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GEOHERMAL ELECTRIC POWER PLANT SITING:
FEDERAL PERMITTING POLICY AND REPORT OF PROGRESS

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ABSTRACT

The U.S. Minerals Management Service (MMS) approves power plant site and facility design, construction criteria, and compliance plans for projects on Federal geothermal leases. Rather than maintain in-house staff expertise, the MMS relies on the applicant and his contractors for many aspects of project review and inspection. Nearly all siting experience has been in California, where two commercial facilities are under construction. The Federal Government and the State of California have formalized procedures for cooperation for site and facility approval and postapproval compliance review.

INTRODUCTION

For about the past four years the Federal Government has been involved in the approval of the design and construction of commercial geothermal electric power plants. During this time the Minerals Management Service (MMS) and its predecessor*, along with the Bureau of Land Management (BLM), approved construction of the nation's first two commercial power plants sited on public lands. This paper discusses the Federal Government's permitting policy and reviews its power plant siting experiences to date.

SUMMARY OF LEGISLATION

The Department of the Interior prepared regulations governing the siting of electric power plants on federally leased lands under the authority of the Geothermal Steam Act of 1970. The following briefly summarizes relevant portions of these regulations. Conover (1979) provides a more detailed discussion.

*On January 19, 1982, Interior Secretary James Watt abolished the Conservation Division of the U.S. Geological Survey. The duties of the Interior Department regarding electric power plant siting, as described herein, were transferred to the Department's Minerals Management Service.

The regulations provide that, in addition to obtaining a valid Federal lease, the lessee must secure separate permits to occupy the land surface, to construct, and to operate the facility. These permits consist of a land-use license issued by the BLM and a two-part Geothermal Utilization Permit (GUP) issued by the MMS.

The regulations address three scenarios for resource utilization and electrical facility siting. These include: either (1) individual production well facilities of not more than 10 megawatts net electrical capacity or heat energy equivalent, or (2) research and demonstration (R&D) facilities of 20 megawatts or less net electrical capacity or heat energy equivalent, or (3) commercial facilities of greater than 20 megawatts net electrical capacity or heat energy equivalent. In the first two cases only GUP's are required of the applicant. In the third case both a BLM license and a GUP are required. All proposals must include a Plan of Utilization (POU), which provides a detailed overview of the proposed facility and its operation.

POLICY APPROACH TO FACILITY APPROVAL

While the MMS has gained expertise in various aspects of power plants, the Agency does not maintain a staff of engineers devoted solely to power plant design, siting, or construction. Neither does the MMS presently have the resources to provide comprehensive independent engineering review and project control during the design and construction phases. Therefore, the MMS siting policy is directed toward identifying applicable criteria and following through with a program to ensure that these criteria are applied during the design, construction, and operation of the facility. This program involves spot work checks by MMS staff for areas within its expertise and "certification checks" for areas outside its expertise.

A certification check means review and approval of a statement stamped and signed by an appropriate registered professional who thereby certifies, prior to construction, that the design criteria, analysis methods, and intended construction practices are adequate to meet the applicable laws, standards, ordinances, and codes necessary to ensure safe and reliable

construction and operation of the facility. Furthermore, this certification check verifies that these laws and standards have been incorporated into the project's final plans and specifications. At the conclusion of the project, a similar statement must certify that the finished product is accurately represented by the as-built drawings and that it does incorporate the agreed-upon design criteria, analysis methods, and construction practices. The MMS relies heavily on the construction and material inspection activities performed by local agencies or the applicant, supplemented by occasional MMS audits.

OPERATIONAL APPROACH TO FACILITY APPROVAL

The steps involved in obtaining MMS approval for the site and facility under a Plan of Utilization (POU) are for the most part similar to those for any other Plan of Operation.

After an applicant obtains a lease and proves commercial potential, he must submit a POU to the MMS. MMS Geothermal Resources Operational (GRO) Order Number 5 explains the requirements for POU's.

The approval process begins with a review of the POU. Once the MMS receives a complete POU, it informs the BLM or other appropriate surface management agency (SMA) and other interested parties of the proposal and arranges any necessary site inspections. Comments on the POU are solicited from all interested parties. After the MMS receives and considers all comments, it prepares draft and final environmental reports. A letter is then prepared and signed by the MMS and the SMA, indicating joint approval of the POU. After both parties sign the joint approval letter and the applicant receives approval of any other appropriate documentation, the MMS will approve and sign the first part of the GUP, authorizing plant construction and prestart-up testing. If the applicant rates the proposed facility as "commercial", as discussed in the regulations, then he must also obtain a license from the BLM before the MMS can approve the GUP.

The Geothermal Utilization Permit

The GUP contains two parts: one for construction approval, the other for operation approval. Prior to approval of the construction part, the applicant must submit to the MMS a list of all laws, ordinances, standards, codes, and other criteria to which the plant site and specific plant structures will be designed, constructed, and operated. This list of laws and standards must be all inclusive, taking into account all pertinent Federal, State, regional, county and local regulations. This information must also indicate which agencies will require permits of the applicant. The list must include at a minimum the following resources and activities: air and water quality, water resources, health, socioeconomics, visual/aesthetics, soils, struc-

tural engineering, geotechnical and civil engineering, biological resources, noise, safety, and waste management.

The applicant must then use the above information to develop a Compliance Verification Program (CVP). This program outlines all applicable laws and standards to be followed during the project's design, construction, and operational phases and what measures will be employed for compliance verification and enforcement. The MMS must approve the CVP before site preparation work and construction can begin.

As part of the CVP, the applicant is expected to develop a Quality Assurance Plan. This plan, when approved, allows responsibility for field and construction inspections to be delegated by the MMS to the applicant or his contractor. This plan should address all aspects of construction monitoring, including material testing, manufacturer or fabricator certification, preparation of as-built drawings, deviations from plans, changed conditions, and so forth. The plan should also provide for the filing of periodic compliance reports with the MMS.

As partial compliance with the operational aspects of the overall program, the MMS requires the applicant to submit various types of design, construction, and operational documentation either for approval or for informational purposes. All drawings and related structural design calculations prepared for site preparation and facility construction must be submitted for approval. As a rule, this type of submittal includes construction contract bid packages, consisting of bid books, drawings, and plans prepared for prospective contract bidders. Necessary submittals include those for site preparation, civil, structural, and concrete work; the power plant building (turbine generator); cooling tower supply and erection, and H₂S control equipment supply and installation, among others.

Some drawings and plans need to be submitted for information only and do not require approval. These include so-called interface drawings, or drawings prepared by vendors of equipment for use in facility design. Examples include drawings needed for foundation designs for switchyard equipment or H₂S abatement/control equipment.

Although the construction part of the GUP may have been approved, additional data requirements must be met by the applicant before any site or facility work can commence. The data are submitted with a Sundry Notice and two alternatives for submittal are available to the applicant. In the first, the MMS will approve a Sundry Notice containing all necessary information for all phases of site and facility design and construction. Usually, however, information regarding the entire facility is not available at the outset of complex projects, and the applicant therefore must utilize the second alternative whereby he submits a series of Sundry Notices

corresponding to various phases of site and facility design and construction. In this case each Sundry Notice addresses a particular phase, and work in that phase cannot commence prior to approval of that particular Sundry Notice. The project can be broken into as many phases as the applicant feels appropriate. Each surface disturbing activity or component of design or construction, however, must be addressed in a Sundry Notice.

An applicant may submit Sundry Notices with the POU or at any time until the activity covered by the Sundry Notice is to be performed, taking into account review time for regulatory Agencies.

The final part of the approval sequence involves prestart-up testing and documentation that the applicant accurately depicted the finished work in the final plans and specifications and incorporated the accepted design and construction criteria, analysis methods, and construction practices. The MMS evaluates test results and verifies construction compliance. At this point, the second part of the GUP is signed, and the applicant may commence commercial operation of the facility.

CASE HISTORIES OF POWER PLANT APPROVALS - CALIFORNIA

The Federal Government has to date approved the construction of three commercial-sized power plants. Two are located in Sonoma County, California, in The Geysers Known Geothermal Resources Area (KGRA), approximately 100 kilometers north of the City of San Francisco. Review and approval of construction are on-going. The USGS performed regulatory activities prior to January 19, 1982, as described below. The MMS is now the responsible Agency.

Case No. 1

The first generating station to gain Federal construction approval was the Northern California Power Agency's (NCPA) 110-Mw facility. The NCPA is a consortium of 12 public agencies, including 11 northern California cities and one rural electric cooperative. Construction of this facility, known as the NCPA Geothermal Project No. 2, was approximately 80-percent complete when a fire destroyed the completed cooling tower and various nearby plant components. Commercial operation has been set back about four months to a new scheduled commercial operation date of February 1, 1983 (Whalen, 1982).

In addition to review and authorization by the MMS and BLM, the U.S. Department of Energy (DOE) was involved because the NCPA applied for a federally guaranteed loan for a portion of the project financing. Because the California Energy Commission (CEC) develops and carries out State policy and responsibility for electric power generation and distribution, the State of California was also involved in project review and

authorization. As a result, three Federal Agencies and one State Agency cooperate in their overlapping roles in the environmental protection, site/facility certification and compliance review of the NCPA No. 2 Project.

The parties involved recognized early in the project that a unique opportunity existed to combine State and Federal review efforts in order to prepare a single environmental document and provide information necessary for each Agency's decision requirements. To take advantage of this opportunity, the MMS and the other Agencies developed and entered into a formal Memorandum of Understanding (MOU) which constituted an agreement to participate jointly in the project review. As a part of the MOU, the MMS agreed to participate in the State's detailed certification proceedings with the understanding that each Agency must still issue appropriate individual permits for the project in accordance with individual procedures.

During negotiations between the MMS and the CEC, the parties agreed that final authority for compliance verification for plant design, construction, and operation resided with the Federal Government. However, the two Agencies developed and signed a formal Letter of Understanding (LOU) for postlicensing duties and responsibilities to insure fulfillment of State requirements for compliance verification. The LOU incorporated a system of primary and secondary CEC involvement. The CEC was primarily involved in: (1) review of final seismic design criteria, (2) structural design criteria for critical structures and components (as defined in the LOU), and (3) the evaluation of mitigation measures for any significant adverse geologic conditions (also defined in the LOU) which might be encountered during site preparation. Primary involvement means that the applicant submits all required drawings, reports, and analyses concurrently to the MMS and to the CEC. The MMS does not approve such drawings, reports, or analyses without expressly soliciting the advice and recommendations of the CEC. The MMS must provide a written explanation to the CEC of its reasons for not adopting any CEC recommendations on these items.

The CEC is secondarily involved for all non-critical structures and components and for mitigation measures as specified in the project's environmental analysis. Secondary involvement means the applicant submits all drawings, reports, and analyses to the MMS which forwards these to the CEC, which may or may not comment on these items.

In order to prepare the site and construct the facility, the NCPA elected to submit a series of Sundry Notices, with each Sundry Notice corresponding to a certain phase of its construction schedule. In general, each Sundry Notice covered all activities contained in a construction contract, although at times NCPA submitted additional Sundry Notices for speci-

fic activities within the contract. This method proved quite convenient and expedited regulatory review and approval.

Case No. 2

The second generating station to receive Federal construction approval was a 72-Mw facility to be operated by the Sacramento Municipal Utility District (SMUD). Known as the SMUDGE No. 1 Project, the plant is approximately 65-percent complete and is scheduled to go on-line about December, 1983 (Knierim, 1982).

Essentially, SMUD repeated for their project all Agency review and approval procedures developed for the NCPA project. The parties again developed a MOU for preparation of an environmental document and the Federal Government again participated in the State's certification proceedings. Each Agency again agreed to issue its own separate permit/license after the certification proceedings concluded. Another LOU was developed for postlicensing duties and responsibilities, with all Agencies basically retaining the roles and responsibilities established for the NCPA project. The DOE, however, was not a party to this project.

As far as site preparation and plant design and construction are concerned, SMUD, like NCPA, decided to submit a series of Sundry Notices. While NCPA broke its project into many phases, SMUD initially intended to submit only three Sundry Notices, each one corresponding to one of three large construction contracts. The inclusion of so many design, construction, and analysis activities into three phases caused considerable potential for delay because of the volume of material submitted with each Sundry Notice and the MMS's limited resources. In this case, therefore, the MMS met with SMUD and requested a further breakdown of activities which would more readily provide for review within shorter timeframes. The parties agreed to a series of Sundry Notices giving partial approval of each of the three original Sundry Notices. In this way, various activities proceed while other later activities are under review, and the total of the various Sundry Notices constitutes a final, unconditional approval of the three original Sundry Notices.

CASE HISTORY OF POWER PLANT APPROVAL - OUTSIDE CALIFORNIA

At the present time, Federal experience with power plants on public lands outside the State of California consists of one project, the Milford No. 1 Unit proposed by Utah Power & Light (UP&L) Company. The 20-Mw facility will be located in the Roosevelt Hot Springs KGRA, in southwestern Utah's Beaver County, about 19 km northeast of the town of Milford. The facility is about 5-percent complete and commercial operation is presently scheduled for April, 1984 (Brown, 1982).

During preliminary discussions, UP&L expressed concern regarding the requirement for two approval signatures on the GUP. To alleviate their concern, the MMS developed an approval procedure whereby site preparation takes place under a conditionally-approved GUP calling for a follow-up series of Sundry Notices. While site preparation is in progress, UP&L prepares and submits civil and structural design information on an as-completed basis. The MMS authorizes no work other than site preparation while this material is under review. Upon approval of a complete civil/structural package, the MMS will sign the second part of the GUP, authorizing commercial operation of the facility. Attached to this signature approval, however, will be a list of conditions UP&L must meet before any actual commercial operations can begin. This procedure essentially is a combination of the phased and single approval approach.

Because Utah has no State agency performing functions comparable to those of the State of California, local agencies are taking a greater role in regulatory review for this project. Because the project has only recently commenced, operational procedures are still evolving, so a more detailed discussion about them is not possible at this time.

SUMMARY

Since mid-1978 a policy has evolved regarding the Federal Government's approval and permitting of geothermal power plants. During this period, the MMS helped develop and now participates in cooperative working agreements with other regulatory Agencies. These agreements provide an expeditious yet comprehensive regulatory framework by which resource utilization proceeds. As the future of geothermal development and utilization grows we anticipate continuing our efforts nationwide to streamline and otherwise improve the regulatory environment within which we accomplish our mission. The Federal Government's power plant experience may not now be extensive, but we are learning and have established a base upon which we will continue to help the Nation meet its energy goals.

REFERENCES

- Brown, D. R., 1982, pers. comm., Utah Power & Light Co., 1359 West No. Temple, Salt Lake City, Utah, 84110.
- Conover, R. D., 1979, Electrical power plant siting under the Geothermal Steam Act of 1970: Transactions, 1979 Geothermal Resources Council Annual Meeting, Reno, Nevada, Vol. 3, p. 129-131.
- Knierim, R., 1982, pers. comm., Sacramento Municipal Utility District, 6201 S Street, Sacramento, CA., 94813.
- Whalen, J. W., 1982, pers. comm., Northern California Power Agency, 8421 Auburn Blvd., Suite 160, Citrus Heights, CA 95610.