CALIFORNIA GEOTHERMAL ENERGY COLLABORATIVE: EXPANDING CALIFORNIA'S CONFIRMED GEOTHERMAL RESOURCES BASE

GEOTHERMAL PERMITTING GUIDE

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Preface

The Public Interest Energy Research (PIER) Program supports public interest energy research and development that will help improve the quality of life in California by bringing environmentally safe, affordable, and reliable energy services and products to the marketplace.

The PIER Program, managed by the California Energy Commission (Energy Commission) conducts public interest research, development, and demonstration (RD&D) projects to benefit the electricity and natural gas ratepayers in California.

The PIER program strives to conduct the most promising public interest energy research by partnering with RD&D organizations, including individuals, businesses, utilities, and public or private research institutions.

PIER funding efforts are focused on the following RD&D program areas:

- Buildings End-Use Energy Efficiency
- Industrial/Agricultural/Water End-Use Energy Efficiency
- Renewable Energy Technologies
- Environmentally Preferred Advanced Generation
- Energy-Related Environmental Research
- Energy Systems Integration
- Transportation

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For more information on the PIER Program, please visit the Energy Commission's website at www.energy.ca.gov/pier or contact the Energy Commission at (916) 654-5164.

CONTENTS

TABLES

FIGURES

APPENDIXES

Abstract

This *Geothermal Permitting Guide* was created as a reference tool for geothermal stakeholders interested in developing low temperature direct use and/or power production projects. It addresses the environmental regulatory requirements beginning after acquisition of the land and/or mineral rights. Organized by development activity, it begins with resource exploration and continues to well abandonment and project closure. No one set of standard regulations apply to geothermal projects due to the differences in land and/or mineral rights ownership, location and resource chemistry. Geothermal resources in California occur in disparate environments from mountainous to desert terrains. The resource also differs from being liquid-dominated high or low temperature, to steam-dominated high temperature. Regional regulators such as counties, regional water quality control boards and air districts develop regulations based on the needs of their jurisdictions. The document contains websites and regulatory citations as statutes and regulations change.

Keywords: Geothermal, permitting; regulations; geothermal power production; geothermal direct uses; geothermal well drilling.

Executive Summary

This Guide is intended to assist California geothermal stakeholders in navigating the permitting process and improve consistency in the regulatory process for geothermal projects. It addresses the regulatory process for both high and low temperature geothermal resource[1] development. However, it does not address geothermal heat pump installations.

For the purposes of this Guide, the assumption is that the land and/or mineral rights have already been acquired (leased, purchased, etc.). It is organized by development activity beginning with the exploration process continuing through power plant licensing or direct-use project authorizations. Although intended to be comprehensive, each geothermal project differs due to the chemical constituency of the resource, the environmental setting and the specifics of the proposed project. These differences preclude anticipating every situation so references and resources for additional information are included. Figure 1 is a map and fact sheet of California Geothermal Fields and Existing Power Plants to illustrate the variety of locations geothermal resources can be found in California.

Since the regulatory process remains fluid, this Guide is a snapshot of the regulatory process as it currently is structured. The process changes as new legislation is passed or new regulations promulgated. For example, the Federal Energy Policy Act passed in 2005 will be the source of changes to the Federal leasing/permitting process administered by the Department of Interior, Bureau of Land Management. Additionally, there are environmental requirements administered by other Federal and State agencies that may change over time. For example, many Federal laws are administered by State agencies (i.e.: Clean Air Act, Clean Water Act, Resource Conservation Recovery Act, etc.). Also, in response to California legislation passed in 1979, some local governments have created Geothermal Elements to their General Plans, policies and/ or requirements specifically addressing geothermal development for high and/or low temperature uses which may be updated as needed. That is why this publication was prepared as a "guide" and it is recommended that you always check with the appropriate state and local governing agencies for updates to the regulatory process.

[1] Definitions of geothermal resources:

Federal: Geothermal Steam Act of 1970 (Public Law 91-581, 84 Stat.1566, 30 U.S.C. 1001-1025) Geothermal steam and associated geothermal resources means (i) all products of geothermal processes, embracing indigenous steam, hot water and hot brines;(ii) steam and other gases, hot water and hot brines resulting from water, gas, or other fluids artificially introduced into geothermal formations; (iii) heat or other associated energy found in geothermal formations; and (iv) any byproducts derived from them;

State: Public Resources Code Section 6903; Geothermal resources shall mean the natural heat of the earth, the energy, in whatever form, below the surface of the earth present in, resulting from, or created by, or which may be extracted from, such natural heat, and all minerals in solution or other products obtained from naturally heated fluids, brines, associated gases, and steam, in whatever form, found below the surface of the earth, but excluding oil, hydrocarbon gas or other hydrocarbon substances.

1.0 Introduction – Getting Started

A multitude of government agencies and regulations are often involved in the permitting and environmental review process for geothermal activities. This Guide addresses the permitting process beginning after the land and/or mineral rights have been acquired (leased, purchased, etc.). It is organized primarily by the three stages of geothermal development as defined in The ***Geothermal Resources Act*** (enacted January 1, 1979 Public Resources Code § 6901-6925.2) which are:

- **Exploratory** (Resource Confirmation; Section 2.0)
- **Resource Development/ Well field** (Section 3.0)
- **Production/End Uses** [i.e. Power plant(s)/Direct Use Project(s) Section 4.0]

In addition to the three major categories as defined by the state a fourth stage was added to this Guide which addresses well abandonment, facilities closure and site restoration/reclamation (Section 5.0).

The permitting and environmental review process can be complicated and take between one to three years and in some cases longer due to appeals and lawsuits. Timing can depend on a number of things such as the environmental sensitivity of the project location and the amount of available environmental data for the site. Issues with endangered species/critical habitat, biological resources, cultural resources, etc. require field studies which usually have seasonal components that can take up to a year to complete. However, with careful coordination and communication with regulators you can keep your project on track and on schedule. Always look ahead to the next phase of your project. The permitting work done during the exploration phase is for the resource development phase, etc. It is important to provide timely responses to data requests from regulators and communicate any changes as your project plans evolve. They can advise you of what impact changes may have on the process.

1.1 Getting To Know Your Regulators

It is recommended that you meet with the surface management agency and/or lead agency and any other State or local agencies with permitting authority as early as possible to discuss your plans. These early meetings allow staff to ask questions on the specific needs of your project and provide more customized assistance. The meetings provide staff with an understanding of your schedule and project details. Also, the meetings allow you to discuss the benefits of using indigenous, reliable and sustainable geothermal energy, a green energy resource that assists in meeting the State's Renewable Portfolio Standard (RPS). Under California's RPS statutes, retail sellers of electricity in California must increase the amount of renewable energy they procure by at least one percent per year, toward a target of 20 percent of retail sales by the year 2017, within certain cost constraints. State energy policy accelerates this goal by seven years to achieve 20 percent by 2010 (Energy Action Plan, 2003 Energy Report)[2]. If your project is a geothermal power generation project this is an added benefit.

[2] Personal communication from William E. Glassley, 5/2006, California Energy Commission, Research and Development Office, MS-43

After a preliminary meeting with the regulators, you will need a permit application form from the lead agency which includes a list of materials required to be filed with your application. A permit application fee is usually required at the time of submittal of your completed permit application. Bonding may also be required for exploration projects and is discussed in Exploration Activities below.

As the project applicant, you will need to prepare a thorough project description as detailed as possible. The project description should be written clearly avoiding the use of acronyms or geothermal jargon unless the terms are clearly defined. You will need a site plan and topographic maps to accompany your detailed project description. It is important to follow the requirements carefully because the time line to process your application does not begin until your application is accepted as "complete". The agency staff will review the materials for clarity and completeness after your submittal. They may have questions or request additional information before determining the project is "complete" and ready to proceed.

1.2 The Environmental Review Process

Typically, if the land and/or mineral rights have been leased from the government (e.g. Federal, State or Tribal agencies), there has been some preliminary environmental review performed during the leasing process. However, if it is a project on privately owned land with privately held mineral rights, that probably is not the case. If you have privately held mineral rights be prepared to provide proof of ownership of the mineral rights for permitting or financing requirements.

The permitting process is largely determined by Land Ownership/surface management and/or Mineral Rights Ownership. Geothermal resources are classified as mineral resources by both the Federal government (Geothermal Steam Act of 1970, Public Law 91-581, 84 Stat.1566, 30 USC 1001-1025) and the state of California (Public Resources Code Section 6903) instead of groundwater, as in some states. This consistent definition provides a similar but separate approach by the State and Federal governments for the permitting process.

Although a project may be on Federal lands, there will be State requirements that must be met. In some cases, Federal laws have been delegated to State agencies for local enforcement. Other factors determining the permitting process include the type of project proposed, power generation or direct use, and resource chemistry.

Prior to exploration or resource confirmation activities the environmental regulatory process begins. The first steps are as follows:

- **Determine the "lead agency" for California Environmental Quality Act/National Environmental Policy Act (CEQA/NEPA)/meet with regulators**
- **Post the required bonds**
- **Submit a "complete" permit application**

Thanks to extensive online capabilities, the government codes for both the State and Federal government are available on line as are most regulations for State agencies. Some permit application forms are also available online. Websites and Government code citations are included in the text or in the Reference and Resources Section of this Guide. Many of the State

and Federal regulations were originally developed for other types of resource development projects like mining, oil and gas, or gravel extraction, but now are used for geothermal projects.

1.3 What is a Lead Agency?

A lead agency[3] is the public agency which has the principal responsibility for approving a project. Lead agency determination for geothermal projects is affected by surface management or land/mineral rights ownership. The permitting process differs depending on this determination and will establish which agency will be the "lead agency". The surface management and land and/or mineral ownership can be Federal, Tribal/Indian, State or private.

For projects on Federal lands or with Federal mineral rights in California there can be a lead agency for the State and one for the Federal government. Usually joint environmental documents can be prepared to address this situation. Regardless of the surface management agency or land ownership, it is likely that State permits will be required, particularly for power generation.

The surface management agency for Federal lands (according to Subpart 3200.1 of the Code of Federal Regulations) means any Federal agency other than Bureau of Land Management (BLM) which is responsible for managing the surface overlying Federally-owned minerals. This could be the U.S. Forest Service (USFS), as is the case for holdings in Siskiyou and Modoc County, or the Department of Defense (the Navy at Coso). Those agencies must agree to the leasing of the lands they manage before BLM can issue leases.

On Tribal land/Indian country, the lead agency is the Bureau of Indian Affairs (BIA) for third party leases or for tribal development projects. When Federal funding is used by Indians on Indian land, the project must comply with the National Environmental Policy Act (NEPA). The U.S. Environmental Protection Agency (EPA) may be the lead agency, or the federal funding agency (i.e. DOE). Tribal lands or Indian Country are Sovereign Nations, which gives them authority over their land. Many have their own government. On some Indian lands, Congress authorized the EPA to delegate to Indian tribes specific enforcement and regulatory authority of EPA regulations.

In the case of the Ft. Bidwell Indian Community exploration project, funding from the U.S. Department of Energy (U.S. DOE) determines that they are the lead agency for NEPA. [4]

For State owned land and/or mineral rights, the surface management would be the State Lands Commission and for privately owned lands and mineral rights it would be the local land use authority such as a County or City government. (Table 1)

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[3] Federal: A "Lead Agency" is the federal agency with primary responsibility for complying with NEPA on a given proposed action [40 CFR 1508.6;1508.17;Forty Questions No. 14(a)]. If more than one federal agency is involved in a proposed action then the lead agency is determined by considering: Magnitude of the federal agency's involvement; approval authority over the proposed action; expertise with regard to environmental effects; duration of the federal agency's involvement; sequence of the federal agency's involvement [40 CFR 1501.5 (c)].

State: Lead agency is defined in § 21067 of the California Public Resources Code of the California Environmental Policy Act (CEQA) as "the public agency which has the principal responsibility for carrying out or approving a project which may have a significant effect upon the environment".

[4] Appendix D of the Ft. Bidwell Indian Community DOE Contract Geothermal Exploratory Slim-Hole Drilling, Permitting and Environmental Compliance Plan.

Table 1. Lead Agency Determination by Land and Mineral Ownership*

	Mineral Ownership		
LAND OWNERSHIP	**Private**	**State**	**Federal**
Private			
Leasing		SLC	BLM
Exploratory	CDOGGR **	CDOGGR	BLM/Local
Development	Local/Energy Commission	Local/Energy Commission	BLM/Local/Energy Commission
State			
Leasing		SLC	SLC/BLM
Exploratory		CDOGGR	Local/BLM
Development		Local/Energy Commission	Local/Energy Commission/BLM
Federal			
Leasing			BLM/DOD
Exploratory			BLM/USFS/DOD
Development			BLM/USFS/DOD

*Table adapted from County of Lake Geothermal Permit Handbook 1984 ** Imperial County is lead agency.

CDOGGR = California Division of Oil, Gas and `Geothermal Resources
SLC = State Lands Commission
Energy Commission=California Energy Commission (>50 MW net)
BLM= Bureau of Land Management
USFS= U.S. Forest Service
DOD= Department of Defense
Local= Local government, County or City

The California Division of Oil, Gas and Geothermal Resources (DOGGR) is the lead agency for exploratory projects on both State and private lands pursuant to Public Resources Code (PRC) § 3715.5 under the California Environmental Quality Act (CEQA) for exploratory geothermal projects except in Imperial County. Imperial County, under California Code of Regulations (CCR) § 1683.7 developed a Geothermal Element to their General Plan that was determined to meet the criteria by DOGGR to warrant delegation of authority for exploratory projects in 1985. This is why Imperial County is listed as the lead agency in Table 1. for exploratory projects on private lands. A complete set of current DOGGR regulations is available on their website: www.consrv.ca.gov/DOG/geothermal.

The State owns several large parcels of reserved mineral interest school lands at The Geysers geothermal field in Sonoma and Lake Counties, roughly one-third of the productive acreage there (Jeffery Adams, 2005, State Lands Commission). However, compared to Federal lands within California, the State's land or mineral ownership with geothermal potential is limited in scope and consists mostly of small, scattered parcels.

There can be situations where the leaseholder has mineral rights but "no surface access" on that parcel. This typically requires surface access to a nearby parcel that will allow for directional drilling under the parcel with the restricted surface access. Depending on whether the mineral rights are State or Federal, it could require two lead agencies. Also, surface lands can be privately owned with the mineral rights acquired by a different entity under the Federal Stock-Raising Homestead Act of 1916, as was the case in about 8% of The Geysers located in Lake County (1984 Lake County Geothermal Permit Handbook, p. 45).

For development projects on private lands local governments are the lead agency unless it is a power plant project >50 Mega Watts (MW) net, then the California Energy Commission is the lead agency.

1.4 What are NEPA and CEQA?

If the project is on leased Federal lands or there are Federal Mineral Rights, it will also be subject to the **National Environmental Policy Act** (NEPA) (42 USC 4321; 40 CFR 1500.1). Tribal projects using Federal money or third party leases on Tribal land/Indian Country are also subject to NEPA.

If on State or private lands, it will be subject to the **California Environmental Quality Act** (CEQA)((PRC 21000-21177) and the CEQA Guidelines (CCR, Title 14, Division 6, Chapter 3, Sections 15000-15387).

For projects with Federal mineral rights and privately owned surface lands (i.e. The Federal Stock-Raising Homestead Act of 1916) both NEPA and CEQA apply, and would require a lead agency for each.

Both laws are public processes to examine the potential environmental impacts that may result from the proposed project. They are applied to all projects, not just geothermal projects. Both laws provide opportunities for other agencies and members of the public to provide input to the process through public meetings and written comments and/or questions that will require responses. For projects in California on federal land or land with federal mineral rights, NEPA regulations encourage joint planning processes, environmental research, public hearings and joint environmental documents with the lead agency for the state jurisdictions. Figure 2 shows a comparison of both NEPA and CEQA processes.

There are comprehensive websites available for both processes. The NEPA site is http://ceq.eh.doe.gov/nepa/nepanet.htm and the CEQA site is http://ceres.ca.gov. There are also excellent publications available for in depth, step-by-step compliance with CEQA or NEPA (See References and Resources)

Due to staffing limitations, lead agencies often hire third party consultants to prepare the environmental documents for a project often with the funding paid for by the applicant as part of the application process.

1.4.1 NEPA

The environmental regulatory process on Federal lands is governed by NEPA which begins during the leasing stage with one of the following: an Environmental Assessment (EA), Finding of no Significant Impact (FONSI) or an Environmental Impact Statement (EIS). The FONSI is based on the results of the preparation of an Environmental Assessment. The EA is the equivalent to the Initial Study in the CEQA process, a less comprehensive review than an EIS (NEPA) or an EIR (CEQA). It is probably no longer sufficient to assess the potential impacts for leasing in California. This environmental review is prepared prior to the exploration phase of a project. Depending on which type of environmental review was required for leasing (an EA or an EIS), the NEPA process continues by evaluating the potential for environmental impacts of the entire project to be built as planned including each stage of development as well as the cumulative impacts for long term operations. This includes pipelines, electrical transmission lines, structures, access roads, buildings, etc. It is likely that a project will require an Environmental Impact Statement.

Other permitting requirements apply to your project, but most will use the environmental evaluation done by the lead agency to make their determinations. These agencies will be consulted by the lead agency during the environmental review process and are known as "Coordinating Agencies" in the NEPA process. The can participate by commenting on the proposed projects potential for environmental impacts as well as participate in the public scoping and hearing process during the EIS process.

Third party leases on Tribal/Indian land/country also use NEPA. However, for tribal projects, Tribes can establish their own environmental regulations and policies. If they have financing from the federal government they must use NEPA. The lead agency can be the U.S. Environmental Protection Agency (EPA) or the agency providing the funding.

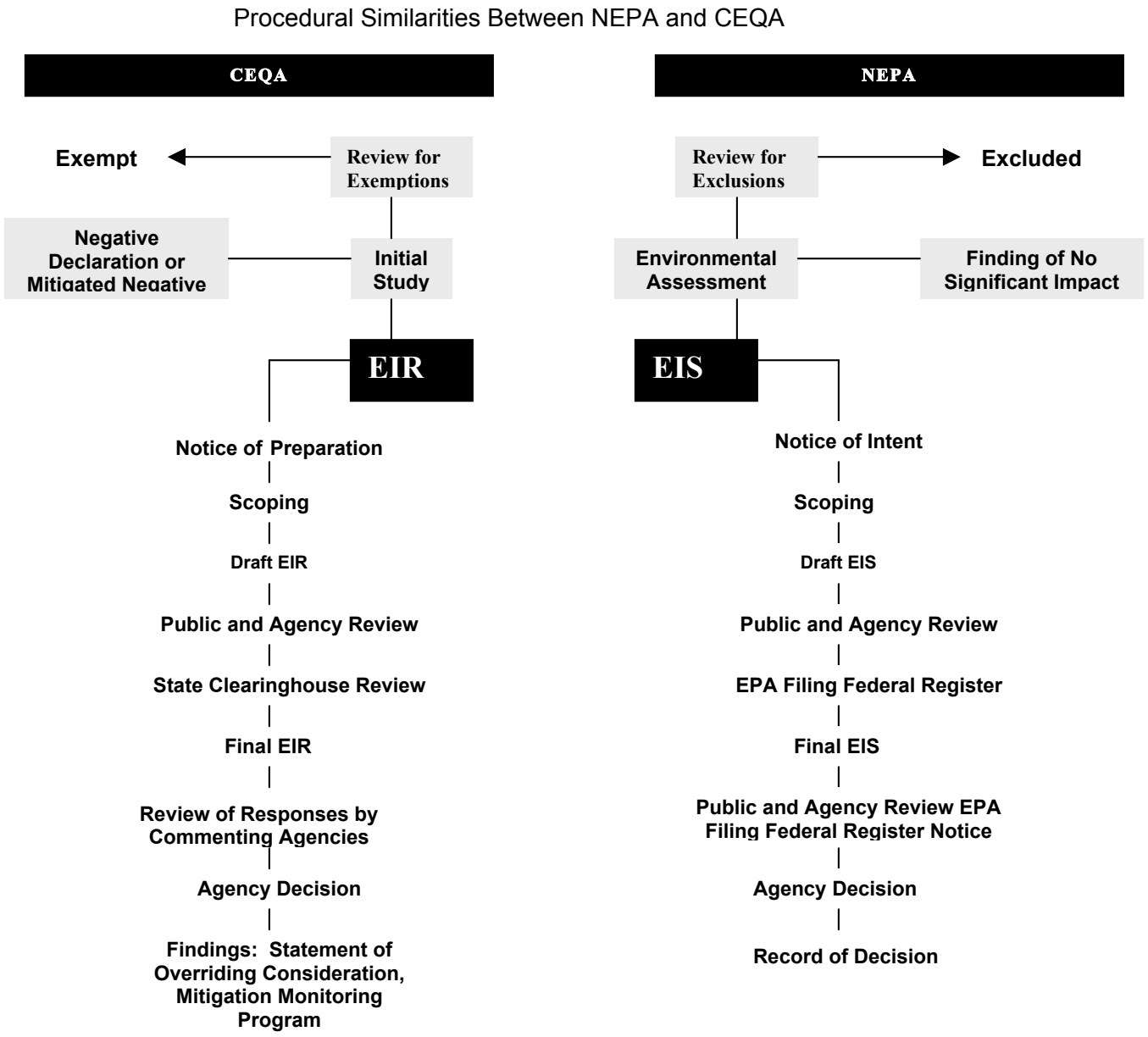
1.4.2 CEQA

On State Lands or private property the environmental regulatory process is governed by the California Environmental Quality Act (CEQA). Sixteen states have Environmental Impact Assessment Laws. Three of the sixteen, California, Hawaii and Montana, have Known Geothermal Resource Areas (KGRAs). The CEQA process is initiated on State lands during the leasing process, which is administered by the State Lands Commission (SLC).

For projects on private lands, filing an application for an Exploration permit triggers the CEQA process. The first step is to determine if the project is eligible for a CEQA exemption. If the project does not qualify for an exemption, the next step is to review the CEQA checklist (Figure 4) included in the CEQA Guidelines, also known as Appendix G and preparing an Initial Study. If any impacts identified in the Initial Study cannot be easily mitigated (Mitigated Negative Declaration), the project review may proceed to a more in depth discussion in an Environmental Impact Report (EIR). An EIR is likely for many direct use projects and power production projects less than 50 MW net which are exempt from the Energy Commission's Application for Certification process and. Under certain circumstances (i.e. redevelopment of a location where a

power plant was removed) a mitigated negative declaration (MND) may be sufficient. Some direct use projects and additional units being added to an existing power generation project (if the total power production remains under 50 MW net) may also qualify for a mitigated negative declaration. A mitigated negative declaration is designed to mitigate or avoid a project's potential significant impacts. Changes and mitigation measures must be agreed upon by the project proponent and the lead agency prior to public review of the MND (Figure 3 CEQA Process Flow Chart). Other permitting requirements apply, but most will use the environmental evaluation done by the lead agency to make their determinations. These agencies will be consulted by the lead agency during the environmental review process and are known as "Responsible Agencies" in the CEQA process. They can participate by commenting on the proposed projects potential for environmental impacts as well as participate in the public scoping and hearing process during the EIR process.

Figure 2. Procedural Similarities Between The National Environmental Policy Act (NEPA) And The California Environmental Quality Act (CEQA)



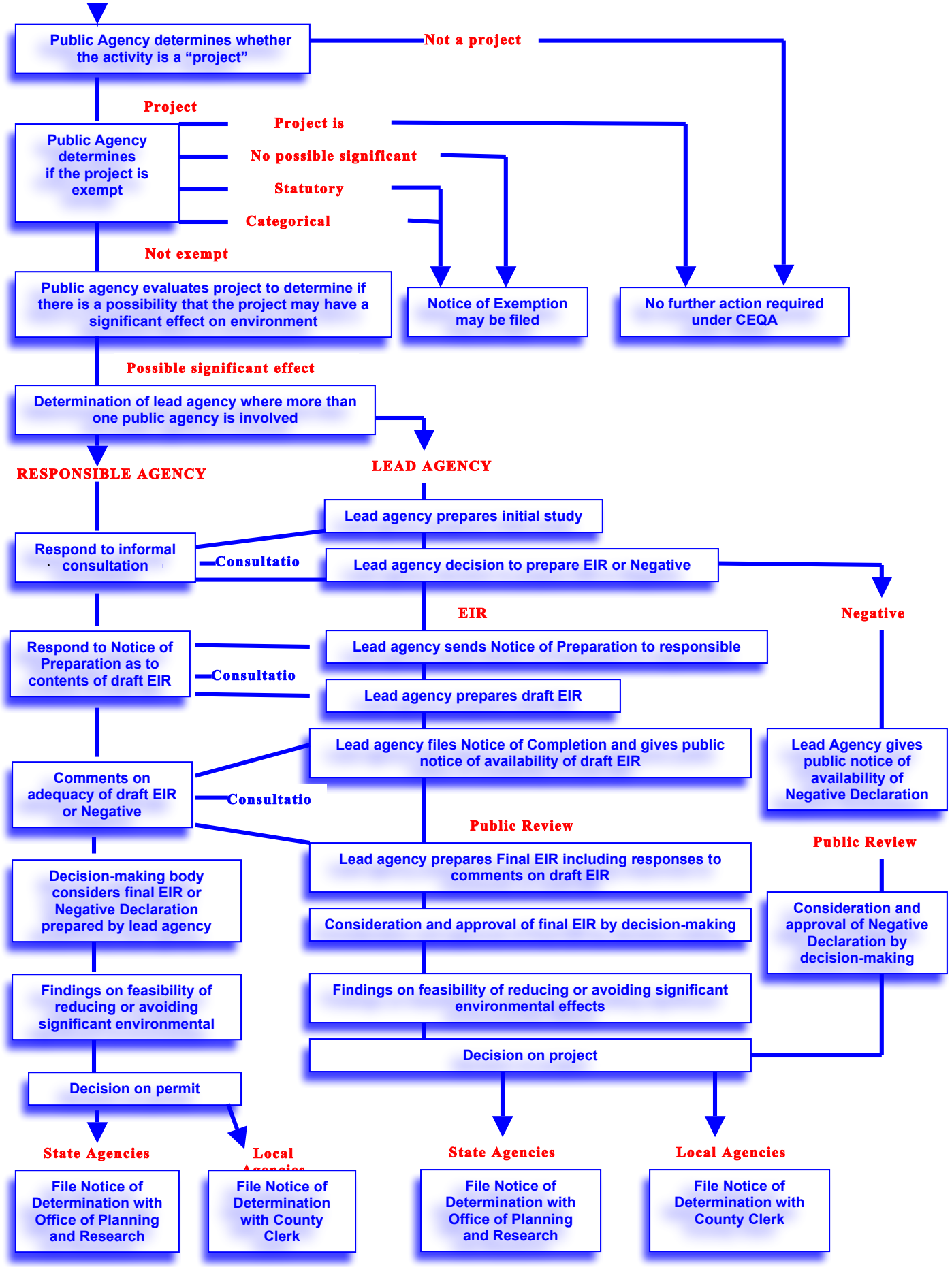
Elimination of Duplication between NEPA and State and Local EIS Requirements

NEPA regulations encourage the following:

- Joint planning processes
- Joint environmental research
- Joint public hearings
- Joint environmental documents

*Adapted from the NEPA Book, A Step-by-Step guide on How to Comply with the National Environmental Policy Act, 2001 (Second) Edition.
Ronald E. Bass, Albert J. Herson, Kenneth M. Bogdan, Solano Press Books

FIGURE 3. CEQA PROCESS FLOW CHART



*http://ceres/ca/gpv/ceqa/images/CEQA_process_chart.gif

Figure 4. CEQA Appendix G - Environmental Checklist

www.ceres.ca.gov/ceqa/guidelines/appendixg

The CEQA checklist is used to determine what type of environmental action under CEQA will be required once a proposal is determined to be a "project" and not eligible for exemptions. The complete checklist is 12 pages and listed at the web site address above. This is a summary, listing the topics included for CEQA review, which are as follows:

Aesthetics
Agriculture Resources
Air Quality
Biological Resources
Cultural Resources
Geology/Soils
Hazards & Hazardous Materials
Hydrology/Water Quality
Land Use/Planning
Mineral Resources
Noise
Population/Housing
Public Services
Recreation
Transportation/Traffic
Utilities/Service Systems
Mandatory Findings of Significance

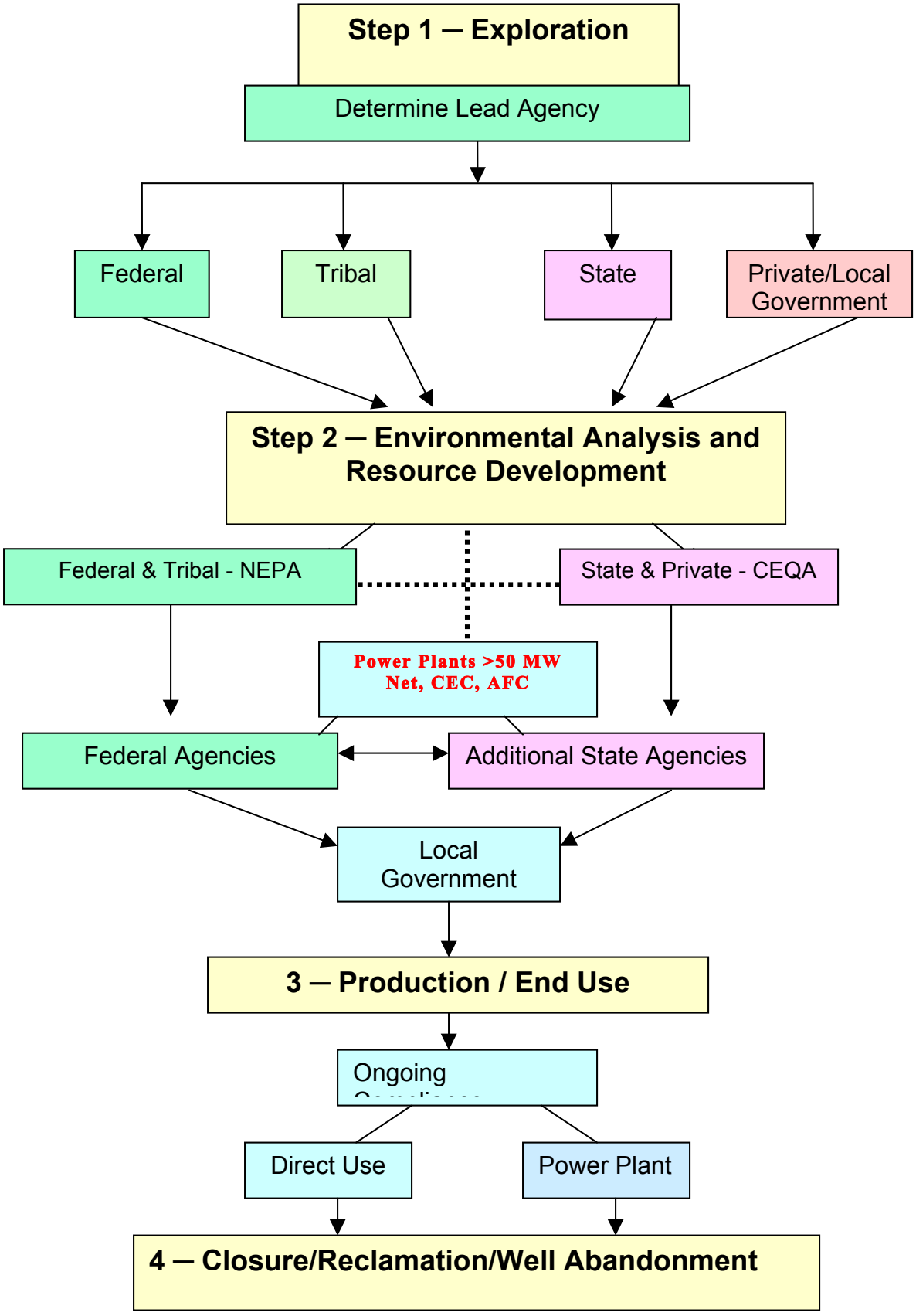
For each topic there are a series of questions with four choices for answers meant to determine the potential for impacts as follows:

- Potentially Significant Impact
- Less Than Significant with Mitigation Incorporation
- Less Than Significant Impact
- No Impact

The answers to each topic are then evaluated in an initial study process to determine which type environmental action should be taken. The options are:

- Negative declaration
- Mitigated negative declaration
- Environmental Impact Report

Figure 5
California Geothermal Permitting Guide Flow Chart



1.5 CEQA Regulatory Program: Application for Certification Process – California Energy Commission

Projects capable of generating 50 MW net or more of electrical power fall into the jurisdiction of the California Energy Commission (Energy Commission). The Energy Commission has a Certified Regulatory Program which delegates it lead agency status under CEQA. The Commission does not prepare EIRs but prepares a functionally equivalent document known as an Application for Certification (AFC), which includes the AFC prepared by the applicant, Staff Assessments and Committee reports. The Commission's AFC is a 12 month process, but can be expedited to a 6 month process if a project meets specific criteria. The criteria include qualifying for a negative declaration as defined by CEQA, resulting in no significant impacts. The AFC process is discussed further in the Well field/Resource development portion of this guide. It was mentioned here due to the environmental review/CEQA component to the process.

1.6 Responsible/Coordinating Agencies

Responsible Agencies (CEQA) as mentioned above are additional public agencies that are included as part of the CEQA or NEPA process (Coordinating Agencies) or the AFC process. They are asked to provide comments as to the potential for environmental impacts and if appropriate suggested mitigation or monitoring measures for the proposed project. They may also participate during the public scoping and hearing process. These agencies may require additional environmental permits depending on the specifics of your project. Once the lead agencies are determined, the location of the project will determine what additional jurisdictions may be needed such as which Regional Water Quality Control Board, Air District, DOGGR office and local government agencies you will need to contact in regard to potential permitting needs. Listed below are the most common California agencies with which you may need to interact:

- State Lands Commission (on State Lands only)
- California Environmental Protection Agency which includes:
  - Air Resources Board/Local Air Districts
  - Department of Toxic Substances Control
  - State Water Resources Control Board/Regional Water Quality Control Boards
- Resources Agency:
  - Department of Conservation; Division of Oil, Gas and Geothermal Resources
- California Energy Commission
- Department of Fish and Game
- State Historic Preservation Officer (SHPO)

Also, some Federal laws are administered through state agencies such as the Clean Water Act and Clean Air Act, etc. State power over activities on Indian land is generally narrow. However, non-Indians within Indian country are subject to ordinary state laws except where Indians, their property, or tribal self government are subsequently affected (L. Slade "Puzzling Powers: Tribal/Federal/State/Jurisdiction in Indian Country).

Federal Agencies that may need to be contacted depending on the location of the project and/or the proposed activities are the:

- U.S. Fish and Wildlife Service

- U.S. Army Corps of Engineers
- U.S. Environmental Protection Agency

Local Government

There are nine counties out of the 58 in California that include designated Known Geothermal Resource Areas (KGRAs). Some counties with geothermal resources have geothermal zoning ordinances, policies and/or Geothermal Energy Elements in their General Plans (Lake, Lassen, Imperial, Modoc, Siskiyou). It is important to become familiar with their requirements as well as the local regulators in the earliest stages of your project.

2.0 Exploration Activities

Definitions for exploration activities vary slightly from BLM, State Lands and DOGGR. The State has a bifurcated classification system, regulating low-temperature resources differently than high-temperature resources. DOGGR has a different fee and bonding schedule for direct uses. A complete list of the details for all DOGGR regulations including bond amounts and options is available at the DOGGR website www.consrv.ca.gov DOG/geothermal (Chapter 4, §3700 et seq. Division 3, Public Resources Code). It is during the exploration phase, once a resource has been confirmed, that the environmental analysis and permitting process for the proposed project proceeds.

Federal Projects

The leasing process on federal lands was established by the Geothermal Steam Act of 1970, (30 USC. 1001-1025). Following the Act, federal regulations were promulgated for leasing, exploration and development (43 CFR, 3200 et. seq.) and as mentioned in the Preface, will be amended due to the Energy Policy Act of 2005.

The Federal Government defines exploration operations as any activity relating to the search for evidence of geothermal resources, where you are physically present on the land and your activities may cause damage to those lands. Exploration operations include but are not limited to the following:

- Geophysical operations,
- Drilling temperature gradient holes
- Drilling holes for seismic exploration
- Core drilling (or any other drilling method excluding production)
- Related construction of roads and trails and cross country transit by vehicles over public land

The Bureau of Land Management (BLM) in 43CFR 3250 issues an exploration permit (form 3200-9) known as the Notice of Intent to Conduct Geothermal Resource Exploration Operations. Having a lease is not required in order to apply for the permit, but approval is needed from the surface management agency (U.S.F.S., DOD, etc.)

The U.S. Forest Service is responsible for the pre-leasing environmental review in national forests (Lake County/Modoc County) as well as pre-leasing resource assessments such as shallow temperature gradient holes within the national forest. However, once a decision to proceed is made, the actual Plan of Operations is administered by the Bureau of Land Management. The U.S. Forest Service does retain responsibility for regulating road and transmission line access to leased areas if the routes are in unleased areas of the National Forest.

The BLM Geothermal Resources Operational (GRO) Order No. 2, Drilling, Completion and Spacing of Geothermal Wells covers all exploratory wells and initial development wells (30 CFR 270.11 and in accordance with 30 CFR 270.14, 270.15 and 270.40). The order states that all wells shall be drilled in such a manner as to minimize damage to the environment and protect life, health, protect usable ground waters and geothermal resources. The Order specifies technical requirements for well casings, spacing, etc. All wells drilled under GRO No. 2 are required to be included in an exploratory or development Plan of Operations as required under 30 CFR 270.34.

Private Lands or State Lands

DOGGR is the lead agency for exploration on State lands or privately owned properties except in Imperial County, which was discussed above. DOGGR defines an exploratory project (21065.5 Public Resource Code) as having not more than six wells and associated drilling and testing equipment whose "chief and original purpose is to evaluate the presence and characteristics of geothermal resources prior to commencement of a geothermal field development project". Wells must be located at least one half mile from commercial geothermal development wells. DOGGR has three Geothermal Districts and three offices in the State to make it easier for explorers and/or operators to have access to DOGGR personnel for field inspections, etc. Their offices are located in Santa Rosa, El Centro and Sacramento.

An owner or operator may submit to the DOGGR Supervisor for approval a written program to drill a shallow well or wells for temperature-gradient monitoring purposes. In order to qualify under this section (Chapter 4, Division 3, Public Resources Code §3724.1) a program shall contain not more than 25 wells and the maximum total depth of each of these wells shall not exceed 250 feet. The fee requirement for the shallow wells is $25 per well or $200 per program whichever is less.

Your program to drill the shallow wells or temperature-gradient holes needs the approval of DOGGR. If the owner or operator has not received a response from DOGGR within 10 working days, the program shall be approved automatically (Chapter 4, Division 3, PRC §3724.3).

State Lands Commission

Although they are not the lead agency for exploration projects on state lands, State Lands Commission can issue two types of exploration permits prior to leases being issued. One is a Non-exclusive Exploration Permit for Geothermal Resources (PRC §6909) which does not give the permittee a preferential right to a geothermal lease, but allows for preliminary information gathering, geological, geophysical and geochemical exploration. It can include shallow temperature gradient holes from a truck-mounted rig. Depending on the location and the nature of the proposed activities, the SLC's Division of Environmental Planning and Management would determine what type of CEQA documentation would be required.

The second is a Geothermal Resources Prospecting Permit (PRC §6910) which does give the permittee the exclusive right to explore the permit area for a period of two years with a possible two year extension. If geothermal resources are discovered in commercial quantities, the permittee has a preferential right to a geothermal lease. However, an applicant is required to submit a Prospecting Program containing a time schedule of specific prospecting activities. The Prospecting proposal must include the drilling of at least one geothermal well deep enough to determine the presence of commercially viable geothermal resources and measure the production potential.

2.1 Bonding for Geothermal Wells/Projects

2.1.1 BLM

Although bonds are required as part of the leasing process, BLM additionally requires all permit applicants to file a surety or personal bond. The bonds range from $5,000-$100,000 (43 CFR §3273) depending on the specifics of the project(s). The amount of the bond for a direct use project is determined by BLM based on the specifics of the project. The fees are $5,000 for a single exploration project, $25,000 for a statewide bond or $50,000 for a nationwide bond for exploration projects. A bond for a Site License is at least $100,000 (43 CFR§3273.19).

2.1.2 DOGGR

Individual Bonds - The bonding amount is $25,000 for an individual bond (Chapter 4 §3725. Division 3, Public Resources Code) for the drilling, redrilling, deepening, maintaining, or abandoning of any well except a low-temperature geothermal well.

Blanket Bond – The bonding amount is $100,000 for a "blanket bond" which is for the drilling, redrilling, deepening, maintaining, or abandoning of one or more wells at any time. (Chapter 4 §3726 Division 3, Public Resources Code).

Low Temperature Well bond - (as defined in Chapter 4 §3725.5 Division 3, Public Resources Code). Any person who engages in the drilling, redrilling, deepening, maintaining, or abandoning of any low-temperature well shale file an individual indemnity bond in the amount of:

- $ 2,000 for each well less than (<) 2,000 feet deep
- $10,000 for each well 2,000 feet deep or <5,000 feet deep
- $15,000 for each well 5,000 feet deep or <10,000 feet deep
- $25,000 for each well 10,000 feet deep or more.

DOGGR does offer substitutes for bonds as evidenced in the California Code of Civil Procedure §995.710. The applicant may deposit with the Office a variety of options such as:

- The full amount in "lawful money of the United States" which will be held in an interest-bearing trust account;
- Bearer bonds or notes;
- Certificates of deposit payable to the officer, not exceeding the federally insured amounts
- Savings accounts
- Investment certificates, etc.

2.1.3 Annual Well Fees

In addition to bonding and well permitting fees, there is an annual fee to be paid per well. Well production reports are filed with DOGGR and BLM (if wells are on federal lands). The well production reports are used to determine royalty payments on leases.

2.2 Local Government Permits

If a project is located on private land with privately held mineral rights, the local government is the lead agency with CEQA responsibility. Some counties with geothermal resources have prepared and adopted Geothermal Elements for their General Plans or geothermal policies and zoning ordinances. The Lake County and Imperial County Geothermal Elements are in the process of being updated (2006). After determining the zoning designation and any General Plan policies that may relate to geothermal projects, a meeting with the Planning Department staff is recommended to review your project (as suggested in the Getting Started part of this Guide). To initiate the CEQA process, an applicant will usually need to apply for a Conditional Use Permit.

Other local government permits will most likely be needed regardless which agency is the lead agency throughout the exploration and development phases of your project. There may be signage requirements, noise abatement requirements, fencing requirements, lighting requirements, restrictions on drilling times, etc. some based on the distance to the nearest residence. Typical permits needed from local government are listed below. However, they may vary by jurisdiction and it is recommended that those requirements be clarified when meeting with the regulators prior to initiating your project.

2.2.1 What is a Conditional Use Permit (CUP)?

A conditional use permit allows a city or county to consider special uses through a public hearing process (CGC § 65803). These uses may be essential or desirable to a particular community, but are not allowed as a matter of right within a zoning district. A conditional use permit can provide flexibility within a zoning ordinance. Another traditional purpose of the conditional use permit is to enable a municipality to control certain uses which might have negative effects on the community.

A CUP is considered a discretionary act and will be considered at a public hearing and if approved is generally subject to a number of pertinent conditions of approval. An environmental CEQA checklist (CEQA Guidelines Appendix G: Environmental Checklist) is typically included as part of the application process, followed by an initial study for most geothermal projects. A summary of the checklist is shown in Figure 4. This review will determine what type of environmental document will be needed, if any.

2.2.2 Who Needs a Grading Permit?

Geothermal projects which include earthmoving and grading activities (well pads, access roads, reserve pits, etc.) usually need to apply for a grading permit from the local Public Works Department or Building Department. They are usually based on the Uniform Building Code and require an application and a fee to be paid often based on the amount of earth to be moved and the project complexity such as sump cleanouts, minor road improvements and pad expansions. Some larger earthmoving projects such as new pad and road construction, are also subject to an inspection agreement at an additional charge to the applicant. These requirements and fees can vary between local governments.

2.2.3 Who Needs an Encroachment Permit?

Generally an encroachment permit is required for anything placed in, over or under a County or State right-of-way, as well as where a private access road or driveway joins a public road.

Once again, there is usually a fee and an application to be submitted. Check with the local Public Works or Building departments as well as CalTrans if it is a state highway. If you do need a permit from CalTrans, it should be done as soon as possible as it can be a lengthy process. Some counties require a Transportation permit for hauling oversized equipment (i.e. drill rigs and turbine/generators) on public roads.

2.2.4 Who Needs Local Health Department Clearance

Local health departments may have requirements for the disposal of domestic sewage and provisions for a domestic water supply. This may include portable toilets, onsite water supplies and showers. You should check with the local health department for rules to ensure compliance.

2.3 What is the California Permit Streamlining Act?

The Permit Streamlining Act requires public agencies (including charter cities per §65921) to follow standardized time limits and procedures for specified types of land use decisions. For the purposes of the Act, "development projects" applies only to adjudicatory approvals such as tentative maps, conditional use permits, and variances. Ministerial projects such as building permits, lot line adjustments, and certificates of compliance are not subject to the time limits established under the Act.

> *The Permit Streamlining Act is reminiscent of a flashing light. It turns on when an application is submitted, off when accepted as complete and the environmental review (CEQA) process begins, and on again after the CEQA determination has been made (California Government Code § 65950).*

All public agencies must establish one or more lists specifying, in detail, the information required from applicants for a development project (CGC §65940). Upon receipt of a project application statement identifying the application as being for a "development permit," an agency has **30 calendar days** to notify the applicant, in writing, of whether or not the project application is complete enough for processing. When rejected as incomplete, the agency must identify where deficiencies exist and how they can be remedied. The resubmittal of the application begins a new **30-day** review period. If the agency fails to notify the applicant of completeness within either of the 30-day periods, the application is deemed to be complete (§65943; Orsi v. City Council (1990) 219 Cal.App.3d1576). If rejected as incomplete a second time, the applicant may appeal the decision to jurisdiction's hearing body that must make a final written determination within **60 calendar days**.

The Permit Streamlining Act is included in this Guide to increase awareness of the time limits and data requirements established by the Act that regulators must follow. These time limits are beneficial for keeping your project on track.

2.4 Air Quality Permits/Issues – Exploration

The role of the air district varies depending once again on the surface management/mineral rights ownership. In some cases the air district can be a lead agency for the State environmental process when the project is on federal lands (e.g., Coso), or their role maybe that of a responsible or reviewing agency.

Exploration activities consisting of construction, drilling and flow testing are short-term and have minimal potential to conflict with applicable California Air Resources Board (CARB) or regional air districts Air Quality Plans.

Air quality issues vary from district to district depending on the location and their "attainment" status for national ambient air pollutant standards and California ambient air pollutant standards. Once again, the appropriate Air District should be contacted prior to exploration activities to determine any need for permits.

Most air quality impacts from geothermal exploration projects are temporary. The sources are usually combustion engines for equipment and fugitive dust. The short-term combustion emissions can be criteria air pollutants Carbon Monoxide, Nitrogen Dioxide, Sulfur Dioxide and Particulate Matter < 10 microns in size (CO, NO_2, SO_2 and PM_{10}), or precursors of criteria air pollutants such as Volatile Organic Compounds (VOCs), and air toxics (diesel PM, acetaldehyde, benzene and formaldehyde). However, typically the amounts are small enough not to violate any air quality standards.

Much of today's exploration equipment (rig and air compressors, etc.) falls into the CARB Portable Equipment Rule. More information is available on their web site (www.arb.ca.gov) Rulemaking 1997-02 Initial Statement of Reasons (ISOR) Statewide Portable Equipment Registration Program and Rulemaking 1998-10 ISOR Proposed amendments to the Regulations for the Statewide Portable Equipment Registration Program.

Fugitive dust is generated during grading of the drill site and any access roads, or other grading and can be controlled by watering or applying an organic, non-polluting dust inhibitor depending on the availability of water, etc. In some cases during the field development phase, water from the geothermal resource can be used to water the roads once tested and approved by the Regional Water Quality Control Board for use in that capacity.

California has 35 Air Districts with geothermal areas located within 8 separate air districts as listed below:

- Great Basin Unified Air Pollution Control District (Inyo, Mono, Alpine)
- Imperial County APCD
- Lake County Air Quality Management District (AQMD)
- Lassen County APCD
- Modoc County APCD (Glass Mtn)
- No. Sonoma County APCD
- No. Sierra AQMD
- Siskiyou APCD

To confirm which air district your project is located in, you can refer to the map of the air districts on the California Air Resources Board web site (www. arb.ca.gov) which also includes contact information, key personnel and other useful information including regulations for the majority of the districts.

2.5 Regional Water Quality Control Boards

The State is divided into nine Regional Water Quality Control Boards which are part of the State Water Resources Control Board (www.swrcb.ca.gov). The State Board and Regional Boards are under the umbrella of the California Environmental Protection Agency (CalEPA). The State Water Board's responsibility is to ensure both water protection and water allocation governed by the Federal Clean Water Act and the State Porter-Cologne Act. Each Regional Board develops and enforces water quality objectives and implementation plans that will best protect the State's ground and surface waters, recognizing local difference in climate, topography, geology and hydrology. This means that requirements may vary by jurisdiction.

Geothermal exploration drilling projects require a place to temporarily hold geothermal drilling fluids and cuttings on site. These are most often held in reserve pits or sumps on site, adjacent to the well pad. In some cases, particularly for direct use projects in areas with limited space or other constraints, portable tanks can be used to contain the drilling fluids and cuttings. The tanks are removed by a licensed hauler after the materials have been tested for naturally occurring hazardous substances (arsenic, mercury, etc.) which determines where the materials can be disposed. Drilling muds in California must be non-hazardous, however in concentrated forms as stored on site before use some are considered hazardous materials and must be handled accordingly.

Once mixed with water for use, these materials are non-hazardous. Excess fluids produced during well testing can be evaporated in the reserve pit, which is often clay lined, and depending on the situation it may be possible to inject the fluids back into the well and geothermal reservoir (possibly as part of an "injectivity" test. This would require approval by DOGGR on private or state lands or Region 9 the U.S. EPA and BLM on federal lands in California. The injection of geothermal fluids is discussed further under Resource/Well field development. In the past, the Regional Board allowed a Waivers of Waste Discharge Requirements during the exploration stage of a project depending on the extent of the project and the analysis of the geothermal fluids and drill cuttings. Due to changes in California regulations, that may no longer be feasible.

3.0 Resource/Well Field Development

In addition to drilling wells and developing the resource with flow testing, etc. it is during this phase of development when the majority of the environmental permitting takes place for the end use of the resource. The environmental review process for the Exploration phase often starts during the leasing process. However, leases are not required when applying for a BLM Exploration permit or a Non-exclusive Exploration Permit neither for Geothermal Resources from the State Lands Commission nor for projects on privately owned lands as discussed earlier. For environmental review purposes, a non-federal project should not be broken into smaller parts, each of which alone might qualify for Negative Declaration (CEQA) in an attempt to avoid preparing an EIR. In some cases it can be risky to spend money on exploration activities with no guarantee of a lease.

The well field development and project permitting can be concurrent activities. Once the resource has been confirmed, it is advisable to move forward with the environmental review, power plant licensing or permitting of direct use projects (i.e. district heating, aquaculture, industrial processing, etc.) as it can be a time consuming process. The permitting process for power plants and direct use projects is discussed in the Production/End Uses section of this Guide.

BLM Requirements

BLM issues Geothermal Drilling Permits for drilling wells and conducting related activities such as conducting flow tests, producing geothermal fluids, or injecting fluids (43 CFR Subpart 3260, Form 3260.2). However, injection of fluids is also captured by the EPA Underground Injection Control, Class V program.

Drilling permits do require a lease from BLM. A drilling permit is also required for the construction of well pads or access roads to drilling operations. With BLM, an operations and drilling program can sometimes be combined to cover several wells, but the drilling permit cannot.

BLM requires a Construction Permit (43 CFR §3270) for construction and operation of electrical generation facilities, direct use and related facility and well field operations, including well field production and injection.

DOGGR

The California Government Code §65928.5 defines a Geothermal Field Development project as being composed of geothermal wells, resource transportation lines, production equipment, roads, and other facilities which are necessary to supply geothermal energy to any particular heat utilization equipment for its productive life, all within an area delineated by the applicant.

A Notice of Intention to Commence Drilling along with the drilling fee must be filed by the owner or operator of any well before starting to drill a well or reopen an abandoned well. Once again approval from DOGGR is necessary. If there has been no response after 10 working days without written notice from DOGGR the project is considered approved (Chapter 4, Div. 3 PRC §3724).

Injection Wells

The injection of fluids is captured by the EPA Underground Injection Control (UIC), Class V regulatory program. EPA Region 9 administers the program on federal lands in California requiring a form to be filed. In California, DOGGR has a Memorandum of Understanding (MOU) with EPA to administer the program for geothermal resources on non-federal lands. Conversion of geothermal exploratory or production wells to injection wells requires DOGGR notification or BLM notification on federal lands. BLM geothermal drilling permit covers injection wells, but a sundry notice is required from conversion of a production well to an injection well.

3.1 Local government

Although well permits are issued by state or federal agencies, many other components of a project are regulated by local government agencies. As discussed in the Exploration section of this Guide, there are a number of local government permits and approvals your project may be subject to comply with.

Direct use project requirements are based on the end use(s), which are resource and location specific (i.e. district heating, spa/pool, aquaculture, greenhouses, etc). In addition to state agencies such as the Regional Water Quality Control Boards, local governments often have the bulk of permitting responsibility for direct use projects not located on federal lands.

3.2 Local Government Permits

Local authorities are the CEQA "lead agency" for power plant projects less than 50 MW net, which are exempt from Energy Commission jurisdiction.

The following permits may be needed for your project from the exploration stage through project development for either direct use or power generation projects.

- Conditional Use Permits – Wellfield development, power plant, all related buildings and pipelines.
- Encroachment permits - needed for where a private road meets a public road.
- Grading permits – access roads, well pads, drilling sumps, etc.
- Building permits – any structures (even temporary) over a specific size.
- Health Department authorizations- domestic waste disposal and potable water supply.
- Environmental Health Department- hazardous materials management/business plans, spill reports, etc.

3.3 State Water Resources Control Board (SWRCB)

Storm Water Permit: Under provisions of the Clean Water Act (40 CFR 122-124), the SWRCB adopted the General Construction Activity Storm Water Permit, requiring developers to prepare and implement a Storm Water Pollution Prevention Plan (SWPPP) if activities disturb greater than one acre (previously had been greater than five acres).

Reserve Pits/sumps: The Regional Board may allow for a Waiver of Waste Discharge Requirements during the exploration and resource development stage of your project depending on the extent of the project and the analysis of your geothermal fluids and drill cuttings. If not, you will be required to obtain Waste Discharge Requirements, which require a fee and completed application called a Report of Waste Discharge. If a proposed project will discharge waste in a diffused manner or affect groundwater quality you are required to get Waste Discharge Requirements (WDR). Sumps can sometimes qualify for a waiver of WDR because they are usually clay lined and required to maintain a two or three foot freeboard. Typically, they require approval by the Regional Board, which requires lead time to get on the agenda. Getting on the agenda can require anywhere from a few weeks to a few months. It may be an item with discussion or could be on the consent calendar depending on the level of public interest or controversy about the project.

For a direct use project that consists of only one well, a National Pollution Discharge Elimination System Permit (NPDES) may be required if you are going to be discharging to a surface body of water. This extensive permitting process requires significant lead time. Depending on the chemical constituency of the resource as well as the temperature when it would be entering the body of water, treatment prior to discharge may be required (filtration, holding pond for cooling, etc).

3.4 Air Quality Permitting

The air quality issues during well field development remain fugitive dust and emissions from combustion engines used in the well drilling process as discussed in section 2.5 of Exploration Activities. However, as successful wells are drilled and vented to the atmosphere, the local air district may require an air monitoring program be established, particularly if it is proposed as a power generation project. An Authority to Construct (ATC) permit for any new stationary source of emissions will be required depending on the emissions (primarily Hydrogen sulfide), and the district rules. Specifics regarding the required information for the permit are available from each air district but will include data to characterize the nature and amount of emissions, location, design, construction and operations of the sources. You will also be required to analyze the effect of the new stationary source or modification on the air quality of the district.

3.5 Federal Land Policy Management Act

The Federal Land Policy Management Act (FLPMA) governs how the BLM manages public lands. Specifically, it requires the agency to manage for the multiple use and sustained yield of public land resources for both present and future generations. For geothermal development projects it applies where a right-of-way for a transmission line, pipeline or other facilities cross federal land. FLPMA also allows BLM to enter into land exchanges to enhance threatened and endangered plant and animal species. Such exchanges may involve an exchange rate of 2:1 or 3:1 (L. Battocletti, 2005 Bob Lawrence and Associates, Inc.; 2002 California Permitting Handbook)

3.6 Noise Control Act of 1972

The Noise Control Act of 1972 (42 USC 4901-4018; 40CFR 209-211) establishes noise control standards and delegates primary control to State and local governments. Noise control for geothermal development falls under the Occupational Safety and Health Act (OSHA) and BLM

43CFR 3200 et seq. In California, on non-Federal land noise control standards are included in DOGGR exploration permits and in local government permits. Noise level limitations are often included as permit conditions on Conditional Use Permits issued by local government. In power production projects >50 MW that have gone through the Energy Commission AFC process, noise control standards are included in compliance requirements. For resource/well field development projects, noise restrictions for drilling may require mufflers for worker protection as well as for wildlife and/or nearby residents. Hours of drilling operations may also be restricted.

3.7 Resources Conservation and Recovery Act of 1976

The Resources Conservation and Recovery Act of 1976 (RCRA) is administered by the U.S. Environmental Protection Agency (EPA) and provides (a) technical and financial assistance for the safe disposal of discarded materials and (b) regulation for hazardous wastes. Geothermal drilling fluids, produced waters and other wastes associated with the exploration, development or production of geothermal energy are presently exempt from RCRA. However, in California wastes must be characterized and if hazardous under the California Code of Regulations Title 22, disposed of as hazardous waste under CA Department of Toxic Substance Control Regulations.

The Endangered Species Act

The Endangered Species Act (ESA), as amended, is a Federal Law (16 USC 1531§7 & 10 16 USC 1536, 1538, 1539) administered by the Fish and Wildlife Service. The ESA may be encountered during the environmental review process for a project on federal lands if it is determined that there are threatened species of fish, wildlife, and plants that could be affected by the proposed development. The ESA provides for the conservation of ecosystems in order to provide sufficient habitat for threatened or endangered species while encouraging state programs to implement protection. There are two categories of protection, threatened and endangered. The Act prohibits unauthorized taking, possession, sale, and transport of endangered species. It also provides authority to acquire land for the conservation of listed species, using land and water conservation funds. There are civil and criminal penalties for violating the Act or regulations and rewards to anyone furnishing information leading to the arrest and conviction for any violation of the Act or any ESA regulation.

Department of Fish and Game (DFG)

The Department of Fish and Game also has regional offices like the Water Resources Control Board and the Air Resources Board. Interactions such as filing forms, etc. will be conducted through the regional office. The locations are listed on the DFG website (www.dfg.ca.gov). A meeting with the regional staff with jurisdiction for your project location combined with a site visit during the exploration/resource development stage can be beneficial in clarifying DFG regulatory requirements, if any.

The California Endangered Species Act (Fish and Game Code, Title 14)

The Department of Fish and Game administers the Act which was developed to protect the largest number of rare plants and animals of any state in the nation. There are 79 animals and 223 plants listed under the California Endangered Species Act. Habitat loss and fragmentation

is the single most important factor affecting the long-term survival of these species. To assist with the protection efforts, the CEQA process requires the filing of Fish and Game Fees. The fees are to defray the costs of managing and protecting fish and wildlife trust resources including but not limited to consulting with other public agencies resulting in environmental documents, recommending mitigation measures, developing monitory requirements for purposes of CEQA (Division 13, §2100 et seq.).

Lake or Streambed Alteration Agreements

The Department of Fish and Game is also responsible for Lake or Streambed Alteration Agreements. Section 1603 of the Fish and Game Code requires any proposed activity that will substantially divert or obstruct the natural flow or substantially change the bed, channel or bank of any river, stream or lake, or proposing to use any material from a streambed to notify the Department prior to beginning the project. This requires the completion of a form and based on that information, the Department may conduct a field inspection and propose modifications in the proposed construction to all for protection of the fish and wildlife resources. These modifications, if contested, may be referred to arbitration. The notification requirement usually applies to any work undertaken within the annual high water mark of a wash, stream, or lake, which contains or once contained fish, wildlife or riparian vegetation. The jurisdiction for Fish and Game Code, (§1600 et seq.) may be broader than the jurisdiction of the United States Army Corps of Engineers over wetlands and other surface waters.

U.S. Army Corps of Engineers (USACE)

Waters of the United States, including wetlands and navigable waters are regulated by the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act (CWA). Section 404 makes it unlawful to discharge dredged or fill material into waters of the United States without a permit from USACE. Section 401 of the Clean Water Act requires all applicants for a federal license or permit that may result in a discharge into a jurisdictional water to obtain certification from the State Water Resources Control Board/Regional Water Quality Control Board.

In addition to swamps, marshes, bogs, and similar areas, the USACE defines "wetlands" as areas that are inundated or saturated by surface water or groundwater that frequently and under normal circumstance do support a prevalence of vegetation typically adapted for life in saturated soil conditions.

USACE issues two types of permits to regulate discharges of dredged or fill material into waters of the U.S:

- Individual Permits for activities not covered by a prior authorized general permit (includes Letters of Permission and Standard Individual Permits).
- General Permits for a category or categories of activities causing only minimal adverse environmental effects (includes Nationwide Permits).

USACE regulates Navigable Waters under Section 10 of the Rivers and Harbors Act. Navigable Waters are defined as:

- Subject to ebb and flow of the tide and/or presently, historically, or potentially used for foreign or interstate commerce.

- Jurisdictional limits are not affected by modifications of a water body.
- Designated by Congress.

Any qualifying activities under § 10 of the Rivers and Harbors Act require a permit from USACE for:

- Construction of structures, in under, or over navigable waters
- Excavation or deposition of material in navigable waters
- All work affecting the course, location, condition or capacity of navigable waters (e.g., piers, boat docks, boat ramps, wharfs, weirs, booms, breakwaters, bulkheads, jetties, utility lines, transmission lines, intake/outfall structures)

Geothermal projects potentially need approval for activities such as culverts for roads or other construction activities that may cross streams or wetlands depending on your project location. Early contact with the USACE is recommended if there is any potential for needing permits or approvals as they can be time consuming to obtain.

Cultural Resource Protections

Commercial geothermal resources are often found near hot springs, fumaroles, and other surface manifestations, many of which were historically important to Native Americans for many reasons. They were used as gathering places, for ceremonial purposes, as well as healing places. The evaluation of a project site for evidence of cultural resources is part of the environmental review process under CEQA or NEPA, but are additionally governed by the following laws. If cultural resources are discovered on potential project land, mitigation measures may be required.

Section 106 of the National Historic Preservation Act (16 USC§470)

Section 106 of the National Historic Preservation Act (16 USC§470) www.nahc.ca.gov/fedhispres. is the review process requiring federal agencies to evaluate the effects of their undertaking on properties included in, or eligible for, the National Register of Historic Places (NRHP). The process affords the President's Advisory Council on Historic Preservation (ACHP) the opportunity to comment on such actions. The federal lead agency (i.e. BLM, DOD, US Forest Service, etc.) for the proposed action is responsible for initiating the Section 106 process and consulting with the State Historic Preservation Officer (SHPO) or the Tribal Historic Preservation Officer (THPO) and the ACHP. Identification and evaluation of the historic resources within a project's area of potential effects is the first step of the process. Subsequent steps involve consideration of effects, which may be followed by additional consultation with SHPO and the ACHP as well as other interested parties. Development of mitigation measures to reduce or avoid impacts is also part of the process. There are no restrictions on private owners of historic properties as long as they do not receive federal assistance or approval.[5]

Antiquities Act of 1906 (16 US Code§432,433)

[5] California Permit Handbook, 2002, California Technology, Trade & Commerce Agency, Office of Permit Assistance.

This Act authorizes the President to designate as National Monuments those areas of the public domain containing historic landmarks, historic and prehistoric structures, and objects of historic or scientific interests located on federally owned or controlled lands www.nahc.ca.gov/fedhispres. The Act includes criminal sanctions for the unauthorized excavation, injury, or destruction of prehistoric or historic ruins and objects of antiquity. The Secretaries of the Interior, Agriculture, and Defense are authorized to issue permits for archaeological investigations on lands under their control to recognized educational and scientific institutions for systematically and professionally gathering data of scientific value.

Archaeological Resources Protection Act (16 US Code §470 et seq)

The Archaeological Resources Protection Act amended the Antiquities Act of 1906. The Act establishes a requirement for the excavation or removal of archaeological resources from public or Indian lands with special permits. Violations of the law include civil and criminal penalties of fines and imprisonment.

Native American Religious Freedom Act of 1978 (42 US Code §1996)

This act sets forth the policy for protecting and preserving the rights of Native Americans to Freedom of Religion. It makes it a policy of the federal government to protect and preserve for American Indians, Eskimos, Aleuts, and Native Hawaiians their inherent rights of freedom to believe, express, and exercise their traditional religions. It allows them access to sites, use and possession of sacred objects, and the freedom to worship through ceremonial and traditional rites.

Executive Order 13007 of 1996

The Order requires that federal agencies accommodate access to and avoid adverse effects to the physical integrity of sacred sites. Agencies are required to provide reasonable notice of proposed actions that may restrict future access to or ceremonial use of, or adversely affect the physical integrity of sacred sites.[6]

Native American Graves Protection and Repatriation Act (25 US Code §1301)

The Act requires federal agencies and recipients of federal funds, such as universities, museums, and governmental agencies, to document Native American human remains and cultural items within their collection. It requires recipients to notify all Indian tribes and Native Hawaiian organizations that are or are likely to be affiliated with these holdings, and to provide an opportunity for the repatriation of appropriate human remains or cultural items. Cultural items include associated and unassociated funerary objects, sacred objects, and objects of cultural patrimony.

[6] Geothermal Direct Use Engineering and Design Guidebook, 1998, Third Addition, Chapter 19, Environmental Considerations

4.0 Production/End Uses – Power Production Or Direct Use Projects

Although the permitting necessary for power production projects and direct use projects should begin after resource confirmation/exploration the permitting process is addressed in this section of the Guide.

4.1 Power Plant Licensing - The California Energy Commission

The California Energy Commission (Energy Commission) has exclusive jurisdiction over thermal power plants 50 MW net or more, even on Federal lands (Title 20, California Code of Regulations §2701 et. seq.) This also includes transmission lines that carry the electricity from a power plant with a generating capacity of 50 MW or more to the first point of interconnection. The Energy Commission does not permit either the resource or the well field; however, there is a resource adequacy requirement.

The Energy Commission siting process has been determined to be a Certified Regulatory Program which delegates it lead agency status under CEQA. The Energy Commission does not prepare EIRs but prepares a functionally equivalent document. The applicant prepares and submits an Application for Certification (AFC), from which Energy Commission staff prepares their Assessments and Committee reports. The Energy Commission license/certification subsumes all requirements of state and regional agencies otherwise required. The Energy Commission also coordinates with the federal agencies that will be issuing permits to ensure Energy Commission certification incorporates conditions and certification that would be required by federal agencies. The Energy Commission's AFC is a 12 month process, but can be expedited to a 6 month process as discussed below. The following publications are available on the Energy Commission website: www.energy.ca.gov

Rules of Practice and Procedure & Power Plant Site Certification Regulations (Energy Commission publication P800-00-0006, 8/2000)

Energy Facility Licensing Process, Developer's Guide of Practices & Procedures Staff Report/Draft (Energy Commission publication P700-00-007, 11/2000). A "plain English" guide to understanding the rules and regulations pertaining to the power plant licensing process.

Geothermal power plant projects are exempt from the filing and compliance fees associated with the AFC process because geothermal is considered a renewable resource.

Table 2. Example of the 12-Month AFC Schedule

Activity	Calendar Days
Applicant files Application for Certification (AFC)	-45
Executive Director's recommendation on data adequacy (completeness)	-15
Decision on data adequacy at the business meeting	0
Staff files data requests (round 1)	15
Staff files Issue Identification Report	35
Applicant provides data responses (round 1)	45
Information hearing and site visit	45
Data response and issue resolution workshop (round 1)	55
Staff files data requests (round 2, if necessary)	65
Applicant provides data responses (round 2, if necessary)	95
Data response and issue resolution workshop (round 2)	105
Local, state and federal agency draft determinations**	120
Preliminary Staff Assessment filed	150
Preliminary Staff Assessment workshop(s)	170-180
Local state and federal agency final determinations**	180
Final Staff Assessment filed	210
Evidentiary hearings	220-240
Committee files proposed decision	305
Hearing on the proposed decision	320
Addendum/revised proposed decision	350
Commission Decision	365

** To meet the milestones above, the applicant must provide timely information when requested. Local and state agencies are required (PRC § 25519H) to complete their reviews and issue any formal notices, findings, opinions,(such as those contained in a final Determination of Compliance, wastewater discharge requirements, biological opinions and land use decisions) within 180 days of the Commission's acceptance of an application as complete. Federal agencies are requested to match the state schedule in Executive Orders of the President of the U.S.

4.2 Expedited 6-Month Energy Facility Licensing Process AFC

Several years ago, the 6-month "fast track" permitting process was created. Projects that qualify for this expedited process include those that would otherwise qualify for a negative declaration as defined by CEQA. This requires that the project will not cause significant adverse impacts to public health, the transmission system and the environment as well as comply with all local, state, and federal laws and ordinances. The information requirements are listed in Appendix B of the Energy Facilities Siting Regulations, Title 20, California Code of Regulations §1704. The legislation establishing the 6-month process sunsets or expires on January 1, 2007. If your project has not started yet it would be very difficult to make this deadline.

Expedited AFC Eligibility Requirements:

1. Meets or exceeds all local, state, and federal air quality rules, including Best Available Control Technology (BACT) requirements, and have contracts for all required air emission offsets;
2. Does not cause adverse water impacts or does not require new appropriations of water;
3. Is in full compliance with all land use requirements, including General Plans and zoning requirements;
4. Avoids significant natural resources, including rare, threatened, and endangered species;
5. Avoids significant adverse impacts and electricity system reliability problems.

In addition, a developer must provide all the information normally required for the standard 12-month AFC process as well as all the information normally required by other local and state agencies in a form they are familiar with.

4.3 Small Power Plant Exemption (SPPE)

The California Energy Commission (Energy Commission) may exempt thermal power plants from the certification process if the project is less than 100 MW and has

- no unmitigated adverse impacts on the environment
- no unmitigated adverse impacts on energy resources

The SPPE is an exemption from the licensing process and is not a permit or license to build the project. The SPPE has been used before for a geothermal project. The Energy Commission is still the CEQA lead agency for the project and will prepare an Initial Study and Final Decision. The power plant developer is still required to apply for the appropriate permits from local, state and federal agencies. The local and State agencies will use the Energy Commission's CEQA document when issuing their respective permits.

The schedule for an SPPE is 4.5 months and includes time frames for critical SPPE milestones. To meet the schedule, the applicant must provide timely responses to data requests and the local, state and federal agencies must provide timely comments. The actual schedule will be

determined by the Energy Commission Committee assigned to the proceeding. There are no specific data adequacy requirements for an SPPE application.

The filing fee for an SPPE equals the actual cost of the Energy Commission's review, with a deposit of $200,000 requested at the time of the filing. The account will be settled after the final decision is made by the Energy Commission. The project developer will be billed for the costs that exceeded the deposit, or a refund will be provided if the costs are less than the deposit (§2308, Title 20, California Code of Regulations).

4.4 California Department of Fish and Game Fee for an AFC or SPPE

Section 711.4 of the Fish and Game Code requires a fee of $850.00 for all AFC projects receiving an Energy Commission license. An SPPE is equivalent to a CEQA Negative Declaration, for which the Department of Fish and Game requires a fee of $1,250.00. The Commission staff collects the fees, which are payable to the California Department of Fish and Game immediately following the Commission's decision.

Local government is the lead agency for power plants less than 50 MW, as well as the resource development wells, pipelines, and associated structures such as interconnecting power transmission lines for those projects.

4.5 California Public Utilities Commission (PUC)

You may need a Certificate of Public Convenience and Necessity for your power generation or district heating system. All common carriers must obtain one before constructing or enlarging any system, facility, transmission line, or pipeline. Common carriers are private, heat corporations, electrical producers with facilities available for public hire. All public utilities fall within the definition of common carriers, although municipal corporations supplying utility services do not (i.e. Sacramento Municipal Utility District, Los Angeles Department of Water and Power, etc.). The PUC does not review electrical generating facilities under 50 MW net or transmission lines carrying less than 200 kilovolts. They review the construction and expansion plans of public utilities to make certain that they provide adequate service at a reasonable rate.

Only investor owned utilities (IOUs) are regulated by the PUC, and there are only three in the state, Pacific Gas and Electric, Southern California Edison and San Diego Gas and Electric. These IOUs are not required to receive a Certificate for Public Convenience and Necessity if the proposed power plant is less than 50 MW in size.

4.6 Bureau of Land Management

For power plant or direct use projects BLM requires a Construction Permit (43 CFR §3270). Specifically, the permit is for construction and operation of electrical generation facilities, direct use and related facility and well field operations, including well field production and injection. Site license or a lease and construction permit are required before beginning site preparation work for facilities. If the operator is not a party to the lease a separate site license is needed.

A Commercial Use Permit (CUP) (Commercial Permit Form) is required from BLM (43 CFR §3274.11) for any commercial use operations once a facility has been built. Commercial operation means delivering federal geothermal resources, electricity or other benefits derived from those resources for sale. You must inform BLM of any existing power purchase

agreements. A CUP is also required if you are delivering resources to the utilization point, if you are utilizing federal geothermal resources for your own benefit and not selling energy to another entity.

4.7 Direct Use Project Development

Direct use projects are not regulated by the Energy Commission, and usually fall under the jurisdiction of local government unless on federal lands or Tribal lands. Depending on the type of project and the specifics of the resource such as temperature, flow and chemistry there may be variations in the permitting requirements. The local government most likely would require a Conditional Use Permit. Additional permits would depend on the type of use. If there are structures, local building permits may be needed. Balneology may require a public pool permit from a local health department, district heating systems may need permits for disposal (National Pollution Discharge Elimination Permit) of the resource from the Regional Water Quality Control Board if there is not an injection well, etc. These permits can take just as long as the Energy Commission AFC process in the case of the NPDES permit and are in addition to the CEQA or NEPA environmental review process needed.

4.8 Air Quality

Permit to Operate

The local air district issues an Authority to Construct Permit during the Resource/well field Development stage of a project to address air emissions from stationary sources (wells at that stage). If it is a power generation project, there is usually an ATC initially for the power plant, which usually includes the wells. After the power plant is constructed and operating long enough for a "shake out" of operations problems, the next step is for the air district to issue a Permit to Operate (PTO). Depending on the type of project and the amount and type of air emissions, abatement systems may be required by the local air district.

Typically there has been an air monitoring system set up during the resource/well field development stage that has been collecting pertinent baseline data about the nature of the emissions from the wells and later, power plant(s) during the course of development/construction.

If it is a direct use project, there may only be one or two wells and essentially no emissions. If it is a power plant project with binary system units, there are essentially no emissions during operations. Emissions occur from well venting if the power plant is undergoing maintenance, or potential leaks of the volatile organic compounds (VOCs) used in the heat exchangers or when those substances are replaced during routine maintenance.

4.9 State Water Resources Control Board (SWRCB)

Stormwater Management

Under provisions of the Clean Water Act, the State Chief Legal Counsel for SWRCB determined in 1993 that the Discharges of storm water from geothermal power plants are not required to obtain coverage under the State Water Resources Control Board's (State Water Board) general permit for industrial discharges of storm water. (Memorandum 2/23/93) Newer power plants have been designed with berms, drains and tanks to capture run off from storms or spills of geothermal fluids and tie into the injection well system for return into the geothermal reservoir.

Waste Discharge Requirements

Waste Discharge Requirements may or may not be required for power production facilities or direct use projects as discussed in Section 3, Resource/Well Field Development. If injection is the primary method of disposal of spent geothermal fluids, WDR may not be required. Whether WDR apply depends on the contents of the fluids and the determination of the Regional Water Quality Control Board.

4.10 Toxic Substance Control Act (TSCA)

The TSCA is a federal law (15 USC 2601) administered by the EPA to regulate chemical substances or mixtures that may present an unreasonable risk of injury to health or the environment. The relationship to geothermal projects is through the sale for commercial use of by-products recovered from either liquid or solid waste streams (sulfur, etc). The EPA administrator is authorized to determine the environmental, economic and social impacts of any such material. This Act requires certification of the by-products contents as non-toxic. If these by products are determined to be toxic, regulations for their control, flow and use must be developed. Typically compliance with this law would come during the production phase of the project. However, it would be addressed during the environmental review stage of the project.

5.0 Well Abandonment /Facilities Closure/Site Restoration

This section is included to address the back end of a project when it is no longer desirable to maintain operations of a project for a variety of reasons. This applies to either direct use or power generation projects. It is important to notify all regulators, not just the original lead agency of your plans early on, as there may be ongoing monitoring requirements, etc. that may need to be determined.

5.1 Well Abandonment

Well abandonment refers to geothermal wells that have become unproductive, were never productive or are still viable but will no longer be used. DOGGR defines well abandonment in the PRC §3729 as being properly abandoned when it has been shown to the satisfaction of the DOGGR Supervisor that all proper steps have been taken to protect underground or surface water suitable for irrigation or farm or domestic purposes from infiltration or addition of any detrimental substance, and to prevent the escape of all fluids to the surface. There are specific technical requirements from DOGGR as well as BLM for proper well abandonment. After sufficiently meeting these requirements for the State, DOGGR can release the surety bond and liability for individual wells as long as the wells covered by the bond have been properly abandoned. These may be wells that were used for direct use projects or power production projects.

For BLM regulated projects, the plugging and abandonment of wells is covered in the Geothermal Resources Operational Order No. 3, (30 CFR 270.11, 270.14 and 270.45).

5.2 Facility Closure

Facility Closure refers to the process to officially discontinue the use of a power plant. If the power plant output was > 50 MW net and went through the Energy Commission AFC process, it must also go through a Energy Commission process for Closure to assure that the environment is protected both during the deconstruction phase as well as the long term issues such as site stability, habitat restoration, reclamation of the property, etc. The AFC process requires the applicant to include a discussion of how facility closure will be accomplished in the event of premature or unexpected "cessation of operations". It also has a public input component as in the AFC process. Also, if there were ongoing compliance monitoring activities for wildlife, aquatic resources or other issues monitoring at a reduced level may be required for a specified amount of time.

Closure can also refer to the shut down of a direct use project. However, because direct use projects are regulated locally, the wells that need to be officially abandoned might be the only regulated geothermal component of the project. Any structures may be viable for other uses, etc. Local Use Permit conditions may have addressed the cessation of operations and included specific conditions.

To date there has been one power plant at The Geysers that has gone through the Energy Commission Facility Closure process. There were power plants at The Geysers that predated the advent of the Energy Commission that went through a shut down and site deconstruction and the sites were reclaimed.

5.3 Site Restoration/ Reclamation

As mentioned above, there have already been cases of power plants being subject to "Closure" and eventual dismantling and reclamation of the site. Imperial County has a $500,000 site reclamation bond in addition to bonds that are posted for well(s) abandonment. The extent of the site restoration and reclamation will be a site specific, case-by-case determination by regulators. As an example, the BLM has required a 100% reclamation bond for the proposed Telephone Flat development project at Glass Mountain.

It was originally thought that restoring a site to its predevelopment condition was the best solution for reclamation when a power plant, well pad or other facilities were to be dismantled and removed from a site. However, once again it depends on the individual project location. It may be determined by regulators that the feasibility of returning a site to its predevelopment condition may not be the most beneficial thing for the overall environment, particularly in higher elevations with unstable slopes and soils. Issues may include site stability, safety, drainage and erosion control.

6.0 Conclusions And Recommendations

6.1 Conclusions

The environmental permitting and regulatory process for developing geothermal resources is a necessary part of every project. Understanding the complexity and budgeting appropriate time and resources to integrate the process with development of the rest of the project is crucial to meeting scheduling and financial goals.

6.2 Recommendations

Including the environmental and regulatory process in the initial stages of project planning will save time and financial resources for project proponents.

6.3 Benefits to California

California has benefited from geothermal energy for decades and yet there has not been a reference document to assist project proponents in understanding or navigating the environmental permitting system. The benefit to California by providing a reference tool is to assist project proponents in understanding the complexity of the permitting process relative to the location and type of project. The intent is to assist them in realistically budgeting both time and financial resources to meet the necessary regulatory requirements.

APPENDIX A

ABBREVIATIONS

ABBREVIATIONS

ACHP	ADVISORY COUNCIL ON HISTORIC PRESERVATION (THE PRESIDENT'S)
ATC	AUTHORITY TO CONSTRUCT
BACT	BEST AVAILABLE CONTROL TECHNOLOGY
BIA	BUREAU OF INDIAN AFFAIRS
BLM	BUREAU OF LAND MANAGEMENT
CAA	CLEAN AIR ACT
CARB	CALIFORNIA AIR RESOURCES BOARD
CCR	CALIFORNIA CODE OF REGULATIONS
CDOGGR	CALIFORNIA DIVISION OF OIL, GAS AND GEOTHERMAL RESOURCES OR DIVISION OF OIL, GAS AND GEOTHERMAL RESOURCES
CEC	CALIFORNIA ENERGY COMMISSION
CEQA	CALIFORNIA ENVIRONMENTAL QUALITY ACT
CGC	CALIFORNIA GOVERNMENT CODE
CO	CARBON MONOXIDE (CRITERIA AIR POLLUTANT)
CPRC	CALIFORNIA PUBLIC RESOURCES CODE
CSLC	CALIFORNIA STATE LANDS COMMISSION
CUP	CONDITIONAL USE PERMIT OR FOR BLM PROJECTS, COMMERCIAL USE PERMIT
CWA	CLEAN WATER ACT
DOGGR	CALIFORNIA DIVISION OF OIL, GAS AND GEOTHERMAL RESOURCES OR DIVISION OF OIL, GAS AND GEOTHERMAL RESOURCES
EA	ENVIRONMENTAL ASSESSMENT
EIR	ENVIRONMENTAL IMPACT REPORT (CEQA)
EIS	ENVIRONMENTAL IMPACT STATEMENT (NEPA)
EPA	ENVIRONMENTAL PROTECTION AGENCY
ESA	ENDANGERED SPECIES ACT
MW	MEGAWATT – ONE THOUSAND KILOWATTS OR ONE MILLION WATTS. ONE MEGAWATT IS ENOUGH ENERGY TO POWER 1,000 AVERAGE HOMES.
MND	MITIGATED NEGATIVE DECLARATION
NEPA	NATIONAL ENVIRONMENTAL POLICY ACT

NO_2	NITROGEN DIOXIDE (CRITERIA AIR POLLUTANT)
PM_{10}	PARTICULATE MATER, <10 MICRONS
PTO	PERMIT TO OPERATE
PUC	PUBLIC UTILITIES COMMISSION
PURPA	PUBLIC UTILITY REGULATORY POLICIES ACT OF 1978
RPS	RENEWABLE PORTFOLIO STANDARD
SHPO	STATE HISTORIC PRESERVATION OFFICER
SLC	STATE LANDS COMMISSION
SO_2	SULFUR DIOXIDE (CRITERIA AIR POLLUTANT)
TSCA	TOXIC SUBSTANCES CONTROL ACT
UIC	UNDERGROUND INJECTION CONTROL (PART OF THE CLEAN WATER ACT)
USFS	UNITED STATES FOREST SERVICE
VOC	VOLATILE ORGANIC COMPOUND
WDR	WASTE DISCHARGE REQUIREMENTS

APPENDIX B
REFERENCES AND RESOURCES

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APPENDIX C

KEY LAWS, REGULATIONS AND EXECUTIVE ORDERS FOR GEOTHERMAL PROJECTS

Key Laws, Regulations and Executive Orders for Geothermal Projects

Law/Regulation/Executive Order	Implementing Agency	Regulated Activity
Geothermal Steam Act (43CFR§3200 et seq.)	BLM	Federal leasing and related
National Environmental Policy Act 42 USC §4321;,40 CFR §1500.1	BLM, USFS, DOD, BIA,	Geothermal exploration, development, etc.
California Environmental Quality Act PRC § 21000-21177; Guidelines-CCR Title 14,Div.6,Chapter3 §15000-15387	State/local Lead Agency	Geothermal exploration, development, etc.
Endangered Species Act Sections 7 & 10 (16 USC §1536, 1538, 1539);	U.S. Fish and Wildlife Service; NOAA; State Fish & Game	Activities affecting species listed as "endangered" and "threatened"
Clean Water Act 22 USC 1251 et seq./40 CFR 122-124 Section 401- 33 USC1341 Section 402- 33 USC1342 Section 404-33 USC 1344	EPA State Water Resources Control Board U.S. Army Corps of Engineers	Activities affecting water quality; Discharge of dredged or fill material into "waters of the United Stated "including wetlands or construction in "navigable waters" or activities within a flood plain.
Executive Order 11990 Protection of Wetlands	Federal Lead Agency	Activities affecting wetlands
Executive Order 11988 Floodplain Management	Federal Lead Agency	Activities in floodplains

Law/Regulation/Executive Order	Implementing Agency	Regulated Activity
National Historic Preservation Act 16 USC §470 – Section 106	State Historic Preservation Officer or Tribal Historic Preservation Officer	Activities affecting cultural resources
Antiquities Act 16 USC §432, 433	Federal Lead Agency (BLM, DOD, USF, etc.)	Activities affecting cultural resources
Archaeological Resources Protection Act of 1979 16 USC § 470a., et seq.	Federal Lead Agency	Activities affecting cultural resources
Native American Religious Freedom Act 42 USC §1996	Federal Lead Agency	Activities affecting cultural resources
Native American Graves Protection and Repatriation Act 25 USC §1301	Federal Lead Agency	Activities affecting cultural resources
Federal Land Policy Management Act (FLPMA) 43 USC §1701	BLM	Geothermal activities such as right-of-way for a transmission line, pipeline etc. across federal land.
National Forest Management Act 16 USC § 1600	U.S Forest Service/BLM	Activities affecting federal forests
Noise Control Act 42 USC §4901-4918; 40 CFR §209-211	BLM on federal lands; State and Local Governments (DOGGR, etc.)	Geothermal activities such as drilling
Fish and Wildlife Coordination Act 16 USC 661-666	U.S Fish and Wildlife Service; NOAA (NMFS);Fish & Game	Activities modifying or controlling surface waters
Occupational Health and Safety Act (OSHA) 29 USC Chapter 15 § 651 et seq	Administered by CA Dept. of Industrial Relations CAL OSHA	Activities that may endanger a workers health or safety.
Superfund Amendments and Reauthorization Act 42 USC § 9601	EPA	Activities involving hazardous materials or hazardous waste.
Toxic Substances Control Act 15 USC 2601	EPA	Activities involving hazardous materials or hazardous waste.

Law/Regulation/Executive Order	Implementing Agency	Regulated Activity
Comprehensive Environmental Response, Compensation and Liability Act 43 USC §9601	EPA	Activities involving hazardous materials or hazardous waste.
Executive Order 12898 Environmental Justice	Federal Lead Agency	Federal Actions to address Environmental Justice in minority and low-income populations
Clean Air Act 40 CFR 60 &75	EPA/CARB	Air emissions from power plants, etc.