TRAINING OR SPECIAL INSTRUCTIONS, REGARDING PREVENTION OF THIS OR SIMILAR ACCIDENTS, HAVE BEEN GIVEN TO THE EMPLOYEES? GIVE DATES OF ANY SAFETY MEETINGS HELD DURING PAST SIX MONTHS ON PREVENTION OF SIMILAR ACCIDENTS.

41. DATE (mo/day/yr) SIGNATURE OF LESSEE'S FIELD SUPERVISOR _____

SIGNATURE OF EMPLOYEE'S SUPERVISOR _____

(This space for Federal use)

Oral report received by: _____

Field inspection by: _____ Date and Time: _____

Date _____

Remarks: _____

INSTRUCTIONS

General: This form is designed for submitting a complete and accurate account of monthly activity and performance of geothermal wells and production facilities on Federal leases. The report must include all wells on the lease which have not been abandoned.

Item 9: Group wells together which are producing or injecting into the same reservoir or zone, and distinguish reservoirs or zones by name such as upper, lower, formation name, etc. Within each zone, list injection wells separately from production wells. In column 3, show the type of well reported (P=production, I=injection, D=disposal, WS=water supply, OB=observation, HE=heat exchange, O=other (specify under remarks)) and in parenthesis, the current month end status for each well or completion (i=injecting, f=flowing, p=pumping, si=shut-in, susp=suspended, obs=observation, o=other (specify under remarks)). For heat exchange wells, report production in British thermal units, Btu and production rate in Btu/hr. Production or injection rate is the total amount of mass flow divided by the total number of active well hours.

Item 10: In reporting current operations, particular attention should be directed toward 30 CFR 270.74(e).

Remarks: Report in this section any environmental monitoring conducted, and the results obtained.

10. OPERATIONS CONDUCTED DURING MONTH: Describe Drilling, Remedial Drilling, Redrilling, Stimulation, Testing and other Well Work Performed.			
TWSP, KGE, SEC, B&M	WELL NUMBER	OPERATIONS CONDUCTED	MONTH END STATUS

Remarks: (use additional pages if needed)

*A Disposal well is used to inject fluids into the same formation or reservoir from which they are produced. An injection well is used for injection of fluids which are not produced from the formation or reservoir.

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY, CONSERVATION DIVISIONForm Approved
Budget Bureau No. _____GEOHERMAL UTILIZATION PERMIT

The U.S. Geological Survey requires this form or other Supervisor approved form to be prepared and filed in triplicate with requisite attachments with the Supervisor. The Supervisor must approve this permit prior to any lease operations.

1. NAME AND ADDRESS OF LESSEE		4. LEASE SERIAL NO. UPON WHICH FACILITY IS LOCATED
2. NAME AND ADDRESS OF OPERATOR		5. LEASE SERIAL NO(S). SERVING FACILITY
3. NAME AND ADDRESS OF CONTRACTOR AND/OR FACILITY DESIGNER		6. SURFACE MANAGER: BLM () FS () Other ()
13. TYPE OF FACILITY: INDIVIDUAL WELL () RESEARCH & DEMONSTRATION () PLANT () OTHER ()		7. UNIT AGREEMENT NAME
ESTIMATED PROJECT LIFE:		8. WELL NO., FACILITY NO. OR DESIGNATION
14. LOCATION OF FACILITY (1/4, 1/4, 1/4 SECTION)		9. FIELD OR AREA
15. NET GENERATING CAPACITY ELECTRIC (MW) HEAT (Btu)		10. SEC. T., R., S. & M.
16. GROSS GENERATING CAPACITY ELECTRIC (MW) HEAT (Btu)		11. COUNTY
17. NAME OF RESOURCE PURCHASER/USER (If other than lessee/operator)		12. STATE
18. NO. OF ACRES AFFECTED BY FACILITY CONSTRUCTION	19. APPROXIMATE START OF CONSTRUCTION	20. APPROXIMATE DATE OF START-UP
21. ELEVATIONS: ESTIMATED () FINAL () REFERENCE DATUM: GR () MAT () Other ()	22. DESCRIPTION OF PROPOSED UTILIZATION PROGRAM (Include a brief description of the facility, method of operation, manner of proposed utilization of the resource and the anticipated by-products and their proposed uses)	

(Use additional sheets if necessary)

23.

SIGNED: _____ TITLE: _____ DATE: _____

(This space for Federal use)

Approval is hereby granted for the construction of a geothermal utilization facility.

PERMIT NO. _____ APPROVAL DATE _____

APPROVED BY _____ TITLE _____

CONDITIONS OF APPROVAL, IF ANY:

Whereas all requirements set forth in the subject leases, laws, regulations and orders have been satisfied, approval to operate the geothermal utilization facility is hereby granted. This permit shall be effective for a period of _____ from the date the facility is certified as operational by the Geological Survey.

CERTIFIED BY _____ DATE _____ APPROVED BY _____ DATE _____
District Geothermal Supervisor Area Geothermal Supervisor

This permit is required by law (30 U.S.C. 1023); regulations: 30 CFR 270.71-1; Federal Geothermal Lease Terms and Stipulations and other regulatory requirements. The United States Criminal Code (18 U.S.C. 1001) makes it a criminal offense to make a willfully false statement or representation to any Department or Agency of the United States as to any matter within its jurisdiction.

(See instructions on reverse side)

INSTRUCTIONS

GENERAL: This form shall be used for applications to construct and operate any utilization facility on federally leased lands or lands under a unit or cooperative agreement. Approval to operate the utilization facility shall be obtained subsequent to the approval for construction, as provided for on this form, and shall not be granted until all necessary requirements have been satisfied.

APPENDIX B

State Permit Forms

Department of Natural Resources
OLYMPIA, WASHINGTON
98504

BRIAN BOYLE
Commissioner of Public Lands

ENVIRONMENTAL CHECKLIST

Purpose of Checklist:

The State Environmental Policy Act (SEPA), chapter 43.21C RCW, requires all governmental agencies to consider the environmental impacts of a proposal before making decisions. An environmental impact statement (EIS) must be prepared for all proposals with probable significant adverse impacts on the quality of the environment. The purpose of this checklist is to provide information to help you and the agency identify impacts from your proposal (and to reduce or avoid impacts from the proposal, if it can be done) and to help the agency decide whether an EIS is required.

Instructions for Applicants:

This environmental checklist asks you to describe some basic information about your proposal. Governmental agencies use this checklist to determine whether the environmental impacts of your proposal are significant, requiring preparation of an EIS. Answer the questions briefly, with the most precise information known, or give the best description you can.

You must answer each question accurately and carefully, to the best of your knowledge. In most cases, you should be able to answer the questions from your own observations or project plans without the need to hire experts. If you really do not know the answer, or if a question does not apply to your proposal, write "do not know" or "does not apply". Complete answers to the questions now may avoid unnecessary delays later.

Some questions ask about governmental regulations, such as zoning, shoreline, and landmark designations. Answer these questions if you can. If you have problems, the governmental agencies can assist you.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Use of checklist for nonproject proposals:

Complete this checklist for nonproject proposals, even though questions may be answered "does not apply." IN ADDITION, complete the SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS (part D).

For nonproject actions, the references in the checklist to the words "project," "applicant," and "property or site" should be read as "proposal," "proposer," and "affected geographic area," respectively.

A. BACKGROUND

1. Name of proposed project, if applicable:

2. Name of applicant:

3. Address and phone number of applicant and contact person:

4. Date checklist prepared:

5. Agency requesting checklist:

6. Proposed timing or schedule (including phasing, if applicable):

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.

10. List any government approvals or permits that will be needed for your proposal, if known.

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

TO BE COMPLETED BY APPLICANT

EVALUATION FOR
AGENCY USE ONLY

B. ENVIRONMENTAL ELEMENTS

1. Earth

a. General description of the site (circle one): Flat, rolling, hilly, steep slopes, mountainous,
other _____.

b. What is the steepest slope on the site (approximate percent slope)?

TO BE COMPLETED BY APPLICANT

EVALUATION FOR
AGENCY USE ONLY

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any prime farmland.

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

e. Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate source of fill.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

2. Air

a. What types of emissions to the air would result from the proposal (i.e., dust, automobile, odors, industrial wood smoke) during construction and when the project is completed? If any, generally describe and give approximate quantities if known.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

c. Proposed measures to reduce or control emissions or other impacts to air, if any:

TO BE COMPLETED BY APPLICANT

EVALUATION FOR
AGENCY USE ONLY

3. Water

a. Surface:

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

b. Ground:

1) Will ground water be withdrawn, or will water be discharged to ground water? Give general description, purpose, and approximate quantities if known.

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals . . . ; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

c. Water Runoff (including storm water):

1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.

2) Could waste materials enter ground or surface waters? If so, generally describe.

d. Proposed measures to reduce or control surface, ground, and runoff water impacts, if any:

4. Plants

a. Check or circle types of vegetation found on the site:

- ☐ deciduous tree: alder, maple, aspen, other
- ☐ evergreen tree: fir, cedar, pine, other
- ☐ shrubs
- ☐ grass
- ☐ pasture
- ☐ crop or grain
- ☐ wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
- ☐ water plants: water lily, eelgrass, milfoil, other
- ☐ other types of vegetation

b. What kind and amount of vegetation will be removed or altered?

c. List threatened or endangered species known to be on or near the site.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

5. Animals

a. Circle any birds and animals which have been observed on or near the site or are known to be on or near the site:

- birds: hawk, heron, eagle, songbirds, other:
- mammals: deer, bear, elk, beaver, other:
- fish: bass, salmon, trout, herring, shellfish, other:

b. List any threatened or endangered species known to be on or near the site.

- c. Is the site part of a migration route? If so, explain.
- d. Proposed measures to preserve or enhance wildlife, if any:

6. Energy and Natural Resources

- a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.
- b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.
- c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

7. Environmental Health

- a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.

1) Describe special emergency services that might be required.

2) Proposed measures to reduce or control environmental health hazards, if any:

b. Noise

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.

TO BE COMPLETED BY APPLICANT

EVALUATION FOR
AGENCY USE ONLY

3) Proposed measures to reduce or control noise impacts, if any:

8. Land and Shoreline Use

a. What is the current use of the site and adjacent properties?

b. Has the site been used for agriculture? If so, describe.

c. Describe any structures on the site.

d. Will any structures be demolished? If so, what?

e. What is the current zoning classification of the site?

f. What is the current comprehensive plan designation of the site?

g. If applicable, what is the current shoreline master program designation of the site?

h. Has any part of the site been classified as an "environmentally sensitive" area? If so, specify.

i. Approximately how many people would reside or work in the completed project?

j. Approximately how many people would the completed project displace?

k. Proposed measures to avoid or reduce displacement impacts, if any:

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

9. Housing

- a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.
- b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.
- c. Proposed measures to reduce or control housing impacts, if any:

10. Aesthetics

- a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?
- b. What views in the immediate vicinity would be altered or obstructed?
- c. Proposed measures to reduce or control aesthetic impacts, if any:

11. Light and Glare

- a. What type of light or glare will the proposal produce? What time of day would it mainly occur?
- b. Could light or glare from the finished project be a safety hazard or interfere with views?
- c. What existing off-site sources of light or glare may affect your proposal?
- d. Proposed measures to reduce or control light and glare impacts, if any:

12. Recreation

- a. What designated and informal recreational opportunities are in the immediate vicinity?
- b. Would the proposed project displace any existing recreational uses? If so, describe.

TO BE COMPLETED BY APPLICANT

EVALUATION FOR
AGENCY USE ONLY

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

13. Historic and Cultural Preservation

a. Are there any places or objects listed on, or proposed for, national, state, or local preservation registers known to be on or next to the site? If so, generally describe.

b. Generally describe any landmarks or evidence of historic, archaeological, scientific, or cultural importance known to be on or next to the site.

c. Proposed measures to reduce or control impacts, if any:

14. Transportation

a. Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any.

b. Is site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?

c. How many parking spaces would the completed project have? How many would the project eliminate?

d. Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? If so, generally describe (indicate whether public or private).

e. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

f. How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur.

g. Proposed measures to reduce or control transportation impacts, if any:

15. Public Services

a. Would the project result in an increased need for public services (for example: fire protection, police protection, health care, schools, other)? If so, generally describe.

b. Proposed measures to reduce or control direct impacts on public services, if any.

16. Utilities

a. Circle utilities currently available at the site: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other.

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

C. SIGNATURE

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature:

Date Submitted:

Approved by:

Title:

Date:

Chapter 173-218 WAC

UNDERGROUND INJECTION CONTROL PROGRAM

WAC

173-218-010	Purpose.
173-218-020	Policy enunciated.
173-218-030	Definitions.
173-218-040	Authorization required.
173-218-050	Class I injection wells.
173-218-060	Class II injection wells.
173-218-070	Class III injection wells.
173-218-080	Class IV injection wells.
173-218-090	Class V injection wells.
173-218-100	Permit terms and conditions.
173-218-110	Enforcement.

WAC 173-218-010 Purpose. (1) The purpose of this chapter is to set forth the procedures and practices applicable to the injection of fluids through wells.

(2) Permits issued in accordance with the provisions of this chapter are designed:

(a) To satisfy the intent and requirements of Part C of the Federal Safe Drinking Water Act (SDWA) 42 U.S.C. § 300h et seq. as authorized by RCW 43.21A-.445 and of the Water Pollution Control Act, chapter 90.48 RCW; and

(b) To preserve and protect ground waters, including underground sources of drinking water, for existing and future beneficial uses. [Statutory Authority: RCW 43-.21A.445. 84-06-023 (Order DE 84-02), § 173-218-010, filed 2/29/84.]

WAC 173-218-020 Policy enunciated. (1) It shall be the policy of the department of ecology in carrying out the purposes of this chapter:

(a) To maintain the highest possible standards to prevent the injection of fluids that may endanger ground waters which are obtainable for beneficial uses or which contain fewer than 10,000 mg/L of total dissolved solids;

(b) To require the use of all known, available, and reasonable methods to prevent and control the discharge of fluids and waste fluids into the waters of the state;

(c) To protect public health and welfare through preservation and protection of the quality of the state's ground waters.

(2) Consistent with this policy:

(a) The disposal of waste fluids from industrial, commercial, or municipal sources into wells will not be authorized by the department, except that existing operations are authorized providing these operations satisfy the standards and requirements of this chapter;

(b) The department will act to prevent the disposal of waste fluids that present a risk to human health, including the potential, chronic effects of lifetime exposure to waste fluids. [Statutory Authority: RCW 43.21A.445. 84-06-023 (Order DE 84-02), § 173-218-020, filed 2/29/84.]

WAC 173-218-030 Definitions. (1) "Beneficial uses" shall include, among others, uses for domestic water, irrigation, fish, shellfish, game, and other aquatic life, municipal, recreation, industrial water, generation of electric power, and navigation.

(2) "Class I injection well" means a well used to inject industrial, commercial, or municipal waste fluids beneath the lowermost formation containing, within 1/4-mile of the well bore, an USDW.

(3) "Class II injection well" means a well used to inject fluids:

(a) Brought to the surface in connection with conventional oil or natural gas exploration or production and may be commingled with wastewaters from gas plants which are an integral part of production operations, unless those waters are classified as dangerous wastes at the time of injection;

(b) For enhanced recovery of oil or natural gas; or

(c) For storage of hydrocarbons which are liquid at standard temperature and pressure.

(4) "Class III injection well" means a well used for extraction of minerals, including but not limited to the injection of fluids for:

(a) In-situ production of uranium or other metals that have not been conventionally mined;

(b) Mining of sulfur by Frasch process; or

(c) Solution mining of salts or potash.

(5) "Class IV injection well" means a well used to inject dangerous or radioactive waste fluids.

(6) "Class V injection well" means all injection wells not included in Classes I, II, III, or IV.

(7) "Dangerous waste" means any discarded, useless, unwanted, or abandoned nonradioactive substances, including but not limited to certain pesticides or any residues or containers of such substances, which are disposed of in such quantity or concentration as to pose a substantial present or potential hazard to human health, wildlife, or the environment because such wastes or constituents or combinations of such wastes:

(a) Have short-lived, toxic properties that may cause death, injury, or illness or have mutagenic, teratogenic, or carcinogenic properties; or

(b) Are corrosive, explosive, flammable, or may generate pressure through decomposition or other means (Hazardous Waste Disposal Act, chapter 70.105 RCW).

(8) "Department" means department of ecology.

(9) "Fluid" means any material or substance which flows or moves whether in a semisolid, liquid, sludge, gas, or any other form or state.

(10) "Ground waters" means all waters that exist beneath the land surface or beneath the bed of any stream, lake or reservoir, or other body of surface water within

the boundaries of this state, whatever may be the geological formation or structure in which such water stands or flows, percolates, or otherwise moves (Regulation of public ground waters, chapter 90.44 RCW).

(11) "Injection well" means a "well" that is used for the subsurface emplacement of fluids.

(12) "New injection well" means an injection well that is proposed subsequent to the effective date of this chapter.

(13) "Person" includes any political subdivision, local, state, or federal government agency, municipality, industry, public or private corporation, partnership, association, firm, individual, or any other entity whatsoever.

(14) "Radioactive waste" means any waste which contains radioactive material in concentrations which exceed those listed in 10 Code of Federal Regulations Part 20, Appendix B, Table II, Column 2.

(15) "SDWA" means Part C of the Federal Safe Drinking Water Act, 42 U.S.C. § 300f et seq.

(16) "Underground source of drinking water (USDW)" means ground waters which contain fewer than 10,000 mg/l. of total dissolved solids or which are obtainable for beneficial uses.

(17) "Waste fluid" means any discarded, abandoned, unwanted, or unrecovered fluid(s), except the following are not waste fluids for the purposes of this chapter:

(a) Discharges into the ground or ground water of return flow, unaltered except for temperature, from a ground water heat pump used for space heating or cooling; *Provided*, That such discharges do not have significant potential, either individually or collectively, to affect ground water quality or beneficial uses;

(b) Discharges of stormwater that are not contaminated or potentially contaminated by industrial or commercial sources.

(18) "Well" means a bored, drilled or driven shaft, or dug hole whose depth is greater than the largest surface dimension. [Statutory Authority: RCW 43.21A.445. 84-06-023 (Order DE 84-02), § 173-218-030, filed 2/29/84.]

WAC 173-218-040 Authorization required. No fluids may be injected through wells except as authorized pursuant to this chapter. [Statutory Authority: RCW 43.21A.445. 84-06-023 (Order DE 84-02), § 173-218-040, filed 2/29/84.]

WAC 173-218-050 Class I injection wells. (1) New Class I injection wells are prohibited.

(2) All persons operating an existing Class I injection well operation must apply to the department for approval to operate within one year of the effective date of this chapter.

(3) The department will accept, process, and act upon the application in accordance with applicable requirements as contained in 40 Code of Federal Regulations Parts 124 and 144 as published in Federal Register Volume 48, #64 (April 1, 1983) and Part 146 as published in Federal Register Volume 45, #123 (June 24, 1980), Volume 46, #166 (August 27, 1981) and Volume 47, #23 (February 3, 1982). [Statutory Authority: RCW

43.21A.445. 84-06-023 (Order DE 84-02), § 173-218-050, filed 2/29/84.]

WAC 173-218-060 Class II injection wells. (1) Any person, who proposes to conduct or is conducting a Class II injection well operation, as defined in WAC 173-218-030(3)(a), must notify the oil and gas conservation committee (OGCC) in accordance with the provisions of general rules, chapter 344-12 WAC.

(2) The department shall perform review, evaluation, and approval in accordance with the provisions of general rules, chapter 344-12 WAC.

(3) The department shall process a Class II injection well application, as defined in WAC 173-218-030(3)(a), in accordance with applicable requirements as contained in 40 Code of Federal Regulations Parts 124 and 144 as published in Federal Register Volume 48, #64 (April 1, 1983) and Part 146 as published in Federal Register Volume 45, #123 (June 24, 1980), Volume 46, #166 (August 27, 1981) and Volume 47, #23 (February 3, 1982).

(4) At present, there appears to be no reasonable likelihood that approval will be sought for a Class II injection well for either enhanced recovery of oil or natural gas or for storage of liquid hydrocarbons; therefore, Class II injection wells as defined in 173-218-030(3)(b) and (3)(c) are not authorized. If it appears likely that approval will be sought for either of these types of injection wells, these regulations will be amended to include an appropriate regulatory program. [Statutory Authority: RCW 43.21A.445. 84-06-023 (Order DE 84-02), § 173-218-060, filed 2/29/84.]

WAC 173-218-070 Class III injection wells. At present, there appears to be no reasonable likelihood that approval will be sought for a Class III injection well; therefore, Class III injection wells are not authorized. If it appears likely that approval will be sought for a Class III injection well, these regulations will be amended to include an appropriate regulatory program. [Statutory Authority: RCW 43.21A.445. 84-06-023 (Order DE 84-02), § 173-218-070, filed 2/29/84.]

WAC 173-218-080 Class IV injection wells. Class IV injection wells are prohibited regardless of proximity to USDW. [Statutory Authority: RCW 43.21A.445. 84-06-023 (Order DE 84-02), § 173-218-080, filed 2/29/84.]

WAC 173-218-090 Class V injection wells. (1) All new Class V injection wells that inject industrial, municipal, or commercial waste fluids into or above an USDW are prohibited.

(2) All persons operating an existing Class V injection well, that inject industrial, commercial, or municipal waste fluids into or above an USDW, must apply to the department for approval to operate within one year of the effective date of this regulation. The department will accept, process, and act upon the application in accordance with the procedures and practices of the state

Waste Discharge Permit Program, chapter 173-216 WAC.

(3) All other Class V injection well owners and operators must notify the department of the location of injection wells within one year of approval of the state underground injection control program by the United States environmental protection agency. The notification shall be on a form as prescribed by the department and will include the information needed to satisfy the requirements of 40 Code of Federal Regulations Part 146.52. [Statutory Authority: RCW 43.21A.445, 84-06-023 (Order DE 84-02), § 173-218-090, filed 2/29/84.]

WAC 173-218-100 Permit terms and conditions.

(1) Any permit issued by the department shall specify conditions necessary to prevent and control injection of fluids into the waters of the state, including the following, whenever applicable:

(a) All known, available, and reasonable methods of prevention, control, and treatment;

(b) Applicable requirements as contained in 40 Code of Federal Regulations Parts 124 and 144 as published in Federal Register Volume 48, #64 (April 1, 1983) and Part 146 as published in Federal Register Volume 45, #123 (June 24, 1980), Volume 46, #166 (August 27, 1981) and Volume 47, #23 (February 3, 1982); and

(c) Any conditions necessary to preserve and protect USDW.

(2) Any injection well that causes or allows the movement of fluid into an USDW that may result in a violation of any primary drinking water standard under 40 Code of Federal Regulations Part 141 or that may otherwise adversely affect the beneficial use of an USDW is prohibited. [Statutory Authority: RCW 43.21A.445, 84-06-023 (Order DE 84-02), § 173-218-100, filed 2/29/84.]

WAC 173-218-110 Enforcement. (1) For violations of this chapter, the department shall have the remedies available in the Water Pollution Control Act, chapter 90.48 RCW, and all other applicable statutes.

(2) All injection well operations not operated in accordance with the provisions of this chapter, that cause or tend to cause entry of fluids into the waters of the state as a result of a violation of these provisions, constitutes pollution of the waters of the state in violation of RCW 90.48.080. [Statutory Authority: RCW 43.21A.445, 84-06-023 (Order DE 84-02), § 173-218-110, filed 2/29/84.]

Chapter 332-17 WAC
GEOTHERMAL DRILLING RULES AND REGULATIONS

NEW SECTION

WAC 332-17-010 INSPECTION. The department shall inspect all geothermal operations for the purpose of obtaining compliance with the rules, regulations, and orders promulgated by authority of the Geothermal Resources Act, chapter 43, Laws of 1974 ex. sess.

NEW SECTION

WAC 332-17-020 GENERAL RULES. General rules shall be statewide in application unless otherwise specifically stated and shall be applicable to all lands within the jurisdiction of the state of Washington.

NEW SECTION

WAC 332-17-030 SUPREMACY OF SPECIAL RULES AND ORDERS. Special rules and orders will be issued as required and shall prevail as against general rules if in conflict therewith.

NEW SECTION

WAC 332-17-100 APPLICATION FOR PERMIT TO COMMENCE DRILLING, REDRILLING OR DEEPENING. 1) The owner or operator of any well, or proposed well, before commencing the drilling, redrilling, or deepening of any wells shall file with the department a written application in triplicate of the intention to commence such drilling, redrilling or deepening accompanied by a fee of two hundred dollars as prescribed in RCW 79.76.070, except no fee is required for the drilling of core holes. The application shall be on forms as prescribed by the department and contain the following:

- (a) The name of operator or company and address.

(b) Description of the lease or property including acres together with the name and address of the owner or owners of surface and mineral rights.

(c) The proposed location of the well or wells including a typical layout showing the position of mud tanks, reserve pits, cooling towers, pipe racks, etc.

(d) Existing and planned access and lateral roads.

(e) Location and source of water supply and road building material.

(f) Location of supporting facilities.

(g) Other areas of potential surface disturbances.

(h) The topographic features of the land, including drainage patterns.

(i) Methods for disposing of waste materials.

(j) The proposed drilling and casing plan.

(k) A surveyed plat showing the surface and expected bottom-hole locations and the distances from the nearest section or tract lines as shown on the official plat of survey or protracted surveys of each well or wells. The scale shall not be less than 1:24,000.

(l) A narrative statement describing the proposed measures to be taken for protection of the environment, including, but not limited to, the prevention or control of:

(i) fires,

(ii) soil erosion,

(iii) pollution of surface and ground waters,

(iv) damage to fish and wildlife or other natural resources,

(v) air and noise pollution, and

(vi) hazards to public health and safety during operational activities.

(m) Such other pertinent information or data which the department may require to support the application for the development of geothermal resources and the protection of the environment.

Provisions for monitoring may be required as deemed necessary by the department to ensure compliance with these regulations.

The collection of data concerning existing air and water quality, noise, seismic and land subsidence activities, and the ecological system of the area may be required as deemed necessary by the department.

(2) An application for the drilling of core holes shall contain the following:

(a) Name and address of the operator or company.

(b) Name and number, location of the core hole or holes to the nearest quarter-quarter section or lot.

(c) Proposed depth of each core hole, but not to exceed 750 feet into bedrock.

(d) A map of sufficient scale to show topography and drainage patterns, access roads, and the proposed core hole locations. A metes and bounds description of each core hole location shall be provided to the department within thirty days of completion of the core hole or the approved core hole program.

(3) Well names and numbers shall not be changed without first obtaining the written approval of the department.

NEW SECTION

WAC 332-17-110 CASING REQUIREMENTS. (1) All wells shall be cased to protect or minimize damage to the environment, surface and ground waters, geothermal resources and health and property. The department shall approve proposed well spacing and well casing programs or prescribe such modifications to the programs as the department determines necessary for proper development, giving consideration to such factors as:

- (a) Topographic characteristics of the area.
- (b) Hydrologic, geologic, or reservoir characteristics of the area.
- (c) The number of wells that can be economically drilled to provide the necessary volume of geothermal resources for the intended use.
- (d) Protection of correlative rights.
- (e) Minimizing well interference.
- (f) Unreasonable interference with multiple use of lands.
- (g) Protection of the environment.

(2) Casing specifications shall be established on an individual well basis. The following specifications are general, but should be used as guidelines in submitting drilling permit applications.

(a) Conductor pipe. Annular space shall be cemented solid from the shoe to surface. An annular blowout preventer, or equivalent, remotely controlled hydraulically operated including a drilling spool with side outlets or equivalent may be required by the department. A kill line and blowdown line with appropriate fittings shall be connected to the drilling spool when same is required.

Conductor casing shall be set to a minimum depth of 15 meters (50 feet).

(b) Surface casing. This casing shall be set at a depth equivalent to, or in excess of, ten percent of the proposed depth of the well, provided, however, such depth shall not be

less than 60 meters (200 feet) or extend less than 30 meters (100 feet) into bedrock. Surface casing holes shall be logged with an induction electric log, or equivalent, prior to running surface casing.

(c) Intermediate casing. This casing shall be required whenever anomalous pressure zones, cave-ins, washouts, abnormal temperature zones, uncased fresh water aquifers, uncontrollable lost circulation zones, or other drilling hazards are present or occur, and whenever the surface casing has not been cemented through competent rock units. Intermediate casing strings shall be cemented solid if possible from the shoe to surface. If a liner is used as an intermediate string, the tap shall be tested by a fluid entry or pressure test to determine whether a seal between the liner top and the next casing string has been achieved. The liner overlap shall be a minimum of 30 meters (100 feet). The test shall be recorded in the driller's log and may be witnessed by a representative of the department.

(d) Production casing. This casing may be set above or through the producing or injection zone and cemented above the objective zones. Production casings shall be cemented to the surface or lapped into the intermediate string. Overlap shall not be less than 30 meters (100 feet) and shall be pressure tested. Lap or casing failure shall require repair, recementing, and successful retesting.

(e) Cementing of casing. Conductor and surface casing strings shall be cemented with a quantity of cement sufficient to fill the annular space from the shoe to surface. A high temperature resistant admix shall be used in cementing production casing unless waived by the department, and shall be cemented in a manner necessary to exclude, isolate, or segregate overlying formation fluids from the geothermal resources zone and to prevent the movement of fluids into possible fresh water zones.

A temperature or cement bond log may be required by the department if an unsatisfactory cementing job is indicated.

(f) Pressure testing. Prior to drilling out the casing shoe after cementing, all casing strings set to a depth of 152 meters (500 feet) or less except for conductor casing, shall be pressure tested to a minimum pressure of 35 bars (500 psi). Casing strings set to a depth of 152 meters (500 feet) or greater shall be pressure tested to a minimum pressure of 69 bars (1,000 psi) or 0.045 bars/meter (0.2 psi/ft) whichever is greater. Such test shall not exceed the rated working pressure of the casing or the blowout preventor stack assembly, whichever is lesser.

NEW SECTION

WAC 332-17-120 BLOWOUT PREVENTION. Blowout prevention and related control equipment shall be installed, tested immediately thereafter, and properly maintained ready for use until drilling operations are completed. Certain components, such as packing elements and ram rubbers, shall be of high temperature resistant material as necessary. All kill lines, blowdown lines, manifolds, and fittings shall be steel and have temperature derated minimum working pressure rating equivalent to the maximum anticipated wellhead surface pressure. Unless otherwise specified, blowout prevention equipment shall have manually operated gates and remotely controlled hydraulic actuating systems and accumulators of sufficient capacity to close all of the hydraulically operated equipment and have a minimum pressure of 69 bars (1,000 psi) remaining on the accumulator. Dual control stations shall be installed with a high pressure backup system. One control panel shall be located at the driller's station and one control panel shall be located on the ground at least 15 meters (50 feet) away from the wellhead or rotary table. Blowout prevention assemblies involving the use of air or other gaseous fluid drilling systems may include, but are not limited to, a rotating head, a double ram blowout preventer or equivalent, a banjo-box or an approved substitute therefore and a blind ram blowout preventer or gate valve, respectively. Exceptions to the requirements of this paragraph will be considered by the department for areas of known surface stability and low subsurface formation pressure and temperatures.

(1) Conductor casing. One remotely controlled hydraulically operated expansion type preventer or acceptable alternative, including a drilling spool with side outlets or equivalent, may be required before drilling below conductor casing.

(2) Surface, intermediate and production casing. Prior to drilling below any of these strings, blowout prevention equipment shall include a minimum of:

(a) One expansion-type preventer and accumulator or a rotating head,

(b) A manual and remotely controlled hydraulically operated double ram blowout preventer or equivalent having a temperature derated minimum working pressure rating which exceeds the maximum anticipated surface pressure at the anticipated reservoir fluid temperature,

(c) A drilling spool with side outlets or equivalent,

(d) A fillup line,

(e) A kill line equipped with at least one valve, and

(f) A blowdown line equipped with at least two valves and securely anchored at all bends and at the end.

(3) Testing and maintenance. Ram-type blowout preventers and auxiliary equipment shall be tested to a minimum of 69 bars (1,000 psi) or to the working pressure of the casing or assembly, whichever is the lesser. Expansion-type blowout preventers shall be tested to 70 percent of the above pressure testing requirements.

(a) The blowout prevention equipment shall be pressure tested:

(i) When installed,

(ii) Prior to drilling out plugs and/or casing shoes,

(iii) Not less than once each week, alternating the control stations, and

(iv) Following repairs that require disconnecting a pressure seal in the assembly.

(b) During drilling operations, blowout prevention equipment shall be actuated to test proper functioning as follows:

(i) Once each trip for blind and pipe rams, but not less than once each day for pipe rams, and

(ii) At least once each week on the drill pipe for expansion-type preventers.

All flange bolts shall be inspected at least weekly and retightened as necessary during drilling operations. The auxiliary control systems shall be inspected daily to check the mechanical condition and effectiveness and to ensure personnel acquaintance with the method of operation. Blowout prevention and auxiliary control equipment shall be cleaned, inspected and repaired, if necessary, prior to installation to assure proper functioning. Blowout prevention controls shall be plainly labeled, and all crew members shall be instructed on the function and operation of such equipment. A blowout prevention drill shall be conducted weekly for each drilling crew. All blowout prevention tests and crew drills shall be recorded on the driller's log.

(4) Related well control equipment. A full opening drill string safety valve in the open position shall be maintained on the rig floor at all times while drilling operations are being conducted. A kelly cock shall be installed between the kelly and the swivel.

NEW SECTION

WAC 332-17-130 DRILLING FLUID. The properties, use and testing of drilling fluids and the conduct of related drilling procedures shall be such as are necessary to prevent the blowout of any well. Sufficient drilling fluid materials to ensure well control shall be maintained in the field area readily accessible for use at all times.

(1) Drilling fluid control. Before pulling drill pipe, the drilling fluid shall be properly conditioned or displaced. The hole shall be kept reasonably full at all times, however, in

no event shall the annular mud level be deeper than 30 meters (100 feet) from the rotary table when coming out of the hole with drill pipe. Mud cooling techniques shall be utilized when necessary to maintain mud characteristics for proper well control and hole conditioning. The conditions contained herein shall not apply when drilling with air or aerated fluids.

(2) Drilling fluid testing. Mud testing and treatment consistent with good operating practice shall be performed daily or more frequently as conditions warrant. Mud testing equipment shall be maintained on the drilling rig at all times. The following drilling fluid system monitoring or recording devices shall be installed and operated continuously during drilling operations, with mud, occurring below the shoe of the conductor casing:

(a) High-low level mud pit indicator including a visual and audio-warning device, if applicable,

(b) Degassers if applicable, and desilters and desanders if required for solids control,

(c) A mechanical, electrical, or manual surface drilling fluid temperature monitoring device. The temperature of the drilling fluid going into the coming out of the hole shall be monitored, read, and recorded on the driller's or mud log for a minimum of every 9 meters (30 feet) of hole drilled below the conductor casing, and

(d) A hydrogen sulfide indicator and alarm shall be installed in areas suspected or known to contain hydrogen sulfide gas which may reach levels considered to be dangerous to the health and safety of personnel in the area.

No exceptions to these requirements will be allowed without the specific prior permission of the department.

NEW SECTION

WAC 332-17-140 WELL LOGGING. All wells shall be logged with an induction electric log or equivalent from total depth to the shoe of the conductor casing. The department may grant an exception to this requirement when well conditions make it impractical or impossible to meet the above requirements.

NEW SECTION

WAC 332-17-150 REMOVAL OF CASING. No person shall remove casing or any portion thereof from any well without first obtaining prior written approval from the department. In the request to remove casing, the applicant must describe the condition of the well, the proposed casing to be removed, all casing in the hole, location of plugs, and perforations.

NEW SECTION

WAC 332-17-160 DRILLING BOND. The owner or operator who proposes to drill, redrill, or deepen a well for geothermal resources shall file with the department a good and sufficient bond in the sum of fifteen thousand dollars for each well or a fifty thousand dollar blanket bond for one or more wells being drilled, redrilled, or deepened at any time. The bond shall be filed with the department at the time of filing the application to drill, redrill, or deepen a well or wells. Approval of the bond by the department must be obtained prior to the commencement of drilling, redrilling, or deepening. The bond shall be made payable to the state of Washington, conditioned for performance of the duty to properly:

- (1) Drill all geothermal wells,
- (2) Operate and maintain producing wells, and
- (3) Plug each dry or abandoned well in accordance with applicable rules and regulations of the department.

The bond shall be executed by such owner or operator as principal and by a surety company authorized to do business in the state of Washington as surety, conditioned upon the faithful compliance by the principal with the laws, rules, regulations, and orders under the Geothermal Resources Act and shall secure the state against all losses, charges, and expenses incurred by the state in obtaining such compliance by the principal of the bond.

A single core-hole shall be in the sum of five thousand dollars and a blanket core-hole bond shall be in the sum of twenty-five thousand dollars.

NEW SECTION

WAC 332-17-165 CANCELLATION OF BOND. Termination and/or cancellation of any bond will not be permitted until the well, or wells, for which the bond has been issued have been properly abandoned or another valid bond for such well or wells has been submitted therefore and approved by the department. A bond may be canceled upon transfer of the jurisdiction of the well to and acceptance of jurisdiction by the department of ecology. No bond shall be released until the department in writing shall have authorized such release.

NEW SECTION

WAC 332-17-200 TRANSFER OF JURISDICTION TO DEPARTMENT OF ECOLOGY. Transfer of jurisdiction over a well to the department of ecology may be permitted provided it has been established that it is not technologically practical to produce electricity commercially or usable minerals cannot be derived from the well and provided, further, the department of ecology has by affidavit indicated its willingness to assume such responsibility. Transfer of such jurisdiction will relieve the owner or operator of further compliance with the provisions of the Geothermal Resources Act and these rules and regulations, however, the owner or operator shall be subject to applicable laws and regulations relating to wells drilled for appropriation and use of ground waters.

NEW SECTION

WAC 332-17-300 PROPER COMPLETION AND ABANDONMENT. Completion and abandonment of any well or wells shall be conditioned upon implementation of adequate procedures to protect the environmental and esthetic qualities of the drill site, access roads, and other areas that were disturbed as a result of drilling or related operations.

(1) Completion. For the purposes of the Geothermal Resources Act and these rules and regulations, a well will be considered as properly completed when drilling has been completed and a production head has been installed on the well pending actual utilization

in the production of geothermal resources as defined in this act. Suspension of a well after completion and prior to actual production shall not exceed six months duration unless approved in writing by the department.

(2) Abandonment. A well shall be properly abandoned for the purposes of this act when:

(a) Drilling, redrilling, or deepening operations have ceased; or geothermal resources cannot be produced from the well; or the well no longer commercially produces geothermal resources; and proper cement plugs have been placed by the owner or operator and approved by the department; and

(b) The owner or operator has taken all appropriate steps to protect surface and ground waters and prevent the escape of deleterious substances to the surface.

(3) Site restoration. Cellars, pads, structures, and other facilities shall be removed. All drilling supplies and scrap shall be removed. The surface shall be graded and revegetated as appropriate to the immediate area or as otherwise specified by the department.

NEW SECTION

WAC 332-17-310 ABANDONMENT PROCEDURES. No well shall be plugged and abandoned until the manner and method of plugging have been approved or prescribed by the department. The owner or operator shall give notice to the department of the intention to abandon the well and the date and time abandonment procedures will commence.

(1) The notice shall specify the condition of the well and the proposed method of abandonment. The owner or operator shall furnish such additional information concerning the well condition and abandonment procedures as may be required by the department.

(2) The owner or operator shall within twenty-four hours after giving notice of intent to abandon provide the department with a written notice setting forth the proposed abandonment procedures and the condition of the well.

(3) All wells to be abandoned shall have cement plugs placed in the well as prescribed herein. Such cement shall consist of a high temperature resistant admix unless waived by the department in accordance with the particular circumstances existing in the well.

(a) Cased holes.

(i) A cement plug shall be placed across all perforations in the casing, extending 30 meters (100 feet) below and 30 meters (100 feet) above the perforated interval.

(ii) A cement plug shall be placed across all casing stubs, laps, and liner tops, extending a minimum of 15 meters (50 feet) below and 15 meters (50 feet) above such stub, lap, or liner top.

(iii) Casing shoes shall be straddled by a cement plug with a minimum of 30 meters (100 feet) below and 30 meters (100 feet) above and below the shoe.

(iv) All annular space open to the surface shall be filled with cement to the surface.

(v) All casing exposed to the surface shall be cut off 6 feet below ground surface unless otherwise designated by the department.

(vi) A surface plug shall be placed in the casing extending for a minimum of 10 meters (30 feet) below the approved cut off top of the casing. The casing shall be capped by welding a steel plate on the casing stub.

(b) Open holes. Cement plugs shall be placed across fresh water zones, geothermal resource zones, to isolate formations, and to prevent interformational migration or contamination of fluids. Such plugs shall extend a minimum of 30 meters (100 feet) above and below all such zones.

(4) All intervals between plugs shall be filled with drilling mud.

(5) Within thirty days after plugging a well the owner or operator shall file an affidavit with the department setting forth in detail the method used in plugging the well and restoring the site. The affidavit shall be made on a form supplied by the department.

NEW SECTION

WAC 332-17-320 SUSPENSION. Drilling equipment shall not be removed from any well where drilling operations have been suspended before adequate measures have been taken to close the well and protect the surface and subsurface resources including fresh water aquifers. A suspended well shall be mudded and cemented as set forth in WAS 332-17-310 of these rules and regulations or as otherwise approved by the department except that WAC 332-17-310 (3) (a) (iv) - (vi) will not be required.

NEW SECTION

WAC 332-17-340 NOTICE OF CHANGE OF OWNERSHIP. Every person who acquires the right of ownership or right of operation of a geothermal well or wells shall within ten days notify the department in writing of the newly acquired ownership or right of operation and provide a bond equivalent to the bond supplied by the prior owner or operator. Each notice shall contain the following:

- (1) Name, address, and signature of the person from whom the well or land was acquired;
- (2) Name and location of such well or wells;
- (3) Date of acquisition; and
- (4) Description of the land upon which such well or wells is situated.

NEW SECTION

WAC 332-17-400 RECORDS. The owner or operator of any well or wells shall keep or caused to be kept careful and accurate logs, core records, and history of the drilling of the well. The logs and tour reports shall be kept in the local office of the owner or operator and shall be subject during business hours to inspection by the department except during casing or abandonment operations when appropriate logs will be available at the well site.

Records that shall be filed with the department as set forth in RCW 79.76.210 are:

- (1) The drilling log and core record showing the lithologic characteristics and depths of formations encountered, and the depths and temperatures of water-bearing and steam-bearing strata, and the temperature, chemical compositions, and other chemical and physical characteristics of fluids encountered. Core records shall show the depth, lithologic character, and the fluid content of cores obtained.
- (2) The well history shall describe in detail in chronological order on a daily basis all significant operations carried out and equipment used during all phases of drilling, testing, completion, recompletion, and abandonment of the well.
- (3) The well summary report shall accompany the drilling logs and well history report. It shall show the spud date, completion date, abandonment date, casing summary, fresh water zones, producing zones, total depth, well location, tops of formations penetrated and bottom hole temperature.

(4) Production records shall be submitted monthly to the department on or before the 10th of each month for the preceding month on a form approved by the department.

(5) Electric logs, directional logs, physical or chemical logs, tests, water analysis, surveys including temperature surveys, and such other logs or surveys as may be run.

(6) A set of ditch samples if taken at not less than 30 meters (100 feet) intervals.

NEW SECTION

WAC 332-17-410 VERTICAL AND DIRECTIONAL WELLS. Deviation surveys shall be taken on all wells during the normal course of drilling at intervals not to exceed 152 meters (500 feet). The department may require a directional survey giving both inclination and azimuth or a dipmeter to be obtained on all wells. In calculating all surveys, a correction from true north to Lambert-Grid north shall be made after making the magnetic to true north correction. All surveys shall be filed with department as set forth in WAC 332-17-400. Wells are considered to be directional if inclination from vertical exceeds an average of five degrees. In directional wells directional surveys shall be obtained at intervals not to exceed 300 meters (100 feet) prior to, or upon setting any casing string or lines (except conductor casing) and total depth.

NEW SECTION

WAC 332-17-430 WELL DESIGNATION. The owner or operator shall place in a conspicuous location near the well site a sign setting forth the name of the owner or operator, lease name, well number, permit number, and the quarter-quarter section or lot, township, and range of the well location. Such well designation shall be maintained until the well has been abandoned.

NEW SECTION

WAC 332-17-440 WELL SPACING. The department will approve proposed well spacing programs or prescribe such modifications to the programs as it determines necessary for proper development, giving consideration to such factors as:

- (1) Topography of the area;
- (2) Geologic conditions of the reservoir;
- (3) Minimum number of wells required for adequate development; and
- (4) Protection of environment.

NEW SECTION

WAC 332-17-450 RIGHT OF ENTRY. Department representatives shall have the right to enter upon any lands and examine such records related to the drilling, redrilling, deepening, or the completion, or the abandonment of, or production from any geothermal well to ensure compliance with the Geothermal Resources Act and these rules. Any owner or operator who denies the right of entry of a department representative or willfully hinders or delays the enforcement of the provisions of the act and these rules or who otherwise violates, fails, neglects, or refuses to comply with any of the provisions of the act or these rules will be subject to the penalties as set forth in RCW 79.76.260.

NEW SECTION

WAC 332-17-460 PITS OR SUMPS. The owner or operator shall provide pits and/or sumps of adequate capacity and design to retain all fluids and materials necessary to the drilling, production, and related operations on the well. No contents of pits and/or sumps shall be allowed to:

- (1) Contaminate streams, artificial canals, waterways, ground waters, lakes, or rivers;
- (2) Adversely affect the environment, persons, plants, and wildlife; and
- (3) Adversely affect esthetic values of the property or adjacent properties.

When pits and/or sumps are no longer needed, they shall be pumped out and the contents disposed of in approved disposal sites unless otherwise approved by the department.

STATE OF WASHINGTON
GEOTHERMAL DRILLING BOND

BOND NO. _____

KNOW ALL MEN BY THESE PRESENTS that _____,
a _____, of _____ in the
State of _____, as principal, and _____
_____, a corporation duly authorized to transact surety
business in the State of Washington, as surety, are held and firmly bound unto the STATE
OF WASHINGTON in the sum of _____ Dollars
(\$ _____), lawful money of the United States, for the payment of
which, well and truly to be made, we and each of us, bind ourselves, our heirs, executors,
administrators, successors and assigns, jointly and severally, firmly by these presents.

The condition of the foregoing obligation is such that, whereas the above bounden
principal has made application under Application No. _____ dated
_____ 19____ for a permit to drill for
Geothermal Resources on a tract described as _____

_____ pursuant to the laws of the State of Washington (RCW 79.76) and the rules and regulations
(Chapter 332-17 WAC) adopted and promulgated by the Department of Natural Resources
of said state, and all amendments thereto, and desires to give bond as required by said
law, rules and regulations and amendments thereto,

NOW, THEREFORE, if said principal, in its operations after the granting of permit
by the Department of Natural Resources of the State of Washington, shall fully comply
with all the conditions of any permit, the laws of the State of Washington, orders of the
Department of Natural Resources and Rules and Regulations adopted and promulgated by
the Department of Natural Resources of said state, and amendments thereto, prescribed
to govern the drilling for geothermal resources in the State of Washington, and procures
from the said Department approval of all abandoned wells drilled by the principal, then
and in that event the above obligatee shall be void; otherwise, it shall remain in full force
and effect.

PROVIDED, that the total liability of the surety hereunder for all causes of action
arising under this bond shall not exceed the total sum of _____
_____ Dollars (\$ _____).

IN WITNESS WHEREOF, The said principal has hereunto set his hand and seal, and
the surety has caused these presents to be signed by its duly authorized officers and its

corporate seal to be hereto affixed this _____ day of _____
19_____.

Countersigned:

Licenses (Resident) Agent of Surety Co.

Principal

Name and Address, Local Office of Agent

Attorney-in-fact, surety

Assistant Attorney General

Approved as to execution by surety (No
responsibility assumed for forgery)

APPROVED

Department of Natural Resources

WHAT IS YOUR INTEREST IN THE PROPERTY ON WHICH THE WATER IS TO BE USED (PROPERTY OWNER, LESSEE, CONTRACT PURCHASER, ETC.)

ARE THERE ANY EXISTING WATER RIGHTS RELATED TO THE LAND ON WHICH THE WATER IS TO BE USED (INCLUDING WATER PROVIDED BY IRRIGATION DISTRICTS OR DITCH COMPANIES) ☐ YES ☐ NO

IF YES, FROM WHAT SOURCE (i.e. SURFACE OR GROUND WATER) AND UNDER WHAT AUTHORITY

6. DESCRIPTION OF SYSTEM PROPOSED OR INSTALLED
(FOR EXAMPLE: SIZE OF PUMP, CAPACITY OF PUMP, PUMP MOTOR HORSE POWER, PIPE DIAMETER, NUMBER OF SPRINKLERS, ETC.)

REMARKS

7.

IF 10 ACRE-FEET OR MORE OF WATER IS TO BE STORED AND/OR IF THE WATER DEPTH WILL BE 10 FEET OR MORE AT THE DEEPEST POINT, A STORAGE PERMIT MUST BE FILED IN ADDITION TO THIS PERMIT. THESE FORMS CAN BE SECURED, TOGETHER WITH INSTRUCTIONS, FROM THE DEPARTMENT OF ECOLOGY.

SIGNATURES

APPLICANT'S SIGNATURE

LEGAL LANDOWNERS NAME
(PLEASE PRINT)

LEGAL LANDOWNER'S SIGNATURE (OWNER OF PROPERTY
DESCRIBED IN ITEM NUMBER 5)

LEGAL LANDOWNER'S ADDRESS

FOR OFFICE USE ONLY

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

SS.

This is to certify that I have examined this application together with the accompanying maps and data, and am returning it for correction or completion as follows:

.....

In order to retain its priority date, this application must be returned to the Department of Ecology, with corrections, on or before....., 19.....

Witness my hand this.....day of....., 19.....

Department of Ecology

Your water right application will be processed by the Regional Office of the Department of Ecology having jurisdiction in the area in which your water works are located. **Please submit your completed application form, maps, sketches and \$10.00 examination fee to the appropriate Regional Office.**

Northwest Regional Office
4350 150th Avenue N.E.
Redmond, Washington 98502 - 5301
Tel. (206) 885-1900

Central Regional Office
3601 West Washington
Yakima, Washington 98903 - 1164
Tel. (509) 575-2491

Southwest Regional Office
7272 Cleanwater Lane
Olympia, Washington 98504 - 6811
Tel. (206) 753-2353

Eastern Regional Office
N. 4601 Monroe, Suite 100
Spokane, Washington 99205 - 1295
Tel. (509) 456-2926

The appropriate Regional Office will be happy to answer any further questions you may have.

DEPARTMENT OF ECOLOGY

APPLYING FOR A WATER RIGHT

General Information

The State Water Code of 1917 prescribes that all water is publicly owned and no public water may be appropriated (taken from its natural source and used) except as specified in the code.

The water code makes an exception to the otherwise mandatory procedure of obtaining a water right to use public water. This exception allows withdrawal of public water from a well for the following uses: stock watering, single or group domestic supply, irrigation of lawn and/or garden not greater than 1/2 acre, and industrial uses—PROVIDED, that the water used shall not exceed 5,000 gallons per day. This exception is principally used to provide single family dwellings with wells for their domestic needs without requiring a formal water right.

The following information is not intended to answer all the questions you may have in applying for a water right, but it should help with some of the more common problems people frequently encounter. If you need further help, contact the regional office of the Department of Ecology which serves your area. Regional office addresses are provided elsewhere in this package.

STEPS NECESSARY TO OBTAIN A WATER RIGHT

PLEASE READ CAREFULLY

1. The applicant applies for a permit to construct works for the diversion or withdrawal of water. The application must be accompanied by the minimum examination fee of \$10.00. This minimum examination fee covers the appropriation of up to five cubic feet per second or 2,250 gallons per minute. If additional examination fee is required the applicant will be notified.
2. The Department of Ecology reviews the application with respect to form and, if it is complete, processes the application. If the application is incomplete, it is returned to the applicant.
3. The Department of Ecology provides the applicant with a notice of intent to divert or withdraw water which the applicant is responsible for publishing in an appropriate newspaper(s).
4. The Department of Ecology examines the specifics of the application and reports its findings and conclusions. This action may require a field examination of the project site.
5. The report of findings and conclusions is forwarded to the applicant for his concurrence accompanied by a request for the permit filing fee. The amount of the fee is based on the use(s) of the water as authorized by the permit. The minimum filing fee is \$5.00. This minimum fee covers uses such as a single domestic supply or the irrigation of up to 12 acres. Other uses will cause the permit filing fee to exceed the minimum.
6. If the applicant concurs with the report of findings and conclusions and submits the statutory permit filing fee, the Department will issue a permit granting authority to the applicant (now a permittee) to develop a water works and begin appropriating water. NOTE: A permit to appropriate public waters does not convey the right to trespass on lands of others for access to the water source. Rights of way or easements to such source must be obtained by the permittee.
7. The permittee develops his water works and applies the water to the authorized uses. During this period the permittee must submit progress reports as required by the Department of Ecology. Extensions may be granted when, for good reasons, the permittee is unable to comply with the construction schedule.
8. Upon completion of the works and application of the water to the uses allowed in the permit, the Department of Ecology issues the permittee a certificate of water right. The permittee pays the certificate recording fee of \$5.00 payable to the Department of Ecology plus a County Auditor's recording fee.
9. Please retain the above schedule for reference until a certificate is issued.

✓

The specific use or uses to which the water is to be applied must be entered here. Examples of such uses are irrigation, heat and frost control, single and multiple domestic supply, stock water, power generation, mining, industrial, fish propagation, wildlife refuge, recreation, heat exchange, commercial, municipal, etc.

If your point of diversion or withdrawal is on platted property, please enter the lot and block numbers, the name of the plat or addition, and the related section, township and range. Please also attach an official (as recorded) copy of the plat on which is marked your point of diversion or withdrawal and the boundaries of the property on which the water is to be used. Finally, please send in any additional maps or drawings you may have which will help pinpoint your point of diversion or withdrawal and your place of water use.

If your point of diversion or withdrawal is not on platted property, refer to a detailed map or sketch of the property or turn to the **SECTION MAP** provided in this package. Here you should sketch the boundaries of the property on which the water is to be used. Next, show by an "X" your point of diversion or withdrawal and indicate the north/south, east/west distances from the nearest section corner or property corner—which ever is more convenient. Below the map, indicate traveling directions from the nearest town to the vicinity of your point of diversion or withdrawal. Be certain to send in this map and any others which may help pinpoint your point of diversion or withdrawal and your place of use.

Attach two copies of the legal description of the property on which the water is to be used, taken either from a real estate contract, property deed or title insurance policy. If the property is large and water will not be applied to the entire piece, please highlight on the **SECTION MAP**, or other maps you have enclosed, those portions which will receive water. If you are unable to enclose copies of your legal description, please copy it carefully on the application or on a separate piece of paper and attach it to the application. Particular attention should be paid to insuring that the exact legal description of the property on which the water is to be used is submitted with the application. Errors in the legal description, such as omissions or transpositions, will result in a delay and/or an error in your water right.

2

Indicate traveling directions from nearest town in space below.

Fold along scale

ECY 040-1-14
Rev. 1/85

☐ SURFACE WATER ☐ GROUND WATER

(GRAY BOXES FOR OFFICE USE ONLY)

APPLICANT'S NAME — PLEASE PRINT _____ Bus. Tel. _____

ADDRESS (STREET) (CITY) (STATE) (ZIP CODE)

SOURCE OF SUPPLY	
1.	

TRIBUTARY	SIZE AND DEPTH
-----------	----------------

USE

ENTER QUANTITY OF WATER REQUESTED USING UNITS OF:	CUBIC FEET PER SECOND (CFS)	OR	GALLONS PER MINUTE (GPM)	ACRE FEET PER YEAR
--	-----------------------------	----	--------------------------	--------------------

TIMES DURING YEAR WATER WILL BE REQUIRED

IF IRRIGATION, NUMBER OF ACRES	IF DOMESTIC USE, NUMBER OF UNITS BY TYPE, E.G. 1-HOME, 1-MOBILE HOME, 2-CAMPSITES, ETC.	IF MUNICIPAL USE, ESTIMATED POPULATION 20 YEARS FROM TODAY
--------------------------------	---	--

3. LOCATION OF POINT OF DIVERSION/WITHDRAWAL

A. IF IN PLATTED PROPERTY

ON ACCOMPANYING SECTION MAPS, ACCURATELY MARK AND IDENTIFY EACH POINT OF DIVERSION. SHOW NORTH-SOUTH AND EAST-WEST DISTANCES FROM NEAREST SECTION CORNER OR PROPERTY CORNER.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE (E. OR W.) W.M.	COUNTY
---	---------	-------------	-----------------------	--------

5. LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

OFFER TO LEASE AND LEASE FOR GEOTHERMAL RESOURCES

Serial No.

The undersigned (see reverse) offers to lease all or any of the lands in item 2 that are available for lease pursuant to the Geothermal Steam Act of 1970 (30 U.S.C. 1001-1025).

Read Instructions Before Completing

1. Name

Street

City, State, Zip Code

2. Surface managing agency if other than BLM: Unit/Project

Legal description of land requested (segregate by public domain and acquired lands):

T. R. Meridian State County

Total acres applied for

Percent U.S. interest

Amount remitted: Filing fee \$

Rental fee \$

Total \$

DO NOT WRITE BELOW THIS LINE

3. Land included in lease:

T. R. Meridian State County

Total acres in lease

Rental retained \$

In accordance with the above offer, or the previously submitted competitive bid, this lease is issued granting the exclusive right to drill for, extract, produce, remove, utilize, sell, and dispose of all the geothermal resources in the lands described in item 3 together with the right to build and maintain necessary improvements thereupon, for a primary term of 10 years. Rights granted are subject to applicable laws, the terms, conditions, and attached stipulations of this lease, the Secretary of the Interior's regulations and formal orders in effect as of lease issuance and, when not inconsistent with lease rights granted or specific provisions of this lease, regulations and formal orders hereafter promulgated.

THE UNITED STATES OF AMERICA

Type of lease:

Noncompetitive

Competitive

Other

by (Signing Officer)

(Title) (Date)

EFFECTIVE DATE OF LEASE

Tear

Tear

Tear

Instructions

A. General

- Items 1 and 2 need to be completed only by parties filing for a noncompetitive lease. The BLM will complete front of form for all other types of leases.
- Entries must be typed or printed plainly in ink. Offeror must sign form (item 4) in ink.
- An original and two copies of this offer must be prepared and filed in the proper BLM State office. See regulations at 43 CFR 1821.2-1 for office locations.
- If more space is needed, additional sheets must be attached to each copy of the form submitted.

B. Special:

Item 1—Enter offeror name and billing address.

Item 2—Indicate the agency controlling the surface use of the land and the name of the unit

or project of which the land is a part. Offeror may also provide other information that will assist in establishing title for minerals. The description of land must conform to 43 CFR 3203.4. Total acres applied for must not exceed that allowed by regulations.

Payments: The amount remitted must include the filing fee and the first year's rental at the rate of \$1 per acre or fraction thereof. The full rental based on the total acreage applied for must accompany an offer even if the mineral interest of the United States is less than 100 percent. The filing fee will be retained as a service charge even if the offer is completely rejected or withdrawn. To protect priority, it is important that the rental submitted be sufficient to cover all the land requested. If the land requested includes lots or irregular quarter-quarter sections, the exact area of which is not known to the offeror, rental should be submitted on the basis of each such lot or quarter-quarter section containing 40 acres. If the offer is withdrawn or rejected in whole or in part before a lease issues, the rental remitted for the parts withdrawn or rejected will be returned.

Item 3—This space will be completed by the United States.

PAPERWORK REDUCTION ACT STATEMENT

1. This information is being collected pursuant to the law (43 CFR 3200).
2. This information will be used to create and maintain a record of geothermal lease activity.
3. Response to this request is required to obtain a benefit.

NOTICE

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

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

PRINCIPAL PURPOSE—The information is to be used to process geothermal lease applications.

ROUTINE USES:

- (1) The adjudication of the lessee's rights to the land or resources.
- (2) Documentation for public information in support of notations made on land status records for the management, disposal, and use of public lands and resources.
- (3) Transfer to appropriate Federal agencies when concurrence is required prior to granting a right in public lands or resources.
- (4)(5) Information from the record and/or the record will be transferred to appropriate Federal, State, local or foreign agencies, when relevant to civil, criminal or regulatory investigations or prosecutions.

EFFECT OF NOT PROVIDING INFORMATION—If all the information is not provided, the offer may be rejected. See regulations at 43 CFR 3200.

Tear

Tear

Tear

4. (a) Undersigned certifies that:

(1) Offeror is a citizen of the United States; an association of such citizens; a municipality; or a corporation organized under the laws of the United States, any State or the District of Columbia; (2) All parties holding an interest in the offer are in compliance with 43 CFR 3200 and the authorizing Act; (3) Offeror's chargeable interests, direct and indirect, do not exceed that allowed under the Act; and (4) Offeror is not considered a minor under the laws of the State in which the lands covered by this offer are located.

- (b) Undersigned agrees that signature to this offer constitutes acceptance of this lease, including all terms, conditions and stipulations of which offeror has been given notice, and any amendment or separate lease that may cover any land described in this offer open to lease application at the time this offer was filed but omitted for any reason from this lease. The offeror further agrees that this offer cannot be withdrawn, either in whole or part, unless the withdrawal is received by the BLM State Office before this lease, an amendment to this lease, or a separate lease, whichever covers the land described in the withdrawal, has been signed on behalf of the United States.

This offer will be rejected and will afford the offeror no priority if it is not properly completed and executed in accordance with the regulations, or if it is not accompanied by the required payments. Title 18 U.S.C. Sec. 1001 makes it a crime for any person knowingly and willfully to make to any Department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

Duly executed this _____ day of _____, 19 _____.

(Signature of Lessee or Attorney-in-fact)

LEASE TERMS

Sec. 1. Rentals—Rentals shall be paid to proper office of lessor in advance of each lease year until there is production in commercial quantities from the leased lands. Annual rental rates per acre or fraction thereof are: \$1 for noncompetitive leases and \$2 for competitive leases.

If this lease or a portion thereof is committed to an approved cooperative or unit plan which includes a well capable of producing leased resources, and the plan contains a provision for allocation of production, royalties shall be paid on the production allocated to this lease. However, annual rentals shall continue to be due for those lands not within a participating area.

Failure to pay annual rental, if due, on or before the anniversary date of this lease (or next official working day if office is closed) shall automatically terminate this lease by operation of law. Rentals may be suspended by the Secretary upon a sufficient showing by lessee.

Sec. 2. Royalties—Royalties shall be paid to proper office of lessor. Royalties shall be computed in accordance with regulations and orders. Royalty rates on production are: 10 percent for steam, heat, or energy; 5 percent for byproducts; and 5 percent for demineralized water.

Lessor reserves the right to establish reasonable minimum values on production after giving lessee notice and an opportunity to be heard. Royalties shall be due and payable on the last day of the month following the month in which production occurred.

A minimum royalty shall be due for any lease year beginning on or after the commencement of production in commercial quantities in which royalty payments aggregate less than \$2 per acre. Lessee shall pay such difference at the end of lease year. This minimum royalty may be waived, suspended, or reduced, and the above royalty rates may be reduced for all or portions of this lease if the Secretary determines that such action is necessary to encourage the greatest ultimate recovery of the leased resources, or is otherwise justified.

Sec. 3. Bonds—Lessee shall file and maintain any bond required under regulations.

Sec. 4. Diligence, rate of development, unitization, and drainage—Lessee shall perform diligent exploration as required by regulations and shall prevent unnecessary damage to, loss of, or waste of leased resources. Lessor reserves right to specify rates of development and production in the public interest and to require lessee to subscribe to a cooperative or unit plan, within 30 days of notice, if deemed necessary for proper development and operation of the area, field, or pool embracing these leased lands. Lessee shall drill and produce wells necessary to protect leased lands from drainage or pay compensatory royalty for drainage in amount determined by lessor.

Sec. 5. Documents, evidence, and inspection—Lessee shall file with proper office of lessor, not later than (30) days, after effective date thereof, any contract or evidence of other arrangement for the sale or disposal of production. At such times and in such form as lessor may prescribe, lessee shall furnish detailed statements showing amounts and quality of all products removed and sold, proceeds therefrom, and amount used for production purposes or unavoidably lost. Lessee may be required to provide plats and schematic diagrams showing development work and improvements, and reports with respect to parties in interest, expenditures, and depreciation costs.

In the form prescribed by lessor, lessee shall keep a daily drilling record, a log, and complete information on well surveys and tests and keep a record of subsurface investigations and furnish copies to lessor when required. Lessee shall keep open at all reasonable times for inspection by any authorized officer of lessor, the leased premises and all wells, improvements, machinery, and fixtures thereon, and all books, accounts, maps, and records relative to operations, surveys, or investigations on or in the leased lands. Lessee shall maintain copies of all contracts, sales agreements, accounting records, and documentation such as billings, invoices, or similar documentation that support costs claimed as manufacturing, preparation, and/or transportation costs. All such records shall be maintained in lessee's accounting offices for future audit by lessor. Lessee shall maintain required records for 6 years after they are generated or, if an audit or investigation is underway, until released of the obligation to maintain such records by lessor.

During existence of this lease, information obtained under this section shall be closed to inspection by the public in accordance with the Freedom of Information Act (5 U.S.C. 552).

Sec. 6. Conduct of operations—Lessee shall conduct operations in a manner that minimizes adverse impacts to the land, air, and water, to cultural, biological, visual, and other resources, and to other land uses or users. Lessee shall take reasonable measures deemed necessary by

lessor to accomplish the intent of this section. To the extent consistent with leased rights granted, such measures may include, but are not limited to, modification to siting or design of facilities, timing of operations, and specification of interim and final reclamation measures. Lessor reserves the right to continue existing uses and to authorize future uses upon or in the leased lands, including the approval of easements or rights-of-ways. Such uses shall be conditioned so as to prevent unnecessary or unreasonable interference with rights of lessees.

Prior to disturbing the surface of the leased lands, lessee shall contact lessor to be apprised of procedures to be followed and modifications or reclamation measures that may be necessary. Areas to be disturbed may require inventories or special studies to determine the extent of impacts to other resources. Lessee may be required to complete minor inventories or short term special studies under guidelines provided by lessor. If in the conduct of operations, threatened or endangered species, objects of historic or scientific interest, or substantial unanticipated environmental effects are observed, lessee shall immediately contact lessor. Lessee shall cease any operations that would result in the destruction of such species or objects.

Sec. 7. Production of byproducts—If the production, use, or conversion of geothermal resources from these leased lands is susceptible of producing a valuable byproduct or byproducts, including commercially demineralized water for beneficial uses in accordance with applicable State water laws, lessor may require substantial beneficial production or use thereof by lessee.

Sec. 8. Damages to property—Lessee shall pay lessor for damage to lessor's improvements, and shall save and hold lessor harmless from all claims for damage or harm to persons or property as a result of lease operations.

Sec. 9. Protection of diverse interests and equal opportunity—Lessee shall maintain a safe working environment in accordance with standard industry practices and take measures necessary to protect the health and safety of the public. Lessor reserves the right to ensure that production is sold at reasonable prices and to prevent monopoly.

Lessee shall comply with Executive Order No. 11246 of September 24, 1965, as amended, and regulations and relevant orders of the Secretary of Labor issued pursuant thereto. Neither lessee nor lessee's subcontractor shall maintain segregated facilities.

Sec. 10. Transfer of lease interests and relinquishment of lease—As required by regulations, lessee shall file with lessor, any assignment or other transfer of an interest in this lease. Lessee may relinquish this lease or any legal subdivision by filing in the proper office a written relinquishment, which shall be effective as of the date of filing, subject to the continued obligation of the lessee and surety to pay all accrued rentals and royalties.

Sec. 11. Delivery of premises—At such time as all or portions of this lease are returned to lessor, lessee shall place all wells in condition for suspension or abandonment, reclaim the land as specified by lessor, and within a reasonable period of time, remove equipment and improvements not deemed necessary by lessor for preservation of producible wells or continued protection of the environment.

Sec. 12. Proceedings in case of default—If lessee fails to comply with any provisions of this lease, and the noncompliance continues for 30 days after written notice thereof, this lease shall be subject to cancellation in accordance with the Act. However, if this lease includes land known to contain a well capable of production in commercial quantities, it may be cancelled only by judicial proceedings. This provision shall not be construed to prevent the exercise by lessor or any other legal and equitable remedy, including waiver of the default. Any such remedy or waiver shall not prevent later cancellation for the same default occurring at any other time.

Whenever the lessee fails to comply in a timely manner with any of the provisions of the Act, this lease, the regulations, or formal orders, and immediate action is required, the Lessor may enter on the leased lands and take measures deemed necessary to correct the failure at the expense of the Lessee.

Sec. 13. Heirs and successors-in-interest—Each obligation of this lease shall extend to and be binding upon, and every benefit hereof shall inure to, the heirs, executors, administrators, successors, or assigns of the respective parties hereto.

Geothermal Resources of Washington

Spring and Well Location System

Physiographic Provinces of Washington

Springs and Wells

Thermal Waters

Metric Conversion Factors

POPULATION KEY

Geothermal data compiled by M.A. Koseoff, K.L. Kaler, and J.E. Schuster, Washington Division of Geology and Earth Resources, Olympia, Washington, 1972 to 1979.

Thermal and Mineral Springs

County	Spring Name	Latitude	Longitude	Temperature	Flow	Notes
CLALLAM COUNTY	LITTLE WATERS HOT SPRING	47° 18' N	122° 05' W	120° F	100 gpm	
	OLYMPIC HOT SPRING	47° 15' N	122° 05' W	120° F	100 gpm	
	OLYMPIC HOT SPRING	47° 15' N	122° 05' W	120° F	100 gpm	
	OLYMPIC HOT SPRING	47° 15' N	122° 05' W	120° F	100 gpm	
CLATSOP COUNTY	GRUB RUN HOT SPRING	46° 15' N	123° 15' W	120° F	100 gpm	
	GRUB RUN HOT SPRING	46° 15' N	123° 15' W	120° F	100 gpm	
	GRUB RUN HOT SPRING	46° 15' N	123° 15' W	120° F	100 gpm	
	GRUB RUN HOT SPRING	46° 15' N	123° 15' W	120° F	100 gpm	

Thermal Wells

County	Well Name	Latitude	Longitude	Temperature	Flow	Notes
CLATSOP COUNTY	GRUB RUN HOT SPRING	46° 15' N	123° 15' W	120° F	100 gpm	
	GRUB RUN HOT SPRING	46° 15' N	123° 15' W	120° F	100 gpm	
	GRUB RUN HOT SPRING	46° 15' N	123° 15' W	120° F	100 gpm	
	GRUB RUN HOT SPRING	46° 15' N	123° 15' W	120° F	100 gpm	
CLATSOP COUNTY	GRUB RUN HOT SPRING	46° 15' N	123° 15' W	120° F	100 gpm	
	GRUB RUN HOT SPRING	46° 15' N	123° 15' W	120° F	100 gpm	
	GRUB RUN HOT SPRING	46° 15' N	123° 15' W	120° F	100 gpm	
	GRUB RUN HOT SPRING	46° 15' N	123° 15' W	120° F	100 gpm	

Source Reference for Wells

1	Washington State University, Pullman, well logs collected by James W. Crosby from 1972 to 1979.
2	Southern Methodist University, Dallas, Texas, and Washington Division of Geology and Earth Resources, Olympia, well logs and thermal gradient data collected by David D. Blackwell (D.D.B.) and J. Eric Schuster (J.E.S.) from 1971 to 1979.
3	U.S. Geological Survey, Tacoma, Washington, well logs collected from 1972 to 1979.
4	U.S. Geological Survey, Tacoma, Washington, well logs collected from 1972 to 1979.
5	Newcomb, R.C., 1972, Quality of the groundwater in the basin of the Columbia River group, Washington, Oregon, and Idaho: U.S. Geological Survey Water-Supply Paper 1972-1, 151 p.
6	Newcomb, R.C., 1965, Geology and groundwater resources of the Walla Walla River basin, Washington: Oregon-Washington State Division of Water Resources Water-Supply Paper 1965-1, 151 p.
7	Van Dusen, A.S., and Santos, J.F., 1965, Groundwater in Washington: its chemical and physical quality: Washington State Division of Water Resources Water-Supply Paper 1965-1, 151 p.