GEOTHERMAL RESOURCES
OPERATIONAL ORDERS

Issued under the Geothermal Steam Act of 1970

(DRAFT) GRO Order 5. Plans of Operation, Permits, Reports, Records and Forms

United States Department of Interior
Geological Survey
Office of Deputy Conservation Manager,
Geothermal

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UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
CONSERVATION DIVISION

GEOTHERMAL RESOURCES OPERATIONAL ORDER NO. 5

Effective _____

PLANS OF OPERATIONS, PERMITS, REPORTS, RECORDS, AND FORMS

AUTHORITY: This order is established pursuant to the authority prescribed in 30 CFR 270.11 and 270.12.

INTRODUCTION: This order contains information about plans, permits, reports, records, and forms required for geothermal operations conducted on Federal leases. Additional information not detailed in this order may be required by the Deputy Conservation Manager in support of required data. The former title "Area Geothermal Supervisor" (Supervisor) was changed in May, 1980, to Deputy Conservation Manager - Geothermal, and will be referred to herein as the "Deputy Conservation Manager" or "DCM". Written approval by the Deputy Conservation Manager must be received before commencing any activities other than casual use. However, emergency actions that involve an immediate need for protection of personnel, the public, or the environment may be taken without prior approval, provided that the DCM is promptly notified.

The requirements of this order apply to operations proposed by lessees

on Federal geothermal leases including lands with private surface ownership and Federal mineral ownership, and Federal lands committed to a Federal unit. Utilization facility construction on leased lands with private surface ownership is not subject to the provisions of this order. State and private lands committed to a Federal unit are subject to the provisions of this order only if the responsible State agency is agreeable to Federal regulatory control.

HOW TO SUBMIT INFORMATION: Six copies of plans and permit applications must be submitted; reports and records resulting from operations must be submitted in duplicate. Any proprietary information should be so designated and included in a manner which allows it to be easily separated from the non-proprietary portion. Information which may be considered proprietary by the DCM includes, but is not necessarily limited to, geological, geophysical, reservoir and financial data, interpretations of such data and trade secrets. All non-proprietary information submitted shall be available for inspection under the Freedom of Information Act. Information which has been previously submitted need not be resubmitted, but must be properly cross-referenced. All maps submitted with a plan or permit application should be on readily reproducible transparencies. Consolidation of information and cooperation with other lessees is encouraged to avoid duplication. Copies of USGS forms to be used to submit various information are appended to this order. Lessees or operators are encourged to consult with the DCM prior to preparation of plans of operations or applications for permits to conduct operations.

WHERE TO SUBMIT: Unless otherwise directed, all required plans, applications, and information should be submitted to the Deputy Conservation Manager - Geothermal, 345 Middlefield Road, Mail Stop 92, Menlo Park, CA 94025, telephone (415) 323-8111, Ext. 2841.

PLANS OF OPERATIONS (POO)

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 DCM and surface manager(s) 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. A copy of the approved plan and any special conditions of approval must be available at the worksite.

Exhibit 1 specifies information applicable to all plans of operation except for the Plan of Baseline Data Collection. Exhibit 2 is a flow diagram presenting a representative exploration program from lease issuance through resource utilization, and shows necessary application and regulatory procedures. Exhibit 3 presents the necessary applications and permits required to perform various exploration and development activities. In Exhibit 2 and 3 processing times are representative and are based on the applicant's initial submittal of all required information and where no unusal problems develop.

PLAN OF EXPLORATION (POE)

Exploration drilling to determine the existence, extent, quality, and commercial potential of a geothermal resource must be covered in a Plan of Exploration. However, activities which involve the search for evidence of the geothermal resource without major surface disturbances may not require approval of a plan. Activities not requireing a plan may be permitted by a Geothermal Exploration Permit. (See "Geothermal Exploration Permit" section, below).

WHEN TO SUBMIT: A Plan of Exploration must be submitted and approved prior to commencing exploration drilling which involves major surface disturbances and the drilling of holes to test or produce the resource. A plan may also be required for temperature gradient hole drilling in areas where harazardous subsurface geologic conditions are known or suspected or where the resource may be encountered.

REQUIREMENTS: The Plan of Exploration must include all information shown as Exhibit 1. It may cover a multiwell drilling program or just specific operations on localized portions of the lease; however, submittal of a broad plan proposing serveral drill sites or several alternatives to an activity is recommended. For multiwell or multisite programs, it is important to submit area-wide geological, geophysical, hydrological, and other environmental data.

ASSOCIATED APPROVALS: Approval of the Plan of Exploration does not authorize the lessee to initiate activities. Authorization is issued by the DCM by approval of:

1. USGS Form 9-1957, Geothermal Drilling Permit, or

2. USGS Form 9-1958, Geothermal Sundry Notice

(See "Geothermal Drilling Permit" and "Geothermal Sundry Notice" sections, below.)

APPLICABLE REFERENCES: 30 CFR 270.34 and Section 18 of lease Form 3200-21.

PLAN OF BASELINE DATA COLLECTION (PBDC)

Before submitting a Plan of Production, the lessee must collect environmental data for a period of at least one year. The data will be used to establish environmental baselines for the assessment of the effects of later production and utilization. Data shall be collected in accordance with an approved plan of baseline data collection. In areas where more than one lessee intends to produce the geothermal resource, lessees are encouraged to submit a cooperative plan.

WHEN TO SUBMIT: The baseline data collection program should begin as soon as a potentially producible resource has been identified. To ensure acceptability of the data gathered, it is recommended that the Plan of Baseline Data Collection be submitted and approved prior to any new data collection.

REQUIREMENTS: The Geothermal Environmental Advisory Panel (GEAP) has published a report, "Guidelines for Acquiring Environmental Baseline Data on Federal Geothermal Leases" (U.S. Department of the Interior, January, 1977), which can be obtained from the DCM. (These guidelines will be in lieu of Exhibit 1 requirements). The plan of baseline data collection shall describe how baseline data will be collected and the

frequency of reporting. The format of the plan will follow that suggested in the GEAP guidelines.

A final report covering the results of the entire study is to be submitted at the completion of the data collection period. The final report should contain a discussion of which parameters should be subsequently monitored and which shall be deleted and why. This applies to all parameters covered in the report, whether measured by the operator or his contractor or previously measured and included by reference in the report of baseline data. The DCM may require additional reporting in cases where usual reporting and interpretation are not adequate.

ASSOCIATED APPROVALS: The joint approval letter of the Plan of Baseline Data Collection will constitute a permit to proceed with the plan.

APPLICABLE REFERENCES: 30 CFR 270.34(k) and "Guidelines for Acquiring Environmental Baseline Data on Federal Geothermal Leases" (Geothermal Environmental Advisory Panel, U.S. Department of the Interior, January, 1977).

PLAN OF DEVELOPMENT (POD)

After the exploration phase, all additional drilling and construction (excluding utilization facility construction) which is necessary for initiation of commerical production must be covered in a Plan of Development.

WHEN TO SUBMIT: The Plan of Development should be prepared after determining the extent, characteristics, and performance of the reservoir and before full-scale subsurface and surface development of the resource for

commercial utilization. It may be combined with the Plan of Injection or Disposal and/or the Plan of Utilization, to expedite processing.

REQUIREMENTS: The Plan of Development must contain all appropriate information shown as Exhibit 1. It should also include:

1. Topographic Map (preferred scale 1:24,000, but not less than 1:63,360) showing:

   Location and spacing of all existing and proposed production and injection wells (distinguished by type) and their connecting pipelines and surface production and injection facilities; and location of the utilization facility.

2. Justification (using geologic and geophysical maps, cross sections, and other pertinent data) for the proposed location and spacing of wells including information about:

   a. Reservoir characteristics: Areal extent, thickness, geologic structure, lithology, temperatures, pressures, water analyses, enthalpy, porosities, permeabilities, etc.

   b. Reservoir performance characteristics: Productive area, producibility, and anticipated future performance.

   c. Hydrologic and geologic conditions.

   d. Methods to be used to prevent drainage of other lessees' geothermal resource and minimize interference with other land uses.

3. Representative Drilling Program describing:

   Drilling procedures; type of drilling equipment; zone of completion; casing, cementing, and mud programs; and safety provisions.

4. Downhole Production and Injection Equipment (operational description or drawings, capacities, etc.).

5. Surface Production Equipment Installations (pipelines, separators, metering systems, transmission lines, etc.): Operational descriptions or drawings, capacities, safety provisions, etc.

ASSOCIATED APPROVALS: Approval of the Plan of Development does not authorize the lessee to commence development operations. Authorization is issued by the DCM by approval of:

1. USGS Form 9-1957, Geothermal Drilling Permit, or
2. USGS Form 9-1958, Geothermal Sundry Notice.

(See "Geothermal Drilling Permit" and "Geothermal Sundry Notice" sections, below.)

APPLICABLE REFERENCES: 30 CFR 270.34. GRO Orders 2, 6, and 7

PLAN OF INJECTION OR DISPOSAL (POI)

Liquid well effluent must be disposed of in conformance with regulatory requirements. Injection may be required for subsidence control or reservoir recharge. The injection or disposal of geothermal effluent and associated byproducts must be covered by a Plan of Injection or Disposal.

WHEN TO SUBMIT: The Plan of Injection or Disposal may be submitted at the same time and in combination with the Plan of Development and the Plan of Utilization, to expedite processing.

REQUIREMENTS: The Plan of Injection or Disposal must include appropriate

items of information shown as Exhibit 1. In addition, a plan of waste disposal by injection must include documents 1, 2, 3, 10, and 11 below, and discussion of remaining items:

1. Topographic Map (preferred scale 1" = 1000'), showing all existing and proposed wells (distinguished by type), pipelines, and surface production, injection, and utilization facilities.

2. Subsurface Maps and Cross Sections showing structure and lithology of producing and injection zones.

3. Logs and Histories of wells penetrating the injection zone, if not previously submitted.

4. Injection Zone Characteristics: Volume capacity, geologic formation and structure, porosity, permeability, static formation pressures and temperatures, chemical analysis of zonal fluids and their anticipated reactivity with injected fluids, information about injectivity tests conducted and previous injection operations into the same or similar formations, etc.

5. Injection Fluid Characteristics: Quantity, source, chemical analysis and reactivity, toxicity, temperature, etc.

6. Hydrology, including:

   Quantity and analyses of ground water and predicted effects of injection on surface and ground water.

   Identify existence (or lack) of fresh drinking water aquifers. If present,

address how these aquifers will be protected in compliance with applicable regulations.

7. Local Tectonic Conditions and predicted seismic effects of injection.
8. Available Subsidence Data and the discussion of implications of the injection on subsidence control.
9. Proposed Drilling Programs describing:

   Type of drilling procedures and equipment; zone of completion; casing, cementing, and mud programs; and safety provisions.
10. Downhole Production and Injection Equipment (operational drawings, capacities, etc.).
11. Injection Facilities, Pipelines and Metering Equipment: Engineering design plans and descriptions detailing system capabilities, capacities and safety control devices which will demonstrate pollution prevention requirements of GRO Order No. 6.
12. Injectivity Surveys and other means to monitor injection activities.

A plan for waste disposal (including solid and liquid byproducts) by means other than injection must include:

1. Disposal Facilities (equipment with flowline drawings).
2. Processing, Treatment, and Disposal Methods.
3. Waste Volume.
4. Hydrology, including:

   Location and quality of surface and ground water and in particular, existing or potential fresh drinking water aquifers, which may be affected and their chemical compatibility with waste liquids; chemical analyses and reactivity of all fluids; and methods for maintaining

separation of waste from natural water systems. If fresh drinking water acquifers underlie the disposal area, it must be clearly shown that the disposal system will be in compliance with all applicable regulations and standards protecting such drinking water sources.

5. Monitoring and Recordkeeping Methods.

ASSOCIATED APPROVALS: Approvals of the Plan of Injection or Disposal does not authorize the lessee to perform disposal operations. Authorization is issued by the DCM by approval of:

1. USGS Form 9-1957, Geothermal Drilling Permit, or
2. USGS Form 9-1958, Geothermal Sundry Notice.

(See "Geothermal Drilling Permit" and "Geothermal Sundry Notice" sections, below.)

APPLICABLE REFERENCES: 30 CFR 270.41 and Section 9 of GRO Order No. 4.

PLAN OF UTILIZATION (POU)

Any utilization facility construction, and utilization and transmission of the resource products must be covered in a Plan of Utilization which the facility operator must prepare.

WHEN TO SUBMIT: A Plan of Utilization must be submitted prior to constructing either electric or direct use geothermal resource utilization facilities on a Federal lease. When surface rights and mineral rights are separated (e. g., Stock Raising Homestead Act lands), the lessee should consult with the DCM, on a case-by-case basis, as to whether a Plan of

Utilization will be required. To expedite preparation and processing, the plan may be submitted either separately or in combination with the Plan of Development and the Plan of Injection or Disposal.

REQUIREMENTS: The Plan of Utilization should present a general overview of the proposed facility and its operation. Detailed engineering design plans and specifications for actual construction should be submitted with the Geothermal Utilization Permit application. Certain requirements of this part may be waived or modified when the DCM determines such requirements are not necessary for the proper consideration of the Plan of Utilization (e. g., individual well site generators, small scale direct use facilities). Operators are urged to contact the DCM for guidance in such situations. The Plan of Utilization should include the appropriate information shown in Exhibit 1 and the following:

1. Information about proposed structures, equipment, and support facilities, including:
   a. Topographic map (preferred scale 1:6000 in lieu of item 2a, Exhibit 1, showing:
      Facilities and production and injection wells (distinguished by type), power transmission lines, Federal and private lease boundaries and serial numbers, existing and planned access roads, source of road building materials and other pertinent features.
   b. Description, purpose and operation procedures for each facility or important components of the facility.
   c. Schematic flow diagram of the important components of each facility.
   d. Plan of proposed architectural landscaping.

e. Time Schedule for installation and start-up of the facility, including designing of the plant, acquiring materials, construction, and prestart-up testing.

f. Number of Personnel necessary to operate the facilities.

g. Schedule for testing and maintaining safety devices.

2. Facility-Site Suitability Studies conducted and planned, including reports, logs, laboratory reports, and raw data obtained from geological, geotechnical and soil bearing surveys.

3. Water Supplies: Source, quality, consumption rate, and planned use.

4. Disposal Methods for waste water, solid wastes, and noncondensible gases, other than these covered in a Plan of Injection.

5. Narrative Statement (in lieu of Item 3, Exhibit 1) containing: Measures to prevent or control fires, pollution of surface and ground water, air and noise, pollution, hazards to public health and safety, and damage to fish, wildlife, natural resources, and areas of cultural, historical, or archeological value.

6. Program for monitoring operations to assure compliance with noise, air, hazardous wastes, and water quality standards and regulations. The monitoring program shall complement the program presented in the Plan for Production. (See "Plan for Production" section, below.)

7. Abandoment and Reclamation Procedures.

8. Any additional data the DCM may require in support of the Plan of Utilization.

ASSOCIATED APPROVALS: Pursuant to 43 CFR 3250 permanent electrical power generation facilities of any capacity (other than a facility for an individual production well) will require issuance of a land use license by the Bureau of Land Management. Research and demonstration projects (non-electric or electric power generation facilities) of not more than 20 megawatt (MW) net capacity will not require a Bureau of Land Management land use license, unless retained for commerical operation beyond an initial five-year period. All of the above will require approval of a Geothermal Utilization Permit. Approval of the Plan of Utilization does not authorize the lessee to initiate construction and operation of utilization facilities. Authorization will be issued by the DCM by approval of:

1. USGS Form 9-1968, Geothermal Utilization Permit, and if necessary
2. USGS Form 9-1958, Geothermal Sundry Notice.

(See "Geothermal Utilization Permit" and " Geothermal Sundry Notice" sections, below.)

APPLICABLE REFERENCES: 30 CFR 270.2, 30 CFR 270.34-1, and 43 CFR 3250

PLAN FOR PRODUCTION (PFP)

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 must be covered in a Plan for Production.

WHEN TO SUBMIT: The Plan for Production must be submitted and approved prior to initiating production for commercial utilization (except

for approved test period) of the geothermal resource.

REQUIREMENTS: The Plan for Production must contain appropriate items of information shown in Exhibit 1, unless previously submitted, in which case they may be referenced. It must also include:

1. Proposed Policy on rates of production, commingling, use of byproducts, remedial work, infill drilling, maintenance, shutdown and start-up, etc.
2. Data to be collected (pressures, temperatures, etc.) and methods to be used for determining and evaluating past and predicting future reservoir performance. The DCM may require scheduled reports and/or reviews of reservoir performance throughout the life of the project.
3. Details of the methods of calculating Federal royalty.
4. Sales contracts or any other agreements not previously submitted.
5. Monitoring Program for noise, air and water quality, seismic and land subsidence activity, and the ecological system other than (or in conjunction with) that covered under the Plan of Utilization.

ASSOCIATED APPROVALS: Before submission of a Plan for Production, the lessee must collect environmental data for a period of at least one year. A Plan of Baseline Data Collection should be submitted and approved prior to any data collection. The collected data must be submitted for approval in a baseline data report before or with the Plan for Production. (See "Plan of Baseline Data Collection" section, above and "Baseline Data Report" section, below.) In addition to an approved Plan for Production, an appropriate permit and plan of operation may be required before commencing various post-development

activities. (See "Geothermal Sundry Notice and Geothermal Drilling Permit sections, below.)

APPLICABLE REFERENCES: 30 CFR 270.34.

P E R M I T S

GEOTHERMAL EXPLORATION PERMIT

A permit is required for any exploration operations on Federal lands which involve the search for evidence of geothermal resources, such as geophysical surveys and drilling and coring of temperature gradient holes. A permit is not required for casual use exploration activities, however.

For exploration activities on unleased lands, or lands leased to other than the applicant, the exploration permit is issued by the appropriate surface management agency (either Bureau of Land Management or Forest Service).

For exploration activities on lands under lease to the applicant, a Geothermal Exploration Permit must be obtained from the DCM. A Geothermal Exploration Permit may only be used to permit activities not connected with an approved plan of operation. In addition to the above activities the permit may be required for the brushing of roads and off-road vehicle use associated with exploration activities, and may also be required for geotechnical site suitability studies.

WHEN TO SUBMIT: A permit application must be filed and approved prior to initiating any exploration operations.

REQUIREMENTS: To obtain a permit, the lessee must submit;

1. USGS Form 9-1956, Geothermal Exploration permit.
2. Brief Explanation of Proposed Operations.
3. Topographic Map (preferred scale 1:24,000, but not less than 1:63,360) showing the lease boundaries and serial numbers and proposed station points, drill sites, access roads, etc..
4. Description of Proposal, including the information required by GRO Order No.1.
5. Certified Statement of the presence or absence of any cultural, historical, or Native American religious site which may be disturbed by proposed surface disturbing activities, e.g. temperature gradient hole drilling. The statement must be made by a person acceptable to the surface manager, and copies must be submitted to the surface manager and DCM.

ASSOCIATED APPROVALS: A plan is not required to permit exploration operations; however, an approved Plan of Exploration may be required for certain activities, such as deep gradient holes where a potentially hazardous geologic environment is suspected, where the resource may be encountered, or where significant surface disturbance may be necessary for site access or preparation. (See "Plan of Exploration" section, above.) Site suitability surveys involving trenching or road construction in preparation for the submittal of a Plan of Operation require approval by the DCM and concurrence by the surface manager. Such site suitability surveys may be obtained via a Geothermal Exploration Permit. An exploration permit expires one year from the date of issue. All operations must be

completed and abandoned within that time, unless a written request for an extension is approved by the DCM.

APPLICABLE REFERENCES: 30 CFR 270.2, 30 CFR 270.78, GRO Order No.1, and Section 18 of Lease Form 3200-21.

GEOTHERMAL DRILLING PERMIT

A geothermal drilling permit is required for each well drilled to determine the presence of, test, develop, produce, or inject the geothermal resource. An approved copy of Form 9-1957 and the drilling program, with any special stipulations or conditions of approval, must be available at the worksite during operations.

WHEN TO SUBMIT: A permit application must be filed and approved prior to drilling, redrilling, deepening, or plugging back wells. Necessary access road construction and drill site preparation may be authorized by the Drilling Permit or by separate Sundry Notice. The application may be filed at the same time as any plan which proposes drilling, to expedite processing. However, the Drilling Permit will not be approved until such plan has been approved.

REQUIREMENTS: To obtain approval for drilling, the lessee must submit:

1. USGS Form 9-1957, Geothermal Drilling Permit
2. Detailed Drilling Program, including:
    a. Chronological description of drilling plans indicating depths, hole sizes, tests, logging runs etc.

18. b. Blowout prevention equipment. Include:

A drawing showing installation, types, rating, landing heads, and auxiliary equipment for each stage of drilling; proposed accumulator and backup systems; and testing procedures (including advance notification of USGS for witnessing).

c. Casing: Size, weight, grade, condition, design criteria (safety factors, including burst, collapse, tension, and thermal stress allowances), couplings, proposed landing depths and perforated intervals, number and size of perforations or slots, and pressure testing procedures (including advance notifications of USGS for witnessing).

d. Cement: Quantities, type, additives, desired fill, excess to be used, and testing or recementing procedures to insure desired fill and cement bond.

e. Directional measurements to be taken. If the well is to be directionally drilled, include plan and profile drawings and coordinates or bearing to projected hole bottom.

f. Circulating media: Type, additives, cooling measures, reserve supplies kept onsite, toxicity and protective measures for any toxic materials, and noise and dust control procedures for air drilling.

g. Completion wellhead: Manufacturer, type, design specifications (pressure and temperature ratings, etc.), and drawing showing wellhead, valve assembly with auxiliary outlets, etc. Use API recommended nomenclature.

h. Formation evaluation: Proposed methods and tools for coring,

and mud and borehole logging.

i. Drilling hazards: A brief summary of previous drilling experience in the immediate area. Description of suspected zones of severe lost circulation, high gas or water pressure, hydrogen sulfide gas, etc., and safety equipment to handle any hazards.

j. Drilling equipment: Type and capacity rating of rig, pumps, and accessory equipment.

k. Production testing: Details about surface piping and facilities, measurement of flow rates and temperatures, fluid sampling, and containment or disposal.

l. Abandonment: Proposed abandonment procedures compliant with GRO Order No. 3.

3. Plat: A plat (scale not less than 1:24,000) shall accompany each application to drill a new well. The plat shall show the surface and expected bottom hole locations and the distances from the nearest section or tract lines or corners, as shown on the official plat of survey or protracted survey, with bearings of those lines (if available). Located section survey markers should be indicated. The method of obtaining the final ground level should be indicated (topographic map, surveyed, etc). A plat of the preliminary location and elevation will be acceptable, but shall be followed by the final official surveyed location and elevation above sea level after the location is completed.

4. Geological, Geophysical, and Hydrological Conditions. Describe briefly: General geologic evironment; anticipated reservoir type, estimated depths and types of formations to be drilled, and temperature profile; and anticipated kind and quality of production.

(Previously submitted data on an area may be referenced rather than resubmitted.)

ASSOCIATED APPROVALS: A plan which proposes deep drilling must be submitted and approved before a drilling permit will be issued. (See "Plan of Exploration", "Plan of Development", and "Plan of Injection or Disposal" sections above.) Drill site and access road construction may be commenced before the permit is issued if the plan has been approved. In such cases, approval for construction can be obtained with a USGS Form 9-1958, Geothermal Sundry Notice. A Sundry Notice may also be required for other activities, such as subsequent production testing and for changes in a drilling program in progress.
(See "Geothermal Sundry Notice" section, below.)

APPLICABLE REFERENCES: 30 CFR 270.71 and GRO Orders No. 2 and 3.

GEOTHERMAL SUNDRY NOTICE

A Geothermal Sundry Notice may only be used for certain miscellaneous activities where the proposed activity is within the area of operations established by a previously approved Plan of Operation, and which can be conducted without additional surface disturbance.

The following may be authorized by an approved Sundry Notice:

1. Drill Site Preparation Activities (if conducted before the Geothermal Drilling Permit is issued): Surveying; constructing access roads, well pads and sumps; digging cellars; and setting conductor pipe.
2. Changes to Approved Plans or Permits: Proposed total depth, casing

sizes, and cementing depths; powerplant installations; etc.

3. Subsequent Well Operations: Repairing, testing, shooting, or plugging and abandoning wells; stimulating or changing the method used to produce the well; altering casing or liner; changing or reconditioning downhole production or injection equipment; converting a formation or well for fluid injection; production/injection tests (when not covered by the Drilling Permit).
4. Construction or Alteration of surface production facilities and of phases of construction of a utilization facility when complete construction plans were not submitted with the utilization permit application, or subsequent alternations of a utilization facility. (See "Geothermal Utilization Permit" section, below.)
5. Other activities not previously covered by, but connected with, an approved Plan of Operations.

WHEN TO SUBMIT: Prior to initiating certain miscellaneous activities, written request to do work must be approved by the DCM. Application is made by submitting USGS Form 9-1958, Geothermal Sundry Notice.

REQUIREMENTS: The Sundry Notice should include a detailed description of the proposed operations. When proposing subsequent well operations, include current mechanical and production status of the well (casing details and condition, effective depth, etc), reason for proposal, remedial program, proposed starting date and anticipated duration.

ASSOCIATED APPROVALS: Sundry Notices covering the above activities will be approved only if within an existing area of operations and there will be no further significant surface disturbance than that anticipated by

operations approved under a plan. In an emergency, oral approval may be obtained for an activity, but a Sundry Notice must subsequently be filed.

APPLICABLE REFERENCES: 30 CFR 270.17, 30 CFR 270.34, 30 CFR 270.35, 30 CFR 270.45, 30 CFR 270.71-1, 30 CFR 270.72, 43 CFR 3205.3-8, and GRO Order No. 3.

GEOTHERMAL UTILIZATION PERMIT

The Geothermal Utilization Permit (USGS Form 9-1968) requires a two step approval. First approval authorizes construction and prestart-up testing of the facility. Geothermal Sundry Notices (Form 9-1958) may be used to authorize various phases of facility construction when construction plans are not submitted with the initial application, however, approval of these permits must follow the first approval of the Geothermal Utilization Permit. The second approval of the Utilization Permit authorizes the operation of the facility. Such approval can be made after evaluation of the prestart-up testing results submitted by the lessee. Where surface and mineral rights are under separate ownership (e.g., Stock Raising Homestead Act of 1916 lands), the facility operator should consult with the DCM, on a case-by-case basis, as to whether a Utilization Permit under this Order is required.

WHEN TO SUBMIT: The permit application must be submitted for first step approval prior to facility construction and prestart-up testing. Concurrent submittal with the Plan of Utilization is recommended for timely approval. After construction and testing, the original or a copy of the signed Utilization Permit must be submitted with the prestart-up test results for

second step approval to operate the facility.

REQUIREMENTS: To obtain a permit, the lessee must submit:

1. USGS Form 9-1968, Geothermal Utilization Permit.
2. Plat: An official surveyor's plat (scale not less than 1:24,000) showing elevation at ground level and location of the facility and all related sites by distances from the nearest section or tract lines or corners.
3. Detailed Engineering Design Plans and Specifications for all construction of principal and related facilities, power transmission lines, and facility sites, including road construction and improvement. Each drawing submitted should contain an original signature of the supervising registered engineer.
4. A list of all state, county and other local agencies and private organizations, including professional consultants, who have conducted or will conduct independent reviews of criteria, analyses and designs for verification of sound design practice and compliance with applicable codes and standards. The permit will not be granted until the extent of independent review is deemed adequate by the DCM. In order to expedite processing of the Utilization Permit application, the DCM may require additional independent design review, funded by the applicant.
5. Operating Plan containing procedures and standards to operate and maintain the facility.
6. Planned Metering to determine facility input and output.
7. Proposed sampling and chemical analyses program to monitor fluid flow

stream through facility, including byproducts.

8. Schedule and Procedures for installation and prestart-up testing of all equipment and commencement of operations for commercial utilization of resources.

ASSOCIATED APPROVALS: A plan of utilization must be submitted and approved before a Geothermal Utilization Permit will be issued. Sundry Notices may be used to approve the construction activities in phases or stages. (See "Plan of Utilization" section, above.)

APPLICABLE REGULATIONS: 30 CFR 270.60, 30 CFR 270.61, 30 CFR 270.71-1, and 30 CFR 270.72.

REPORTS

COMPLETION OF EXPLORATION OPERATIONS

A completion report must be submitted for exploration operations permitted by a Geothermal Exploration Permit.

WHEN TO SUBMIT: The report should be filed within 30 days after completion of activities. The DCM may, however, require submittal of available data prior to full completion of all scheduled activities.

REQUIREMENTS: Submit data and information required by GRO Order No. 1, properly identified as to lease and Exploration Permit number.

ASSOCIATED APPROVALS: USGS Form 9-1956, Geothermal Exploration Permit. Completed operations must be left in a condition acceptable to the District Geothermal Supervisor.

APPLICABLE REFERENCES: GRO Order No. 1.

GEOTHERMAL WELL COMPLETION REPORT

A completion report must be submitted for wells drilled under a Geothermal Drilling Permit, including all newly drilled and completed wells and old wells which have been deepened, redrilled, or plugged back.

WHEN TO SUBMIT: The report should be filed within 30 days after release of the drilling rig. If results of production tests, water analyses, etc. are not available within this time period, such data shall be submitted in subsequent reports.

REQUIREMENTS: The lessee must submit in duplicate:

1. USGS Form 9-1960, Geothermal Well Completion Report.
2. Chronological History of all operations conducted on the well, giving complete details of drilling, cementing, formation and production tests, and geologic or reservoir phenomena (downhole problems, lost circulation zones, steam and/or water entries, etc).
3. Final Prints of all downhole logs run (electric, sonic, dipmeter, formation density, including 1" = 100' scale S.P. - resistivity logs, if available, etc.) and analyses of these logs (e.g., Saraband).
4. Results of Surveys Run: Temperature, fluid entry, etc.
5. Directional Survey Data: If directionally drilled, plan and profile drawings of the hole course, including projected hole bottom if not measured.
6. Analyses of produced liquids, gases and solid effluents.

7. Plat: An official surveyor's plat showing the final location and elevation of the well if different from the location submitted with the Geothermal Drilling Permit application.

8. Geologic Data:

   Complete geologist's lithologic log or mud log, geologic summary of drilling results, and geologist's reports to the operator.

9. Samples: A Split of all drill cuttings (if requested by the DCM) washed and bagged with intervals clearly labeled.

(Previously submitted data may be referenced by title and date submitted.)

ASSOCIATED APPROVALS: Well operations must be conducted in accordance with an approved USGS Form 9-1957, Geothermal Drilling Permit. (See "Geothermal Drilling Permit" section, above.)

APPLICABLE REFERENCES: 30 CFR 270.72 and 30 CFR 270.73.

GEOTHERMAL POLLUTION INCIDENT REPORT

All blowouts, spills, leaks, toxic or noncondensible gaseous emissions, or other incidents which may have a significant impact on the environment must be reported to the District as soon as possible but no later than 18 hours after the incident. If unable to contact the District Geothermal Supervisor, the DCM should be contacted directly.

WHEN TO SUBMIT: The initial report must be confirmed by a written report to the DCM and District Supervisors within 30 days after the incident.

REQUIREMENTS: The report should be submitted on USGS Form 9-1961, Geothermal Pollution Incident Report. With prior approval of the DCM,

standard pollution report forms (government, company, insurance carrier, computerized, etc.) may be used instead of Form 9-1961.

ASSOCIATED APPROVALS: Corrective measures taken in mitigation of the incident must be acceptable to the DCM.

APPLICABLE REFERENCES: 30 CFR 270.30 and Section 9.B. of GRO Order No. 4.

GEOTHERMAL ACCIDENT AND INJURY REPORT

All accidents and injuries must be reported to the DCM as soon as possible but within 24 hours of the occurrence.

WHEN TO SUBMIT: A written report must be filed not later than 15 days after the accident.

REQUIREMENTS: The report should be submitted on USGS Form 9-1962, Geothermal Accident and Injury Report. With prior approval of the DCM, standard forms (government, company, insurance carrier, computerized, etc.) may be used in place of Form 9-1962.

ASSOCIATED APPROVALS: Corrective and/or preventetive measures to prevent similar accidents must be acceptable to the DCM.

APPLICABLE REGULATIONS: 30 CFR 270.46.

MONTHLY REPORT OF GEOTHERMAL OPERATIONS

The lessee must file a complete report covering all lease activities (production, injection, drilling, exploration, etc) for each lease each

month, starting with the month in which operations conducted under an Exploration or Drilling Permit are started and continuing until the lease is terminated or the DCM authorizes omission of the report.

WHEN TO SUBMIT: The report must be submitted on or before the last day of the succeeding month, unless an extension is granted by the DCM.

REQUIREMENTS: The report should be filed on USGS Form 9-1963, Monthly Report of Geothermal Operations. With prior approval of the DCM, computerized or other special forms may be used in lieu of Form 9-1963. The DCM may from time to time require cumulative production and injection data by well, lease, reservoir, formation, or field.

ASSOCIATED APPROVALS: None

APPLICABLE REFERENCES: 30 CFR 270.74, and Section 9.C.(2) of GRO Order No. 4.

MONTHLY REPORT OF SALES AND ROYALTIES

Beginning with the month in which production is first sold or utilized, the lessee must file a monthly report of sales and royalties for each productive lease, unless otherwise authorized by the DCM.

WHEN TO SUBMIT: The report must be received by the DCM on or before the last day of the succeeding month together with the royalties due the United States. If the last day of the month occurs on a weekend or holiday the report and payment must be received by the last day of business for that month. In addition, the lessee must submit, within 30 days after its effective date, a copy of any sales contract (or utilization

agreement) for disposal of geothermal resources from the lease.

REQUIREMENTS: Prior to submittal of the first report, the DCM will determine what information is required and the form on which it must be submitted. The report should clearly show all of the critical data (volumes, factors, values, etc) and calculations used in arriving at the royalty value due the United States. Unless otherwise authorized by the DCM, this report is required for intermittent as well as continuing sales.

APPLICABLE REFERENCES: 30 CFR 270.49, 30 CFR 270.50 and 30 CFR 270.75.

ANNUAL REPORT OF EXPENDITURES FOR DILIGENT EXPLORATION OPERATIONS

If diligent exploration credit is desired, the lessee must file an annual report of expenditures for diligent exploration operations for that lease.

WHEN TO SUBMIT: The report must be submitted on or before the lease anniversary date.

REQUIREMENTS: The report must include an itemized list of expenditures for exploration activities performed during the lease year. Proprietary data, reports and results of all surveys for which expenditures are claimed should accompany the report if not previously submitted. The report should also indicate the desired mannner of allocation of expenditures toward all related leases.

APPLICABLE REFERENCES: 30 CFR 270.77 and 43 CFR 3203.5, NTL-79-01

ANNUAL REPORT OF COMPLIANCE WITH ENVIRONMENTAL

PROTECTION REQUIREMENTS

The lessee must submit an annual report on actions taken to comply with regulations and requirements for protection of the environment, if any action conducted on the lease during the preceding 12 months resulted in environmental impact. This report can be combined with the appropriate environmental quarterly report required by Section 12, Lease Form 3200-12.

WHEN TO SUBMIT: The report must be submitted on or before the lease anniversary date. No report will be required on inactive leases unless requested by the DCM. Related leases may be covered by one report.

REQUIREMENTS: The report must include:

1. Cover Page: Report title (including year), operator, lease serial number(s), location (section, township, range, base meridian, county, State, and field or KGRA name), lease date, report submittal date, and chronological activity list.
2. Chronological Description of all activities related to geothermal exploration, development, and production, giving dates and actions taken to protect the surface and subsurface environment. (A statement that no citations were received and operations were suspended is not sufficient.) Concerns that should be discussed for each activity include:

Noise, erosion, and pollution control; water and air quality; flora and fauna; aesthetics, antiquities, and historical sites; subsidence and seismic activity; sanitation and waste disposal; public access;

and rehabilitation activities. (Monitoring of various parameters and remote sensing using infra-red or other aerial color photography may be used to substantiate compliance with various requirements.)

3. If Pollution Incidents Occurred: Reference appropriate Pollution Incident Reports and discuss any changes or new development, and the effectiveness of corrective measures.

APPLICABLE REFERENCES: 30 CFR 270.76, Lease Form 3200-21.

BASELINE DATA REPORT

Before submitting a Plan for Production, the lessee must collect environmental data for at least one year so that baselines can be established before starting commercial production.

WHEN TO SUBMIT: Collected data must be submitted in a final report before the approval of the Plan for Production. During data collection, interim baseline data reports shall be submitted as required under the approved Plan for Baseline Data Collection. A final report covering the results of the entire study is to be submitted upon completion of data collection. The DCM may require additional reporting in cases where unusual reporting and interpretation are encountered.

REQUIREMENTS: Data submitted must include air and water quality, noise, seismic and land subsidence activity, species and abundance of vascular plants and vertebrate animals, and other topics as specified in the approved Plan for Baseline Data Collection. Data must be compiled, analyzed, and interpreted in an orderly manner, and the report shall

include: How the geothermal resources will be used; how the data was collected; clear, concise discussions of the data collected for each environmental parameter; and conclusions. The report must stand alone. If other reports are referenced, pertinent data must be summarized. A single report will suffice for all operators participating in a cooperative effort to collect baseline information.

The final report should contain a discussion of which parameters should be subsequently monitored and which should be deleted and why. This applies to all parameters covered in the report, whether measured by the operator or his contractor or previously measured and included by reference in the report of baseline data.

ASSOCIATED APPROVALS: Not applicable.

APPLICABLE REFERENCES: 30 CFR 270.34(k), "Guidelines for Acquiring Environmental Baseline Data on Federal Geothermal Leases" (U.S. Department of the Interior, January 1977).

ENVIRONMENTAL QUARTERLY REPORT

WHEN TO SUBMIT: If required by the DCM, the lessee must submit quarterly reports of environmental monitoring.

REQUIREMENTS: The reports must contain environmental data collected during lease development and subsequent operating activities. It must follow the format of the baseline data report or as otherwise specified by the DCM. (See "Baseline Data Report" section above.)

ASSOCIATED APPROVALS: Not applicable.

APPLICABLE REFERENCES: Section 12 of Lease Form 3200-21, Plan of Baseline Data Collection, Plan for Production.

MONTHLY REPORT OF FACILITY OPERATIONS

A monthly summation of facility operations for each individual production well, research and demonstration, or plant facility must be submitted by the facility operator, unless otherwise authorized by the DCM.

WHEN TO SUBMIT: The report for any month must be submitted on or before the last day of the following month. The first report must be made for the month in which initial operations and sales begin.

REQUIREMENTS: The report must be filed on a form and in a manner agreed to by the DCM.

APPLICABLE REGULATIONS: 30 CFR 270.74-1.

MISCELLANEOUS COMPLETION REPORTS

Completion reports are required for all miscellaneous well operations permitted by a Sundry Notice except for surface facility construction and where operations are reported in a Geothermal Well Completion Report, USGS Form 9-1960.

WHEN TO SUBMIT: The lessee must submit the report within 30 days after completion of the work.

REQUIREMENTS: The report must describe the activities performed and the results obtained. It must include records of any well logs or surveys,

if not previously submitted.

ASSOCIATED APPROVALS: The report may be submitted in a form convenient to the lessee. A copy of the approved USGS Form 9-1958, Geothermal Sundry Notice, must be attached to the report.

APPLICABLE REGULATIONS: 30 CFR 270.72.

RECORDS

During deep drilling activities, all pertinent well records must be made available at the worksite and field headquarters for use or inspection, unless otherwise directed by the DCM.

DAILY DRILLING REPORT AND RECORD

WHEN TO SUBMIT: Unless specifically otherwise arranged with the DCM, a daily telephone report must be made to the District Geothermal Supervisor during the drilling of any well approved by a Geothermal Drilling Permit.

REQUIREMENTS: The telephone report should be a chronological accounting of operations conducted and should include:

1. Depth: Total and plugged back.
2. Footage Drilled and hole size.
3. Drilling Fluid Characteristics:
   Weight or pressure (air drilling),
   Drilling fluid temperature in and out, and
   Drilling fluid losses.

4. Hole Deviation Surveys and, if directionally drilled, hole bottom coordinates.
5. Casing Run.
6. Cementing Details.
7. Logs and Surveys Run.
8. Drilling Problems: Tight hole, lost circulation, etc.
9. Tests:

   Formation or production test details, and

   Blowout preventer and casing tests.

APPLICABLE REGULATIONS: 30 CFR 270.37.

WELL LOGS AND SURVEYS

WHEN TO SUBMIT: During operations, field prints or working copies of the following must be submitted to the DCM and District Geothermal Supervisor:

1. All Downhole Logs (electrical, radioactive, formation density, etc): one copy each to the DCM and District Geothermal Supervisor immediately after running.
2. Temperature and Fluid Entry Surveys: One copy each to the DCM and District Geothermal Supervisor immediately after running.
3. Mud Logging Results: One copy each to the DCM and District Geothermal Supervisor on completion of a data page.

REQUIREMENTS: The following records must be kept at the worksite:

1. Data and Plots for directional surveys and mud logging.
2. Field Prints of downhole logs.

3. Temperature and Fluid Entry Surveys.

4. Fluid Sampling Results.

5. Core Recovery and Description.

APPLICABLE REGULATIONS: 30 CFR 270.37.

SERVICING RECORDS

REQUIREMENTS: Working copies of the following well service records must be kept at the worksite, and copies must be made available to the DCM when requested: Cementing, stimulation, perforation, acidizing, and formation fracturing reports; casing, drill pipe, and other downhole component measurements; fishing tool reports; etc.

APPLICABLE REGULATIONS: 30 CFR 270.37.

COMPANY RECORDS

REQUIREMENTS: Copies of all geologic, geophysical, stratigraphic, structural, engineering, and environmental studies, reports, and records must be made available to the DCM, when requested.

SAFETY RECORDS

REQUIREMENTS: Records of safety meetings, safety devices installed at the worksite, and work crew drills on contingency plan procedures must be available at the worksite.

BASIC INFORMATION FOR PLANS OF OPERATION

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 adjancent 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;

      Homes 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 ground water, air and noise pollution, hazards to public health and safety, and damage to fish, wildlife, 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 of the presence of or absence 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 DCM. 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:

Accident and injury contingency plan for all plans; a blowout contingency plan where drilling is proposed; and when required by the DCM, 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: 30 CFR 270.34 and Section 18 of Lease Form 3200-21.

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; and

Local economy.

Sites of cultural, historical, or archeological value; and

Wildlife migration routes, watering holes, and habitats.

Exhibit 3. APPLICATIONS AND REPRESENTATIVE PROCESSING TIMES FOR VARIOUS GEOTHERMAL ACTIVITIES

ACTIVITY	MUST BE ADDRESSED IN						ACTIVITY AUTHORIZED BY				PROCESS TIME	REFERENCE PAGE(S)
	POE	PBDC	POD	POI	POU	PFP	GEP	GDP	GUP	SN		
Casual Use							Advance notice required for expenditures to qualify as diligent exploration expenditures				None	16
Aerial Surveys												
Geologic Mapping												
Surveying												
Water Sampling												
Exploration Operations												
Areal Geopyhsical Surveys							x				30 days maximum	16-17
Temperature Gradient Hole Drilling and Coring (max. 3000 feet)							x					
Exploration Drilling and Testing												
Geotechnical Site Study											30 days maximum	16-17
With trenching or road construction							x					
No trenching or road construction							x					16-17
Well Pad and Access Road Construction	x							x		x	3-6 months	3-4, 17-21, Exh. 1
Exploratory Well Drilling	x							x				
Well Testing												
Additional surface disturbance	x									x	3 months maximum	3-4, 21-22
No additional surface disturbance										x	15 days maximum	21-22
Development												
Geotechnical Site Study											30 days maximum	6-8, 16-17
With trenching or road construction			x				x					
No trenching or road construction							x					16-17
Well Pad and Access Road Construction			x	x				x		x	4-6 months	6-11, 17-22, Exh. 1
Injection Well Drilling				x				x				8-11, 17-21, Exh. 1
Production Well Drilling			x					x				6-8, 17-21, Exh. 1
Pipeline Construction			x							x		6-8, 21-22
Well Testing (production and injection)												
Additional surface disturbance			x	x						x	3 months maximum	3, 6-11, 21-22
No additional surface disturbance										x	15 days maximum	21-22
Injection facilities construction				x						x		8-11, 21-22
Production facilities construction			x							x	2-6 months	6-8, 21-22
Later construction on same site										x		21-22
Alteration										x	15 days maximum	
Production and Utilization												
Geotechnical Site Study											30 days maximum	11-14, 16-17
With trenching or road construction					x		x					
No trenching or road construction							x					16-17
Site Construction					x				x	x	3-18 months	11-14, 21-24
Facility Construction					x				x	x		11-14, 21-24
Power Transmission Line Construction					x				x	x		
Facility Operation					x				x			11-14, 23-24
Production						x					45 days	14-15
Injection or Disposal (incl. byproducts)				x							4-6 months	8-11
Environmental Data Collection												
Baseline Data Collection (pre-development operations - one year minimum)		x									45 days maximum	5-6
Environmental Monitoring (post development operations)					x	x						11-5
Miscellaneous Activities												
Abandonment											15-30 days	11-14, 21-22
Utilization facility					x					x		
Well								x		x	7 days	17-22
Changes to Approved Plans or Permits										x		
Subsequent Well Operations												
Acidize										x	7 days	21-22
Casing changes										x		
Convert to injection well										x		
Deepen								x			7-15 days	17-21
Directionally drill								x			1-15 days	
Fracture test										x		
Perforate										x	7 days	21-22
Plug back								x				17-21
Redrill								x			7-15 days	17-21
Repair										x		21-22

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 acitivity 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 togther is encouraged.

APPENDIX
(Forms)

Form USGS 9-1955

Form approved
Budget Bureau No.

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 270.80, 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.

Form: USGS 9-1956

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY, CONSERVATION DIVISION

Form Approved
Budget Bureau No. _____

GEOTHERMAL EXPLORATION PERMIT

.... 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

2. ADDRESS OF LESSEE/OPERATOR

3. CONTRACTOR(S) ADDRESS

12. TYPE OF OPERATIONS TO BE CONDUCTED (give brief description)

13. Exploration operations will be conducted during the period (date)

from: to:

4. LEASE SERIAL NO.

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

6. UNIT AGREEMENT NAME

7. PERMIT NO.

8. FIELD OR AREA

9. SEC. T., R., B.& 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, GRO 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 operation(s).

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.

(See instructions on reverse side)

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 Include coordinate locations for all proposed holes from the nearest section corner. Attach a map or maps of sufficient scale to clearly show al. tinent 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.

Form: USGS 9-1957

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY, CONSERVATION DIVISION

Form Approved
Budget Bureau No. _____

GEOTHERMAL DRILLING PERMIT

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

4. LEASE SERIAL NO.

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

1a. TYPE OF WORK: DRILL NEW WELL ( ) REDRILL ( ) DEEPEN ( ) PLUG BACK ( ) DIRECTIONALLY DRILL ( ) OTHER ( )

6. UNIT AGREEMENT NAME

1b. WELL TYPE: PRODUCTION ( ) INJECTION ( ) HEAT EXCHANGE ( ) OBSERVATION ( ) WATER SUPPLY ( ) OTHER ( )

7. WELL NO. | 8. PERMIT NO.

1c. WELL STATUS:

2. NAME OF LESSEE/OPERATOR

9. FIELD OR AREA

3. ADDRESS OF LESSEE/OPERATOR

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

15. LOCATION OF WELL
At surface

At proposed prod. zone

11. COUNTY

16. DISTANCE FROM PROPOSED LOCATION TO NEAREST PROPERTY OR LEASE LINE

12. STATE

17. DISTANCE FROM PROPOSED LOCATION TO NEAREST WELL, DRILLING, COMPLETED, OR APPLIED FOR ON THIS LEASE

13. APPROX. STARTING DATE

14. ACRES ASSIGNED (WELL SPACING)

18. DRILLING MEDIA AND CHARACTERISTICS: AIR ( ) WATER ( ) MUD ( ) FOAM ( ) Other ( )

19. PROPOSED DEPTH
MEASURED:
TRUE VERTICAL:

20. ELEVATIONS: ESTIMATED ( ) FINAL ( )
REFERENCE DATUM: GR ( ) MAT ( ) DF ( ) 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	SETTING DEPTH 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 require- . 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 ncy 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=observatio 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

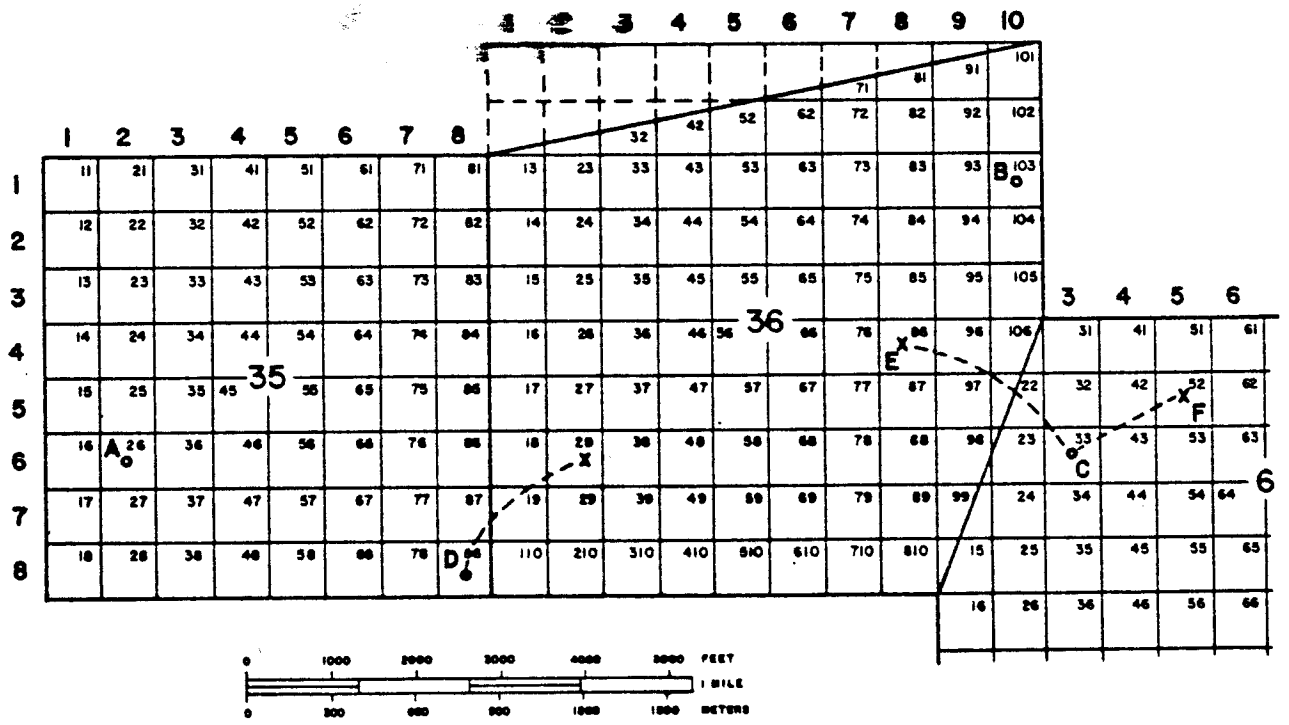
1. Subdivide the sections where the wells are to be located into 10-acre (660 feet X 660 feet) subdivisions. Number each horizontal and vertical subdivision starting in the northwest corner of each section with 1, 1 and increasing to the east and south. A regular 640-acre section contains 64 subdivisions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



Form: USGS 9-1958

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY, CONSERVATION DIVISION

Form Approved
Budget Bureau No. _____

GEOTHERMAL SUNDRY NOTICE

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

4. LEASE SERIAL NO.

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

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

6. UNIT AGREEMENT NAME

1b. WELL STATUS:

7. WELL NO.

8. PERMIT NO.

2. NAME OF LESSEE/OPERATOR

9. FIELD OR AREA

3. ADDRESS OF LESSEE/OPERATOR

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

13. LOCATION OF WELL OR FACILITY

11. COUNTY

12. STATE

14. TYPE OF WORK

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

is 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 thermal Lease Terms and Stipulations and other regulatory requirements. The United States Criminal Code (18 U.S.C. 1001) makes it a criminal offense 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 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, F=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 spac 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.

Form: USGS 9-1960

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY, CONSERVATION DIVISION

Form Approved
Budget Bureau No. _____

GEOTHERMAL WELL COMPLETION REPORT

S. Geological Survey requires this form or other Supervisor approved form to be prepared and filed in ...cate with requisite attachments with the Supervisor within 30 days after completion of permitted oper-...ns.

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 ( ) DF ( ) KB ( ) RT ( ) CASINGHEAD FLANGE ( ) OTHER ( )

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

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., B.& 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

23. LOG TYPE & INTERVALS

CASING RECORD

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

25. LINER RECORD

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

26. TUBING RECORD

Size	Weight	Grade	Depth Set	Packer Depth

27. CEMENT SQUEEZE, ACID, FRACTURE, ETC. (detail type, amount, intervals

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 by knowledge.

SIGNED: _____ TITLE _____ DATE _____

...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 ...egulatory 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.

(See instructions on reverse side)

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 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.

33. WELL TEST

TEST DATE	PRODUCTION METHOD: FLOWING ( ) OTHER ( )	POMPING ( ) - include size, type, intake depth, etc.

34. PRODUCTION

HOURS TESTED	PRODUCTION DURING TEST			ENTHALPY (Btu/lb)
	TOTAL LIQUIDS (lb)	STEAM (lb)	WATER (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		
	at _____ feet		at top of perfs.	TOTAL (lb/hr)	STEAM (lb/hr)	WATER (lb/hr)
WELLHEAD:						
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

Form [illegible]

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY, CONSERVATION DIVISION

Form Approved
Budget Bureau No. _____

GEOTHERMAL 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 [illegible]tion incident.

[illegible]TE OF REPORT

2. NAME OF LESSEE/OPERATOR

3. ADDRESS OF LESSEE/OPERATOR

13. INCIDENT DATE AND TIME

14. DURATION (Days/Hours)

15. WEATHER AND WIND CONDITIONS

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., B. & M.

11. COUNTY

12. STATE

16. TYPE OF POLLUTION

17. EXTENT OF POLLUTION (attach map of involved area)

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)

USGS APPROVAL: YES _____ NO _____

(Use additional pages if needed)

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.

SIGNED _____ TITLE _____ DATE _____

(This space for Federal use)

Oral report received by _____ Field Inspection by _____

Date _____ Time _____

Potential environmental damage and pertinent remarks:

[illegible]eport 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 [illegible]ory requirements. Failure to report in a prescribed manner can result in shutting down operations, suspension and/or recommendation of cancel-[illegible] 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 occur

ITEM 13: If the accident occurred at a drill site, locate the area of occurrance in relation to the nearest structure or equipment. Accidents occurr 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:

Form USGS 9-1962

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY, CONSERVATION DIVISION

Form Approved
Budget Bureau No. _____

GEOTHERMAL ACCIDENT AND INJURY REPORT

U.S. Geological Survey requires this form or other Supervisor approved form to be prepared and ed 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.

3. LEASE SERIAL NO.

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

5. UNIT AGREEMENT NAME

1. NAME OF LESSEE/OPERATOR

6. WELL NO. | 7. PERMIT NO.

2. ADDRESS OF LESSEE/OPERATOR

8. FIELD OR AREA

9. SEC. T., R., B. & 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.

(See instructions on reverse side)

Form: USGS 9-1963

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY, CONSERVATION DIVISION

Form Approved
Budget Bureau No

MONTHLY REPORT OF GEOTHERMAL OPERATIONS

The U.S. Geological Survey requires this form or other Supervisor approved form (computerized, company, State, etc.) to be prepared for each month beginning with the month in which drilling is initiated and filed in duplicate with the Supervisor, on or before the last day of the month following unless exception is granted by the Supervisor.

The following is a complete and accurate report of all operations and production for the Month of _____, 19_____.

Signed:_____ Title:_____ Date:_____

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. Field or Area

7. County

8. State

9. INDIVIDUAL WELL PRODUCTION

TWSP, RGE, SEC., B&M	WELL NUMBER	TYPE (STATUS)	DAYS PROD. OR INJ.	MONTHLY PRODUCTION OR INJECTION			PRODUCTION OR INJECTION RATE			AVERAGE		
				TOTAL (lb)	STEAM (lb)	WATER (lb)	TOTAL (lb/hr)	STEAM (lb/hr)	WATER (lb/hr)	TEMPERATURE IN °F	TEMPERATURE OUT °F	PRESS. psi

This report is required by law (30 U.S.C. 1023); regulations: 30 CFR 270.74; Federal Geothermal Lease Terms and Stipulations and other regulatory requ[illegible]nts. Failure to report in a prescribed manner can result in s[illegible]ing down operations, suspension and/or recommendation of cancel[illegible]on of l[illegible]30 U.S.C. 1011, 30 CFR 270.80, 43 CFR 3244.3). The United S[illegible]Criminal Code (18 U.S.C. 1001) makes it a criminal offense to[illegible]a will[illegible] false statement or representation to any Department or Agency[illegible]he United States as to any matter within its jurisdiction.

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, RGE, 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.

Form USGS 9-1968

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY, CONSERVATION DIVISION

Form Approved
Budget Bureau No. _____

GEOTHERMAL 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

2. NAME AND ADDRESS OF OPERATOR

3. NAME AND ADDRESS OF CONTRACTOR AND/OR FACILITY DESIGNER

13. TYPE OF FACILITY: INDIVIDUAL WELL ( ) RESEARCH & DEMONSTRATION ( ) PLANT ( ) OTHER ( )

ESTIMATED PROJECT LIFE:

14. LOCATION OF FACILITY (1/4, 1/4, 1/4 SECTION)

4. LEASE SERIAL NO. UPON WHICH FACILTY IS LOCAT

5. LEASE SERIAL NO(S). SERVING FACILITY

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

7. UNIT AGREEMENT NAME

8. WELL NO., FACILITY NO. OR DESIGNATION

9. FIELD OR AREA

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

11. COUNTY

12. STATE

15. NET GENERATING CAPACITY
ELECTRIC (MW) HEAT (Btu)

16. GROSS GENERATING CAPACITY
ELECTRIC (MW) HEAT (Btu)

17. NAME OF RESOURCE PURCHASER/USER (If other than lessee/operator)

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)