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HISTORY OF PRIOR FEDERAL ACTION
AND
NEPA DOCUMENTATION FOR NCPA PROJECT NO. 2

Jeffrey I. Daniels

November 1979

Lawrence
Livermore
Laboratory

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FOREWORD

This report was prepared as part of the Joint Environmental Study (JES) for the Northern California Power Agency Geothermal Project No. 2. The U.S. Department of Energy, the U.S. Department of Interior's Bureau of Land Management, and U.S. Geological Survey have also cooperated with the California Energy Commission in the preparation of the JES document.

ABSTRACT

This report documents the federal actions that were performed to ensure environmental protection during the leasing, exploration, development and utilization of geothermal resources on those public lands of The Geysers KGRA in California associated with the proposed Northern California Power Agency (NCPA) Geothermal Project No. 2. The proposed NCPA Geothermal Project No. 2 will be the first commercial geothermal power plant developed on public lands in the United States. Due to this fact, and because NCPA has applied for a federally guaranteed loan for a portion of the project financing, the review and authorization for utilization of the geothermal resource and the construction and operation of the power plant facilities is the responsibility of the California Energy Commission, the U.S. Geological Survey, the Bureau of Land Management and the U.S. Department of Energy. Approval for development of these geothermal resources on public lands in The Geysers KGRA was preceded by extensive environmental analyses conducted over the past decade by the U.S. Department of Interior, and its agencies. These analyses include the Environmental Impact Statement (EIS) for the Geothermal Leasing Program, an Environmental Analysis Record for the selected lease areas in The Geysers KGRA, and site specific Environmental Assessments. All of these documents were prepared to comply with policies, purposes, and goals of the National Environmental Policy Act (NEPA) of 1969 and pertinent state and local environmental protection standards. In addition, these documents contain the environmental protection stipulations which must be agreed to by Shell Oil Company (the geothermal steam provider) and NCPA (the electric power plant builder operator) before development and utilization can begin.

INTRODUCTION

The proposed Northern California Power Agency (NCPA) No. 2 project is a 110 MW electric power generation facility designed to use geothermal steam provided from wells leased to the Shell Oil Co. on public lands at The Geysers KGRA in California. Development and utilization of the geothermal resource by Shell and NCPA, respectively, follows almost a decade of federal actions conducted to ensure environmental protection during these geothermal resource development and utilization activities.

In December 1970, Public Law 91-581, The Geothermal Steam Act of 1970, was approved. The Act and subsequent regulations provide for the leasing and development of geothermal resources on public lands under continuing regulation and environmental controls.

In order to determine whether or not leases were to be issued in The Geysers KGRA, the United States Department of Interior (USDI) needed to identify, evaluate, and describe the environment and the anticipated environmental impacts from geothermal leasing operations there. An Environmental Impact Statement (EIS) for the Geothermal Leasing Program was prepared by USDI to address these issues and also to discuss the alternative uses for KGRA lands and their ramifications. The EIS was published in October 1973 and contains information indicating that geothermal resources can be developed in environmentally non-sensitive areas of The Geysers KGRA under careful regulation and environmental controls.

BLM used the recommendations presented in the 1973 EIS document to determine the suitable lease areas in The Geysers KGRA. Once these lease areas were determined, BLM performed a site specific Environmental Analysis Record (EAR) for each lease area to ensure environmental protection. The EAR document containing the analysis of the lease area that includes the Shell Oil lease tracts #CA-949 and #CA-950 was published in September 1974. In addition to recommended environmental protection stipulations taken from the EIS, the lease agreement also contains the site specific stipulations identified by BLM in the EAR.

After the lease area was determined and the EAR was completed by BLM, the USGS became responsible for dividing the lease area into lease tracts. The lease tract information was returned to BLM, which then administered the competitive bidding procedure.

In January 1974, Shell Oil Company became the successful bidder for lease tracts #CA-949 and #CA-950 (of lease area T. 10N. R8W, MDM; Sections 1,2,3,4,11,12) in The Geysers KGRA and then entered into a geothermal resources lease with BLM.

Prior to construction activities and subsequent development of the geothermal resource on the leasehold, Shell was required to submit a Plan of Operation to USGS. After USGS reviewed Shell's Plan of Operation, it scheduled field trips to the drill sites described in the Plan of Operation.

On these field trips, the expected environmental impacts and their mitigation measures were determined in a coordinated effort between USGS and BLM experts and Shell representatives. From these field trips, USGS prepared Environmental Analyses (EA's) that contain special stipulations and permit conditions to protect the environment at these sites. No construction or development activity was approved by USGS until Shell agreed to comply with the stipulations in the EA for the development activities. Furthermore, once construction and operation begins, USGS and BLM make periodic inspection visits to the sites to ensure Shell is complying with all general and special stipulations, and the Geothermal Resource Operation (GRO) Orders* designed to protect the environment, and minimize or avoid adverse impacts.

To date five production wells have been drilled and completed within the 3,000 acre Shell leasehold. On June 27, 1977, the NCPA entered into a contract with Shell for the purchase of geothermal steam from a designated 1,000 acre production area within the leasehold.

In March 1978, the NCPA filed a Plan of Utilization (POU) for their proposed Geothermal Project No. 2, with the USGS Area Geothermal Supervisor. On August 11, 1978, the NCPA submitted their Notice of Intention (NOI) to apply for certification of this project, to the California Energy Commission. After public review and evaluation, the NOI was approved on March 14, 1979 and on April 4, 1979 the NCPA submitted their Application for Certification (AFC) to the Energy Commission. Following completion of environmental and regulatory review of the proposed project, action will be taken on the POU by the U.S. Geological Survey and on the AFC by the Energy Commission.

On March 28, 1978, the NCPA made application to the BLM for use of the proposed sites for the construction of an electric generating plant and related facilities and transmission route. Action on the BLM license to use the proposed site is pending the outcome of environmental and regulatory review of the proposed project.

On September 5, 1978, the NCPA submitted a loan application to the Department of Energy (DOE). Action on this funding request is pending the outcome of environmental and regulatory review of the proposed project.

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*The Geothermal Resource Operational Orders are on file and available at the Office of the Area Geothermal Supervisor, United States Department of the Interior Geological Survey, 345 Middlefield Road, Menlo Park, California 94025.

HISTORY OF PRIOR FEDERAL ACTION
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NEPA DOCUMENTATION FOR NCPA PROJECT NO. 2

The proposed project of the Northern California Power Agency (NCPA), to utilize geothermal steam from Shell Oil Company wells in a 110 MW power plant in The Geysers KGRA, was preceded by Federal actions which span almost a decade. These federal actions were designed to ensure environmental protection for the leasing, exploration, development, and utilization of geothermal resources on public lands.

GEOHERMAL STEAM ACT OF 1970 AND IMPLEMENTING REGULATIONS

The first major Federal action was the decision to lease federal lands for geothermal development under provisions of the Geothermal Steam Act of 1970. Leasing, operating, and unit plan regulations necessary to implement the Act have been published in the Federal Register since July 1971. The Act and its regulations define both the guidelines and the environmental impact evaluation process that must be followed for the leasing, exploration, development, and utilization of geothermal resources on public lands.

**UNITED STATES DEPARTMENT OF THE INTERIOR (USDI)
ENVIRONMENTAL IMPACT STATEMENT (EIS) for the GEOHERMAL LEASING PROGRAM**

In order to determine whether or not leases were to be issued in The Geysers KGRA, the United States Department of the Interior (USDI) needed to identify, evaluate, and describe the environment and the potential impacts on the environment, from geothermal leasing operations there. Furthermore, USDI needed to identify the alternatives to a geothermal leasing program on the Geysers KGRA lands. The Environmental Impact Statement (EIS) for the Geothermal Leasing Program published in October 1973 contains the results and conclusions of the USDI environmental impact assessment for the Geothermal Leasing Program in The Geysers KGRA.

The Environmental Impact Statement (EIS) for the Geothermal Leasing Program assessed the kinds of impacts that could be expected to occur with geothermal development in The Geysers KGRA. Alternatives that were addressed in the 1973 EIS included: (1) promulgation of leasing and operating regulations, (2) alternatives for leasing geothermal resources, (3) alternatives for exploration and development, and (4) alternative sources of electrical energy. Further, specific alternatives for The Geysers KGRA were discussed. These included: (1) no leasing, (2) lease in connection with the related development of geothermal resources on contiguous private lands, and (3) lease only selected areas where geothermal development is compatible with existing land uses in the area.

The 1973 EIS indicates that leasing and development should not take place unless it can be accomplished in an environmentally acceptable manner. From this investigation, USDI determined that geothermal leasing and resource development in The Geysers KGRA would be acceptable on lands of low environmental sensitivity, and with the implementation of continuous regulation and strict environmental controls.

**BUREAU OF LAND MANAGEMENT
ENVIRONMENTAL ANALYSIS RECORD (EAR)**

The Bureau of Land Management (BLM) used the information, recommendations, and conclusions presented in the 1973 EIS to determine the suitable lease areas of The Geysers KGRA.

After determining the suitable lease areas of The Geysers KGRA, BLM performed a site specific Environmental Analysis Record (EAR) for each of the lease areas. This preleasing EAR, published in 1974, identifies and describes the impacts that could accompany geothermal development and operation in The Geysers KGRA. Included in the EAR (BLM, 1974) are specific stipulations for protecting the environment in the lease area containing lease tracts #CA-949 and #CA-950. This lease area is identified in the EAR as T. 10N. R. 8W, MDM; Sections 1, 2, 3, 4, 11, 12. Each section of this lease area is defined by size, ownership, location, characteristic landmarks, significant contents, and special environmental protection stipulations as shown in the following excerpts from the EAR.

LEASING AREA

Section 1 - 760 acres NRL - Lake County. Northern portion Bear Canyon Creek drainage, southern portion Dry Creek drainage. Vegetation chaparral, chamise, knobcone pine and cypress. Mining activity in south part, balance of area undisturbed. Anderson Springs about one mile north. Stipulate to stay out of creeks. High, distant visibility from Highway 175.

Section 2 - 800 acres NRL - grandfather application - Lake and Sonoma Counties. Bear Canyon Creek and Big Sulphur Creek drainages. Chaparral, dense patches of knobcone pine, some scattered digger pine, fir and ponderosa pine. None commercial. Very rough, mountainous country. Some mining on north and south edges. Nearest habitation Anderson Springs 1-1/4 miles NE. Both watersheds support game fish. Stipulate to stay out of stream.

Section 3 - 620 acres NRL and 400 acres NRL grandfather application - Sonoma County. Sulphur Creek drainage. Area has public access. Good stand of ponderosa pine and Douglas-fir along Big Sulphur Creek. Balance of area predominantly Henneke soil and associated chaparral. Nearest home about 1/2 mile northwest, recreation cabin in Section 3 (SW1/4SW1/4). Stipulate buffer zone along Big Sulphur Creek.

Section 4 - 57 acres NRL and 320 acres grandfather application - Sonoma County. Sulphur Creek drainage. Public access. Chaparral, mostly chamise and scrub oak. Ponderosa pine and Douglas-fir along Sulphur Creek requires buffer zone stipulations. Nearest home 1/4 mile.

Section 11 - 300 acres NRL - Sonoma County. Headwaters of Ingalls Creek. Chaparral brush, Henneke soil, south slope, cabin very near NRL, Locke mining claim.

Section 12 - 60 acres NRL - Sonoma and Lake Counties. Ingalls and Dry Creek watersheds. Pine mountain in section. Jeep trail. No public access. Chaparral, surface disturbance from mining activity.

These special environmental protection stipulations are incorporated into the geothermal lease agreement, Section 31. More general stipulations are contained in Section 14 ("Protection of the Environment (Land, Air, and Water) and Improvements") and Section 15 ("Waste") of the lease agreement.

LEASE TRACT DETERMINATION BY USGS

Following completion of the EAR by BLM, the United States Geologic Survey (USGS) was assigned the task of dividing the lease areas into lease tracts for competitive bidding. USGS does this on the basis of geologic considerations, maximum allowable acreage limitations, and lease tract manageability. The lease tract documentation is then returned to BLM which is the agency responsible for the administration of the competitive bidding procedure.

LEASE SALE AND ENVIRONMENTAL PROTECTION

In January 1974, Shell Oil Company became the successful bidder for both lease tracts #CA-949 and #CA-950. Shell then entered into a geothermal lease agreement with BLM. By signing the lease Shell Oil Company agreed to comply with the environmental protection stipulations in Sections 14, 15, and 31 of the Geothermal Resource Lease. The information contained in these sections is as follows:

Sec. 14. PROTECTION OF THE ENVIRONMENT (LAND, AIR AND WATER) AND IMPROVEMENTS - The Lessee shall take all mitigating actions required by the Lessor to prevent: (a) soil erosion or damage to crops or other vegetative cover on Federal or non-Federal lands in the vicinity; (b) the pollution of land, air, or water; (c) land subsidence, seismic activity, or noise emissions (d) damage to aesthetic and recreational values; (e) damage to fish or wildlife or their habitats; (f) damage to or removal of improvements owned by the United States or other parties; or (g) damage to or destruction or loss of fossils, historic or prehistoric ruins, or artifacts. Prior to the termination of bond liability or at any other time when required and to the extent deemed necessary by the Lessor, the Lessee shall reclaim all surface disturbances as required, remove or cover all debris or solid waste, and, so far as possible, repair the offsite and onsite damage caused by his activity or activities incidental thereto, and return access roads or trails and the leased lands to an acceptable condition including the removal of structures, if required. The Supervisor or the Authorized Officer shall pre-

scribe the steps to be taken by Lessee to protect the surface and the environment and for the restoration of the leased lands and other lands affected by operations on the leased lands and improvements thereon, whether or not the improvements are owned by the United States. Timber or mineral materials may be obtained only on terms and conditions imposed by the Authorized Officer.

Sec. 15. WASTE - The Lessee shall use all reasonable precautions to prevent waste of natural resources and energy, including geothermal resources, or of any minerals, and to prevent the communication of water or brine zones with any oil, gas, fresh water, or other gas or water bearing formations or zones which would threaten destruction or damage to such deposits. The Lessee shall monitor noise, air, and water quality conditions in accordance with any orders of the Supervisor.

Sec. 31. SPECIAL STIPULATIONS-(stipulations, if any, are attached hereto and made a part hereof)

SPECIAL STIPULATIONS AND CONDITIONS

GEYSERS KGRA

LEASEHOLDS NOS. CA-949 AND CA-950

The lessee shall contact the Supervisor prior to the development of a plan of operation to be apprised of practices which shall be followed or avoided in field development, including but not limited to road standards, road crossings, gates, cattleguards, fencing, erosion controls, and surface rehabilitation.

The lessee shall comply with the following special conditions and stipulations unless they are modified by the Lessee, the Supervisor, and the authorized officer.

1. Upon notification by the authorized officer that archeological values exist or are believed to exist in the leased lands, the Lessee will engage a qualified archeologist, acceptable to the BLM, to survey and salvage items of archeological value in advance of any surface disturbance. The responsibility and cost of this survey and salvage will be that of the Lessee.
2. The Lessee shall participate in earthquake and land subsidence prevention and detection programs applicable to the leased area where determined to be necessary.
3. Mud pits and sumps containing any additives toxic to wildlife will be protected from entry by birds and other wildlife.
4. Noise levels shall at all times be kept to a minimum and will never exceed 65 decibels at a distance of 1,500 feet from its source.

5. No clearing of ground cover for power transmission lines, except for tower or pole pads, shall be allowed.
6. All power and transmission lines will be designed to minimize loss of raptors and other large birds by electrocution. Nonspecular conductors may be required.
7. The use of wide-tired or balloon-tired, vehicles and helicopters may be required in off-road areas where necessary, to protect the soil and other resources.
8. Disturbance of soils, within the leased lands which are susceptible to slides, slumps, excessive settlement, soil creep, and severe erosion shall be avoided wherever possible. If it is not possible for the Lessee to avoid these areas, the Lessee shall comply with special stabilization and prevention of soil movement practices required by the Supervisor.

All soil disturbances shall be stabilized by mulching and seeding.

a. No vegetation or soil shall be disturbed within 300 feet (horizontal measurement) of Bear Canyon Creek, Dry Creek, Gunning Creek, Anderson Creek, Big Sulphur Creek, Little Sulphur Creek, Hot Springs Creek, Squaw Creek, Hummingbird Creek, Cobb Creek, or Ana Blecher Creek except at approved crossings and other areas approved by the Supervisor.

b. No vegetation or soil shall be disturbed within 700 feet (horizontal measurement) of Kelsey Creek, High Valley Creek, Sweetwater Creek, and Adobe Creek except at approved crossings and other areas approved by the Supervisor.

PLAN OF OPERATION FILED BY SHELL OIL COMPANY

After signing the lease agreements for the tracts #CA-949 and #CA-950, Shell Oil Company proceeded to develop and submit to USGS a Plan of Operation for the drilling, testing, and operation of wells on leaseholds. One plan was submitted in July 1974 and contains the types of activities Shell proposed to perform during the construction, drilling, and operation of wells and related projects at the site.

USGS ENVIRONMENTAL ANALYSES (EA'S)

USGS then arranged field trips to the locations described in the submitted Plans of Operation. On these field trips USGS took professionals whose expertise and backgrounds would permit them to: (1) critically evaluate the environment; (2) predict the potential adverse environmental consequences from the proposed operating methods; and (3) communicate and cooperate with the lessee to modify the Plan of Operation to include the necessary mitigating measures for protecting the environment and avoiding adverse impacts. Using this procedure, USGS is able to guarantee that construction does not commence until the site specific environmental protection measures are taken.

From the information gathered during the field survey USGS prepares a site-specific Environmental Analysis (EA) which describes the existing environment, the proposed actions of the lessee, the anticipated problems, and reports the communications and cooperation between the lessee and USGS to identify the suitable stipulations to be agreed to and used by the lessee to ameliorate the anticipated problems. Each EA also discusses the alternatives to the proposed activities of the lessee and considers the need for their implementation. Table B-1 is a list of the EA's prepared for geothermal resource development on lease sites #CA-949 and #CA-950.

TABLE B-L. U.S. GEOLOGICAL SURVEY, ENVIRONMENTAL ASSESSMENTS (EA) FOR SHELL OIL LEASEHOLDS CA-949 AND CA-950.

Number		Subject	Lease Number
EA #1-4	08-26-74	One deep well, each lease	CA-949, CA-950
EA #13-5	07-28-75	Deep exploratory drilling, Site B	CA-949
EA #22-5	10-08-75	Deep exploratory drilling, Site C	CA-950
EA #37-6	07-19-76	Deep exploratory drilling, Site D	CA-949
EA #40-6	05-20-76	Deep exploratory drilling, Site B	CA-949
EA #48-6	09-13-76	Deep exploratory drilling, Sites A & C	CA-950
EA #66-7	05-04-77	Deep exploratory drilling, Sites F & G	CA-950
EA #68-7	05-20-77	Deep exploratory drilling, Site E	CA-949
EA #80-8	04-11-78	Deep exploratory drilling, Sites H & I and Site J	CA-950 CA-949
EA #95-8	08-24-67	Deep exploratory drilling, Sites K, L, M, P and Q	CA-949

In addition to the general and special stipulations contained in the lease and EA, the lessee must also consider pertinent state and local standards.

Following agreement on the modified Plan of Operation, USGS and BLM make frequent visits to the site of operation to monitor for adherence to the stipulations and conditions of the lease, the EA's, and the Geothermal Resource Operation Orders. These efforts are designed to make certain that adverse environmental consequences are avoided or minimized.

The procedures described above were adopted by the Department of Interior and its agencies to achieve compliance with the policies, purposes, and goals of the National Environmental Policy Act (NEPA, 1969). The documents prepared from the environmental assessments of BLM, USGS, and USDI, are designed to be used in the evaluation of projects by decision makers. Furthermore, these actions and reporting procedures have provided the framework for developing whatever special terms and conditions are needed to protect the environment, permit the use of the land for other purposes, and prevent significant deterioration of other natural resources during the leasing, exploration, development, construction, operation, and utilization of geothermal resources.

REFERENCES

NEPA, 1969. National Environmental Policy Act of 1969. 42 USC 4321-4347. U.S. Government Printing Office, Washington, D.C.

USDI, 1973. Final Environmental Statement for the Geothermal Leasing Program. 4 Vol. U.S. Department of the Interior, U.S. Government Printing Office, Washington, D.C.

BLM, 1974. Environmental Analysis Record of Geothermal Leasing in The Geysers KGRA, EAR #012. Bureau of Land Management Office, Ukiah, CA.

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