

MINUTE ITEM

This Calendar Item No. 33
was approved as Minute Item
No. 33 by the State Lands
Commission by a vote of 3
to 0 at its 6-24-81
meeting.

MINUTE ITEM

6/81
W 9577
W 9684
Martinez

33. GEOTHERMAL RESOURCES LEASING ACTIVITY

During consideration of Calendar Item 33 attached,
Mr. William F. Northrop, Executive Officer, read into the
record the attached statement (Exhibit "A").

Upon motion duly made and carried, the resolution as presented
in Calendar Item 33 was approved by a vote of 3-0.

Attachment: Calendar Item 33.

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GEOTHERMAL RESOURCES LEASING ACTIVITY

BACKGROUND: At its November, 1979 meeting, the Commission authorized the selection of certain State reserve mineral lands in Lake, Sonoma and Mendocino Counties for leasing of geothermal resources by competitive public bid and denied outstanding applications for prospecting permits on those lands. Additionally, authorization was given for the preparation of an EIR for geothermal leasing on the subject parcels identified in the attached land description.

ENVIRONMENTAL DOCUMENTATION: A programmatic EIR (EIR No. 284) for the Commission's proposed Geysers Geothermal Resource Leasing Program on the selected parcels has been prepared by Westec Services, Inc. and circulated pursuant to CEQA and the State EIR Guidelines. The EIR discusses and evaluates general types of environmental impacts associated with geothermal activities. If and when subsequent site-specific operations occur, a site-specific environmental document will be prepared by the Division of Oil and Gas pursuant to the provisions of AB 2644 (Ch. 1271, Stats. of 1978) that will address all subsequent site-specific activities associated with exploratory drilling.

IMPLEMENTATION: Staff requests that authorization to lease the designated lands by competitive bidding.

EXHIBITS: A. Location Map. B. Land Description.
C. EIR Executive Summary.

IT IS RECOMMENDED THAT THE COMMISSION:

1. AUTHORIZE THE COMPETITIVE BID LEASING OF THE LANDS DESIGNATED IN EXHIBIT "B".

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2. CERTIFY THAT A FINAL EIR (EIR NO. 284) HAS BEEN PREPARED FOR THE STATE LANDS COMMISSION BY WESTEC SERVICES, INC. FOR PROPOSED GEOTHERMAL EXPLORATION ON THE LANDS REFERRED TO IN EXHIBIT "B" PURSUANT TO THE PROVISIONS OF THE CALIFORNIA ENVIRONMENTAL QUALITY ACT, AND THAT SUCH DOCUMENT WAS REVIEWED AND CONSIDERED.
3. DETERMINE THAT THE PROJECT WILL NOT HAVE A SIGNIFICANT EFFECT ON THE ENVIRONMENT.

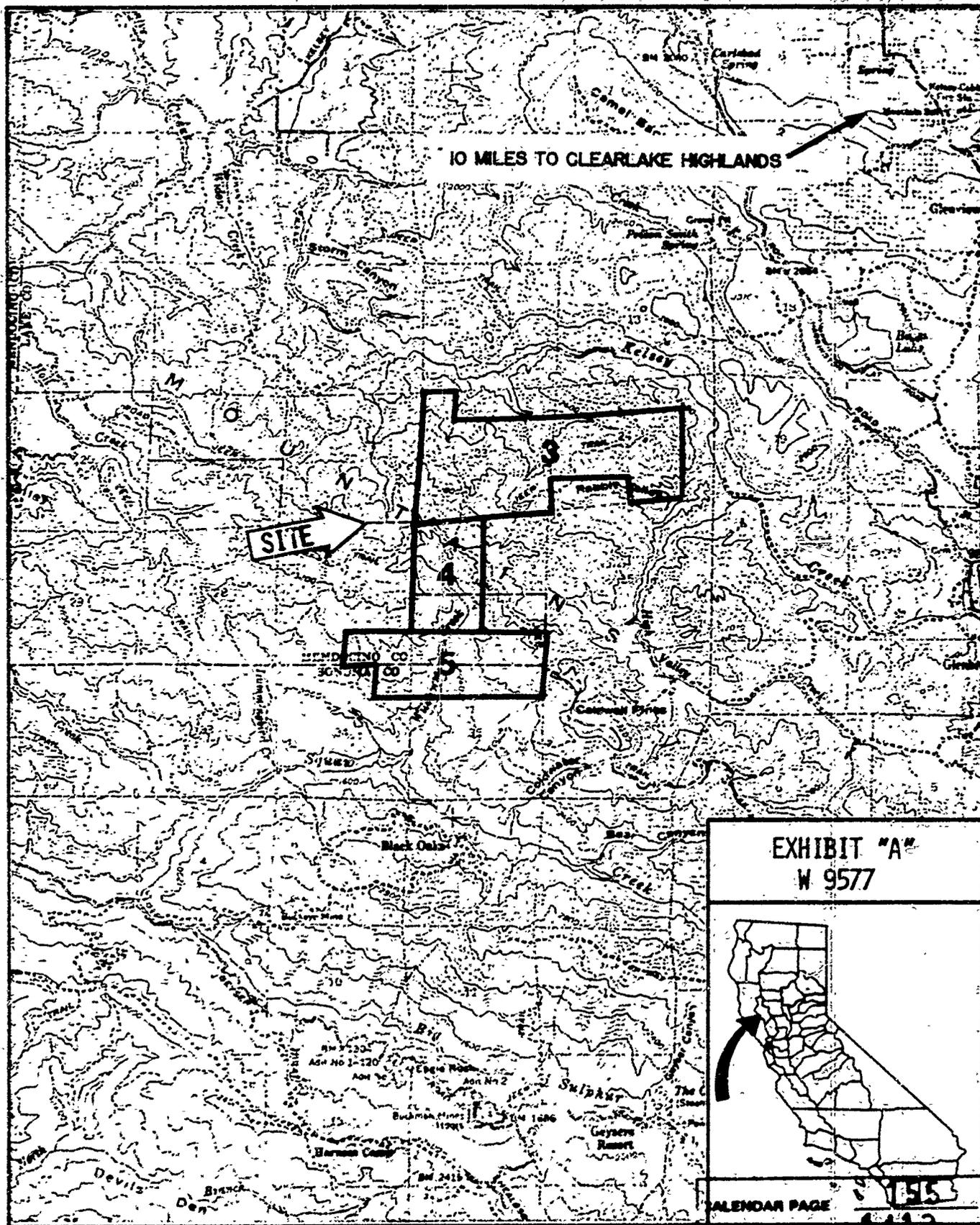
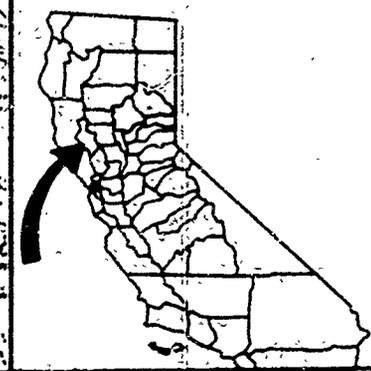


EXHIBIT "A"
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EXHIBIT "B"

Parcel Descriptions

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W/2 of NW/4, SE/4 of NW/4, S/2, S/2 of NE/4, all in Section 23;
S/2 of NW/4, N/2 of SW/4, SW/4 of NE/4, W/2 of SE/4, all in
Section 24; N/2 of SW/4, NW/4, all in Section 26; all in Township
12 North, Range 9 West, M.D.B.&M., Lake and Mendocino Counties,
California, containing 1040 acres, more or less.

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S/2 of S/2 of Section 26; S/2 of SE/4 of Section 27; NE/4 of
NE/4 of Section 34; N/2 of N/2 of Section 35, all in Township
12 North, Range 9 West, M.D.B.&M., Mendocino and Sonoma Counties,
containing 440 acres, more or less.

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EXHIBIT "C"

EXECUTIVE SUMMARY

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A. AGENCY JURISDICTION

This Environmental Impact Report (EIR) has been prepared under a contractual agreement with the State Lands Commission (SLC) utilizing the State EIR Guidelines for implementation of the California Environmental Quality Act (CEQA) of 1970, as amended. The project, as proposed, involves the leasing of certain state-owned geothermal resources pursuant to the Public Resources Code, Division 6, Part 2, and the California Administrative Code, Title 2, Division 3, Article 4.1. Therefore the California State Lands Commission is acting as Lead Agency, and has the principal responsibility for carrying out or approving the project.

B. PROJECT DESCRIPTION

The State has reserved the mineral rights on approximately 600 ha (1,480 ac) within the Geysers-Calistoga Known Geothermal Resource Area (KGRA), and includes portions of Lake, Sonoma, and Mendocino Counties. The SLC proposes to lease, by competitive bidding processes, these areas for exploratory and developmental purposes.

Upon the confirmation of a developable geothermal resource, and consistent with all applicable rules and regulations of affected governmental jurisdictions, it is anticipated that the aspects of the lease program shall further cause, or allow, the construction and operation of geothermal resource-based electrical generating and transmission systems.

In the case of the proposed project, the direct purpose is to offer for lease certain state mineral reservations of the Geysers-Calistoga KGRA. Therefore, the singular discretionary action and permit authority lies with the SLC. However, the successful leasing of these areas will ultimately result in further activities which, under existing plans, regulations, and statutes, fall within the permitting authority of other governmental agencies. Thus, further review of development actions subsequent to the leasing of these lands will be required pursuant to the CEQA. Development in the leasehold, assuming successful leasing, will involve the discovery, extraction, and application of the anticipated geothermal resource and will likely consist of the following phases:

- Issuance of the lease(s);
- Surface or shallow exploration;
- Intensive exploratory drilling;
- Field development;
- Construction of resource-utilizing (power plant) systems;

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- Operation of resource-utilizing systems;
- Field maintenance;
- Field abandonment.

C. ENVIRONMENTAL IMPACTS AND MITIGATION

Although the leasing action, which is the direct purpose for the collection of data in this document, will not in itself produce environmental impacts, subsequent actions will result in certain effects. For this reason, impact analysis is focused on actions subsequent to the leasing of State lands for geothermal energy development. The major areas of analysis include:

- Land Use
- Geology
- Hydrology and Water Quality
- Atmospheric Environment
- Acoustical Environment
- Biological Resources
- Socioeconomics/Public Services
- Visual Resources
- Archaeological, Historical, and Ethnographical Resources

A brief summary of the impacts and proposed mitigation of impacts follows.

1. LAND USE

The proposed leasing of state land for geothermal resource development is a discretionary act that may ultimately commit previously undeveloped areas to relatively long-term industrial activity. The most significant impacts ensuing from development activities will be concentrated on-site in the form of areal disruption or preclusion of present land use functions. Incompatibility with sensitive land uses off-site such as residential and recreational areas, may also be apparent, although minimal and generally mitigatable.

The most effective mitigation of potential land use impacts is to ensure that all subsequent development activities will be pursued in compliance with county and state development standards in order to minimize conflicts to adjacent land uses.

Measures to minimize the land surface required for development, such as directional drilling and limitations on cut and fill activities, should be implemented to minimize disturbance of existing acreage devoted to watershed, wildlife habitat and recreation. In addition, well sites should be located as close as is feasible to existing roadways to limit the need for constructing additional access roads. All disturbed areas should be revegetated as soon as possible after the construction phase and upon termination of production operations.

2. GEOLOGY

The proposed lease is subject to some potentially hazardous-geologic and seismic related conditions. The most significant of these hazards are seismic ground shaking, landsliding, and soil erosion. The recognition and mitigation of these hazards would be most important during the deep exploratory, full-field development and power plant development phases. With the possible exception of very minor soil erosion potential, they are not significant with respect to the subsurface exploration/thermal gradient phase.

Most mitigation is applicable to facilities constructed during the latter phases of development. Appropriate specialists should be required to develop plans and specifications for all sites. Consideration of slope gradient and stability as well as adequate erosion potential measures shall be required. New road construction should be minimized as should road widths and related cuts and fills. In addition, a program of site maintenance should be developed and implemented for the life of the project.

3. HYDROLOGY AND WATER QUALITY

Hydrologic impacts are best characterized by describing geothermal development in the leasehold in two phases. The first is the preliminary exploration, exploratory well drilling, and construction of the development facilities. These would involve mostly short-term local hydrologic effects, consisting mainly of impacts of surface erosion and drilling waste disposal. This could possibly cause alteration of surface runoff and erosion patterns, increased sediment yield, and ground water degradation.

The second phase of geothermal field development is resource utilization activities. The potential impacts may include the incremental depletion of local surface waters; degradation of natural waters, and localized cooling, mineral precipitation, and/or depletion of the geothermal reservoir.

Precise quantification of these long-term impacts requires site specific geothermal development data. Such data are not presently available due to the preliminary nature of project plans. Therefore, the analysis of the hydrologic impacts are somewhat generic and are based on analysis and interpretation of existing available data from other geothermal development in the area.

All phases of geothermal development will be subject to the waste discharge requirement imposed by the North Coast and Central Valley Regional Water Quality Control Boards. Requirements will include measures to control

erosion-sedimentation; to prevent accidental spills or discharge of drill wastes and steam condensate; to report, clean up, and abate discharge incidents; and to monitor steam condensate.

Lake County has established standards to protect water quality which shall be complied with in addition to those of the Regional Water Quality Control Boards in the Kelsey and High Valley Creek watersheds. Specifications for proper waste disposal are included in standards set by the appropriate agencies. Compliance with appropriate standards should substantially mitigate potentially significant effects of the proposed geothermal development on the environment. However, it is also recommended that water quality monitoring programs be initiated on Wildhorse, Kelsey and Squaw creeks as a precautionary measure to ensure that the designated beneficial uses are maintained.

4. ATMOSPHERIC ENVIRONMENT

Estimation of air quality impacts of possible future geothermal resource development is inherently difficult. There are many unknown variables which preclude definitive statement of the probability that resource development would aggravate existing ambient air quality conditions. Impact assessment at this stage of project development can only deal with generalized types of impacts based on generic sources of typical Geyser activities.

Impacts on air quality associated with geothermal development vary in degree but most commonly consist of: combustion emissions, fugitive dust, gases (especially hydrogen sulfide) and steam vented during the exploratory and development stages, and hydrogen sulfide (H₂S) emissions from electrical generation plants.

A number of statutory and regulatory constraints exist which safeguard public health and welfare while allowing for the orderly development of the geothermal resource. The basic premise of these constraints is that development should proceed without any overall increase in regional H₂S emissions. Since H₂S is not a pollutant with national ambient air quality standards, it is not affected by the federal air quality management program. Thus, relevant standards are set by the local air pollution control districts.

The level of H₂S emissions has decreased in the Geysers area recently as existing plants have been retrofitted with abatement systems. New plants are anticipated to include H₂S abatement equipment as a standard feature based upon emission source analysis prior to power plant operation.

5. ACOUSTICAL ENVIRONMENT

Several development-related activities subsequent to the lease sale could increase ambient noise levels in the vicinity of the project, potentially impacting human and non-human noise receptors in the area. Noise producing activities include exploratory drilling, field development, construction and operation of resource-utilizing facilities, field maintenance, and field abandonment.

Ambient noise levels should increase during the exploratory and early development stages and reach a maximum during the intensive field development and power plant construction phases. Noise attenuation characteristics in the Geysers are highly variable due to the existing topography, wind direction and magnitude, temperature inversion, vegetation, and molecular absorption. For this reason, no noise propagation model has been generally agreed upon and accepted as appropriate for use under local terrain and meteorological conditions at The Geysers.

High noise levels will have impacts on the future construction and power plant workers in addition to people and wildlife in areas adjacent to the proposed leasehold. Protection from noise exposure is provided by the responsible authorities through appropriate regulations.

6. BIOLOGICAL RESOURCES

Biological resources consist of vegetation, wildlife, aquatic resources, and wildlife habitat. Full field development within the leasehold will have varying impacts upon existing biological resources depending on the location, timing and extent of development. No rare or endangered species have been identified as occupants in the area; however, the study area must be considered as a potential foraging habitat for the Peregrine Falcon. There is a possibility that this species could be repelled from the area during drilling and construction activities.

Attributes of geothermal development which may serve to repel wildlife or destroy vegetation, both aquatic and terrestrial habitats, include but are not limited to:

Grading and area clearing for development;

Spillage of geothermal fluids;

Use of wet cooling towers;

Acoustical disruptions.

In many cases the effects are interrelated. For example, area clearing reduces vegetative cover which serves to increase erosion which can damage aquatic habitats. The loss of vegetative cover also reduces the size of terrestrial habitats and forage areas. Thus, it is recommended that prior to finalization of the locations for any facilities or access roads, springtime surveys be conducted in order to identify potential populations of rare or endangered species. Once the general botanical and wildlife resource sensitivity of the area has been assessed, facilities and access roads should be oriented away from rare or endangered populations as well as sensitive biological habitats. Also, graded sites, especially cut and fill slopes, should be immediately revegetated with native plants. Wells and power plants should be properly bermed and contained in order to control fluid spills.

7. SOCIOECONOMICS AND PUBLIC SERVICES

Accurate quantification and therefore the significance of socioeconomic and public service impacts will ultimately depend upon the proven characteristics of the resource and corresponding magnitude of development activities. It is anticipated that employment opportunities and consequently project development impacts upon population, housing and public services will occur primarily in Lake County. Although the leasehold encompasses three counties, Lake County services and amenities are the most directly accessible from points within the leasehold.

Development of the leasehold will provide employment opportunities of a specialized nature, yet it is not expected to draw workers from remote areas. Therefore, project-related immigration will be directly related to the availability of new jobs not already absorbed by the local labor pool.

Increased activities in the geothermal industry may also generate employment in other sectors of the local economy through the increased purchasing of equipment, goods and services, and personal spending patterns of the employees.

The provision or capacity of public services within the project area should not be adversely affected by the development of the steam field, construction, or operation of subsequent project-related activities. However, potential exceptions may be the project's impact upon fire protection services, solid waste facilities, and roadway conditions.

No significant or potentially significant alterations to the labor force or demographic characteristics of the region have been identified, and no mitigation measures concerning these factors are considered necessary. Several mitigation measures have been suggested to reduce the impact of development on fire and solid waste services and transportation systems. Generally, they involve compliance with appropriate regulations and provisions for fire and road safety.

8. VISUAL RESOURCES

Due to the terrain relief of the view corridors, the potential for visual impact will vary greatly depending on the specific placement of the various project components. Generally, development along the ridge tops and higher elevated portions of the view corridors would contrast against the horizontal interface, and thereby create a dominant visual element associated with industrial activity in a previously undisturbed landscape. However, the utilization of valleys and natural depressions can effectively screen physical structures from all vantage points and essentially eliminate any adverse visual impacts. Other visual mitigation measures will provide a blending of equipment and environment by the use of compatible color schemes, vegetative screening, and prompt revegetation of denuded areas.

9. ARCHAEOLOGICAL, HISTORICAL, AND ETHNOGRAPHICAL RESOURCES

As development plans are not specific at this time, the full range of potential impacts is difficult to address. Potential causes of impact may include:

- all construction operations,
- land development,
- waste disposal,
- increased erosion.

Cultural resources are fragile, non-renewable, and easily damaged or destroyed by incompatible land uses. Proposed development of the study area should therefore be coordinated with cultural resource inventory data and additional archaeological survey on a site-specific basis. If incompatible land uses are proposed, changes in the project design could be implemented to avoid adverse affects to cultural resources. Appropriate mitigation measures should be undertaken when preservation is not possible.

D. GROWTH INDUCING IMPACTS AND CUMULATIVE EFFECTS OF THE PROPOSED PROJECT

Active resource development has been underway for over 20 years in the Geysers-Calistoga KGRA, primarily within Sonoma and Lake Counties. Such activity, depending upon the success of environmental and regulatory controls, could represent an incremental long-term deterioration of regional environmental quality. Mitigation of resulting impacts will require both the application of new or more sophisticated control technologies, as well as a significant emphasis on systematic county and regional energy and environmental planning efforts.

Geothermal development characteristically requires extensive land area, even though only a small portion of the total acreage is actually utilized. Areal requirements will further limit potential recreational, residential, commercial, agricultural, and wildlife habitat land uses within the KGRA. Cumulative development activities will also incrementally degrade air and water quality, consequently affecting agricultural lands and recreation areas.

Potential sources for surface water degradation are increased sedimentation from the clearing and grading of land, spills of hazardous waste materials, and condensation of vented steam. The region's productive fisheries and recreational opportunities may be subsequently degraded by expanding geothermal development, depending on the success of environmental controls.

Cumulative air quality impacts in the region are likely to result primarily from increased emissions of hydrogen sulfide. This has been identified as the primary impediment to the development of geothermal resources in the KGRA. Without equipping power plants with effective abatement technology, future resource utilization will be limited.

In reference to cumulative impacts of additional regional development, areas currently not exposed to geological and seismological hazards may experience such conditions. These impacts may range from topographic alteration of drainages and

increased erosion to subjecting well structures and pipelines to seismic ground shaking. The specific nature of these impacts are, of course, highly contingent on actual location of facilities. Nevertheless, assuming general KGRA-wide development patterns, hazards that might be expected include surface fault rupture, seismically-induced liquefaction, surface subsidence, and ground shaking.

The cumulative effect of further geothermal development in the region would result in an increase in ambient noise levels discernably above that of similar, non-industrial areas. As various geothermal components are constructed in closer proximity to each other, noise levels generated by their construction and operation will become additive. Noise monitoring programs should be strictly enforced to insure acceptable noise levels adjacent to residential developments. Existing environmental review and county permits processes should provide adequate mitigation to offset potential impacts.

Biological resources will be affected by location of development. If the most sensitive riparian areas are avoided, impacts are anticipated to be minimal. However, continued expansion of electrical transmission towers and lines will increase the magnitude of potential collisions and electrocution of avifauna.

The cumulative effects of geothermal development on cultural resources is difficult to estimate without the proper identification of existing cultural resource sites. It is anticipated that some disturbance will occur due to the incompatibility of cultural resource sites and geothermal development actions.

Geothermal development within the KGRA will inevitably change the character of the area from scenic/recreational to industrial, resulting in a gradual degradation of environmental quality. This perception of industrial activity may also result in a decline in tourism, a significant factor of the area's economy. Visual resources will be impacted by long plumes of steam and possibly by views of power plant facilities. Although additional geothermal activity will benefit the local economies by broadening the fiscal base of the areas, (viz., providing tax revenues, employment, and increased incomes), the lifespan of geothermal production within an area is limited by the quantity of the resource present and operational parameters of the power plant systems.

E. ALTERNATIVES TO THE PROPOSED PROJECT

Three alternatives exist to the proposed leasing of State lands in the study area. They include no project, delay of project, and utilization of alternate forms of fuel.

The no project alternative would preserve the leasehold in its current state of use but allow the environs to be modified by natural processes. No confirmation of the presence or magnitude negation of geothermal resources would result, and no identified impacts would occur.

Deferring action on the proposed lease would result in a delay, and not mitigation, of all related impacts. It will, however, likely result in the consumption of other fuels until the leasehold is brought to an operable state of development.

Although the project is merely the initiation of the leasing action, the ultimate goal is probably the production of electrical power from the geothermal resource. A denial of the use of this resource would, in turn, require that other forms of electrical power generation be employed. The impacts associated with alternative energy sources are numerous and have been discussed at length in other documents.

F. DETERMINATION OF SIGNIFICANT EFFECTS

Per Article 4, Section 15040 of the Guidelines for Implementation of the California Environmental Quality Act of 1970, as amended, a significant effect on the environment is defined as:

"...substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the activity including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance."

Further, the determination of whether a project may have a significant effect on the environment "... calls for careful judgement on the part of the public agency involved; based to the extent possible on scientific and factual data." (Article 7, Section 15081(a)).

A mandatory finding of significance (Article 7, Section 15082) by the applicable public agency is required if:

- (a) The project has the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory.
- (b) The project has the potential to achieve short-term environmental goals to the disadvantage of long-term environmental goals.
- (c) The project has possible environmental effects which are individually limited but cumulatively considerable. As used in the subsection, "cumulatively considerable" means that the incremental effects of an individual project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.
- (d) The environmental effects of a project will cause substantial adverse effects on human beings, either directly or indirectly.

With reference to the above stipulations, and utilizing the guidelines established in Article 7, Section 15081 (c), Appendix G, no significant effects have been identified with reference to the proposed leasing action itself. However,

activities that may occur as a result of leasing action (i.e., development of the leasehold) may in fact produce significant environmental effects. Until specific development plans are formulated, it may be assumed that environmental impacts of the type and magnitude identified in Part C of this document will likely occur.

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