

MINUTE ITEM

This Calendar Item No. 36 was approved as Minute Item No. 36 by the State Lands Commission by a vote of 2 to 0 at its 9-26-79 meeting.

MINUTE ITEM

9/26/79
Burnett

36. PROPOSED SELECTION OF LANDS FOR GEOTHERMAL RESOURCES -
W 9973, PRC 5147.

Because of the issues which were raised during consideration of Calendar Item 36 attached, the Commission considered the Lake County and Sonoma County issues separately.

NORTHERN CALIFORNIA POWER AGENCY/RESOURCE FUNDING LTD/LAKE COUNTY

Messrs. Bruce McDonough, Joseph Pedilla (Science Applications, Inc.) and David Tuttleman, representing the Northern California Power Agency, appeared. Mr. McDonough requested that the Commission postpone acting on this matter for a period of 60 days. He explained that the time was needed in order for NCPA to acquire geothermal leaseholds owned by Resource Funding Ltd. which is presently in the process of filing bankruptcy. However, if the Commission is not favorable to the deferment, they requested that instead of approving the staff's recommendation to put the lease out for competitive bid, that NCPA be issued a prospecting permit in order for them to determine if the area has geothermal potential.

NCPA feels that a prospecting permit should be issued to them instead of the area being let by competitive bid because:

1. They have diligently pursued the exploration for geothermal resources in this general area and have expended large amounts of money.
2. There is still a question if commercial quantities of steam can be produced from this parcel.
3. They are the only company in The Geysers which has a feasible production program for this area.

With regard to the new legislation, they contended the area is outside the proven geothermal field and is therefore not subject to the criteria set forth therein.

Mr. William F. Northrop, Executive Officer, referenced for the record a letter dated September 25, 1979, from Martin McDonough to Mr. Northrop requesting the deferment of this item.

It is the staff's position that the project site is under the new legislation and is suitable to be let by competitive bid. Staff clarified that a prospecting permit had never been issued to NCPA or RFL, and the decision to make expenditures to determine if geothermal resources were available in commercial quantities was made by them without Commission approval.

After discussing the matter further and being advised by staff and the Attorney General's office that no problems would result as to liability by the Commission not acting on the matter at this

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meeting, the Commission deferred acting on this item for 60 days. They instructed the staff to schedule it for the November 1979 meeting.

AMINOIL, U.S.A./SONOMA COUNTY

Mr. C. E. Woods, representing Aminoil, U.S.A., Inc., appeared. Mr. Woods requested that their prospecting permit be extended for two years. He stated that Aminoil has diligently pursued exploration efforts in this general area and has expended a large amount of money. It is their feeling that the best interests of the State would be served by their receiving this extension as it would provide them with an opportunity to perform specific exploration on the parcel relative to the data already collected.

Mr. Northrop agreed that this area has good potential for geothermal development, and feels that the State's interest would be better served by leasing the area by competitive bid.

After discussing the matter further, the Commission concurred with the staff's recommendation and adopted the following resolution by a vote of 2-0:

THE COMMISSION:

1. DETERMINES THAT ENVIRONMENTAL IMPACT REPORT HAS BEEN PREPARED FOR THE PROJECT UNDER PRC 5147 BY THE SONOMA COUNTY BOARD OF ZONING ADJUSTMENTS.
2. CERTIFIED THAT THE INFORMATION CONTAINED IN THE ENVIRONMENTAL IMPACT REPORT OF SONOMA COUNTY HAS BEEN REVIEWED AND CONSIDERED BY THE STATE LANDS COMMISSION.
3. DETERMINED THAT THE PROJECT WILL NOT HAVE A SIGNIFICANT EFFECT ON THE ENVIRONMENT.
4. DENIED THE APPLICATION BY AMINOIL FOR THE EXTENSION OF PROSPECTING PERMIT PRC 5147 AND AUTHORIZED THE OFFERING PURSUANT TO DIVISION 6 OF THE PUBLIC RESOURCES CODE AND DIVISION 3, CHAPTER 1 OF THE CALIFORNIA ADMINISTRATIVE CODE FOR BID FOR THE EXTRACTION OF GEOTHERMAL RESOURCES ON THE PARCEL DESCRIBED IN EXHIBIT "B" CONCERNING PRC 5147 ONLY AND BE REFERENCE MADE A PART HEREOF.

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5. AGREED TO DEFER UNTIL THE NOVEMBER 1979 MEETING ACTION ON STAFF'S RECOMMENDATION TO DENY THE APPLICATION OF NCPA FOR A PROSPECTING PERMIT ON THE PARCEL IDENTIFIED IN EXHIBIT "B" AS W 9973.

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36.

9/79
W 9973
PRC 5147
Burnett

PROPOSED SELECTION OF LANDS FOR GEOTHERMAL RESOURCES
LEASE OF RESERVED MINERAL INTERESTS W 40180

The Commission staff proposes that the Commission select, pursuant to the Public Resources Code Section 6911(a), 2 parcels of land, located in Lake and Sonoma Counties in which the State has reserved mineral interests, for geothermal resources lease by competitive bid.

The Lake County parcel, containing 120 acres, consists of the east and west ridges and summit of a low mountain underlain by Franciscan chert and graywacke, and lies about 3 miles N-NE of The Geysers steam field. One-quarter mile to the south of the parcel an exploratory geothermal well "Cobb Valley" No. 1 is presently being drilled on private land by Northern California Power Agency/Resource Funding Ltd. An application for a geothermal prospecting permit on the State land by Resource Funding Ltd./NCPA is pending.

The Sonoma County parcel, situated about 3 miles NW of The Geysers steam field, contains 200 acres. A permit to prospect for geothermal resources, PRC 5147.2, was issued to the surface owner, Squaw Creek Investment Company, June 26, 1976, and was subsequently assigned to Aminoil U.S.A. in August, 1976. Aminoil drilled a well, "Squaw Creek State" No. 1 in 1977 to a depth of 9045 feet and encountered heat but not in commercial quantities. The well was plugged and abandoned in September 1977. The permit terminated June 26, 1979, and Aminoil has applied to the State for an extension thereof.

The Commission staff feels, because of the geothermal potential of both parcels which are situated within the Geysers area, that it is in the best interest of the State to offer these parcels for geothermal resources lease by competitive bid, rather than to issue a prospecting permit for the Lake County parcel or an extension for the Sonoma County parcel. Section 6910(a) of the P.R.C. provides, in part, that an application for a permit shall be denied if, prior to the issuance of the permit, the lands are selected by the Commission for lease by competitive public bid.

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Section 6911(a) of the P.R.C. states that selected lands may be leased by competitive bid on the basis of a cash bonus, net profit, or other single biddable factor. In accordance with the Commission's view that the bidding procedure should be that which provides the greatest competition and assurance that the resources are developed in a timely and orderly manner, the staff recommends that the biddable factor should be net profit. The net profits bidding procedure does not require large amounts of up-front capital in the form of cash bonuses and allows the small developer to enter the market place using his funds for field exploration and development.

Section 6912(b) provides that the surface landowner may, within 10 days after notification by the Commission, submit a bid identical to the highest acceptable bid, in which case the Commission shall issue a lease to such surface landowner, subject to applicable provisions of law. If the surface landowner does not file such a bid or is unable to comply with the applicable law, the Commission may proceed with the award of the bid.

By their certificate of acceptance issued March 30, 1978, and notice of determination issued July 31, and August 5, 1975, the Lake County Planning Commission and the Sonoma County Board of Zoning Adjustments respectively certified that the Environmental Impact Reports have been prepared pursuant to the provisions of the California Environmental Quality Act of 1970, as amended. Site specific impacts will be addressed upon selection of potential well sites and before any drilling can begin.

The Commission staff is presently preparing a lease form for the extraction of geothermal resources. The staff will submit that form for the review and approval of the Office of the Attorney General.

The environmental documents have been reviewed by the Commission staff, and it is staff's opinion that the provisions of CEQA have been satisfied.

- EXHIBITS:
- A. Location Map.
 - B. Property Descriptions.
 - C. EIR Summary - Cobb Valley Geothermal Project
 - D. EIR Summary - Domenichelli Leasehold

CALENDAR ITEM NO. 36. (CONTD.)

IT IS RECOMMENDED THAT THE COMMISSION:

1. DETERMINE THAT ENVIRONMENTAL IMPACT REPORTS HAVE BEEN PREPARED FOR THESE RESPECTIVE PROJECTS BY THE LAKE COUNTY PLANNING COMMISSION AND THE SONOMA COUNTY BOARD OF ZONING ADJUSTMENTS.
2. CERTIFY THAT THE INFORMATION CONTAINED IN THE ENVIRONMENTAL IMPACT REPORTS OF THE LAKE AND SONOMA COUNTY AGENCIES HAS BEEN REVIEWED AND CONSIDERED BY THE STATE LANDS COMMISSION.
3. DETERMINE THAT THE PROJECT WILL NOT HAVE A SIGNIFICANT EFFECT ON THE ENVIRONMENT.
4. DENY THE APPLICATIONS FOR A PROSPECTING PERMIT AND A PROSPECTING PERMIT EXTENSION ON THOSE PARCELS AND OFFER, PURSUANT TO DIVISION 6 OF P.R.C. AND DIV. 3, CHAPTER 1 OF THE CAL. ADM. CODE FOR BID FOR THE EXTRACTION OF GEOTHERMAL RESOURCES THE PARCELS DESCRIBED IN EXHIBIT "B" AND BY THIS REFERENCE EXPRESSLY MADE A PART HEREOF.
5. AUTHORIZE THE STAFF TO DETERMINE THE HIGHEST QUALIFIED BIDS AND NOTIFY THE SURFACE OWNERS OF SUCH BIDS IN ACCORDANCE WITH PUBLIC RESOURCES CODE SECTION 6912(b).

EXHIBIT "A"
STATE LANDS COMMISSION
W9973 PRC 5147.2

**Lands Proposed for Selection
 for Geothermal Resources
 Lease, Sonoma County and
 Lake County**

September 1979

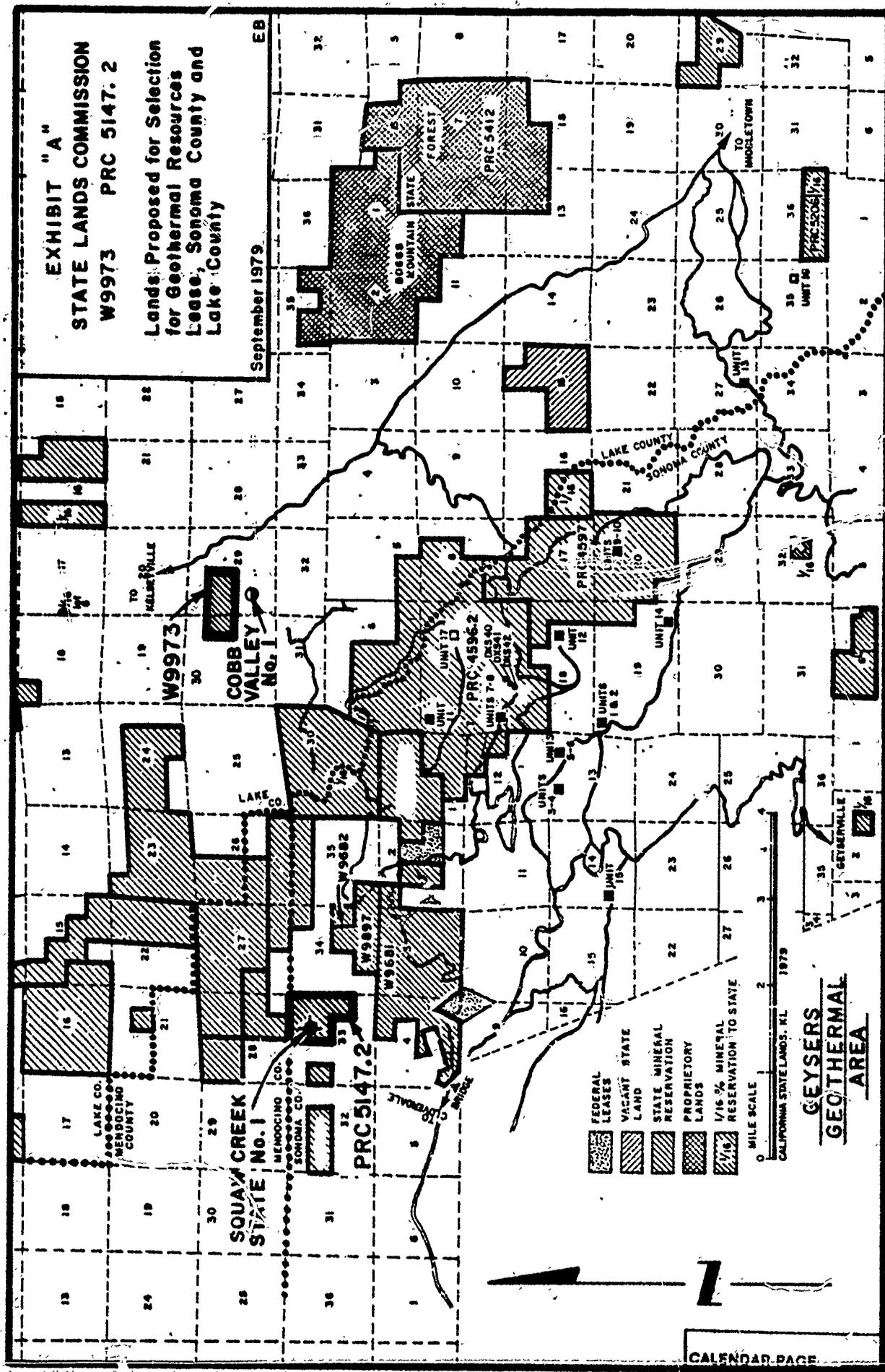


EXHIBIT "B"

W 9973

Mineral interests reserved to the State in Township 12 North, Range 8 West, M.D.B. & M., Lake County, California; The S 1/2 of the NW 1/4 of Section 29, and the SE 1/4 of the NE 1/4 of Section 30. Containing 120 acres, more or less.

PRC 5147.2

Mineral interest reserved to the State in Township 12 North, Range 9 West, M.D.B. & M., Sonoma County, California.

The NE 1/4 and the SE 1/4 of the SE 1/4 of Section 33.

Containing 200 acres, more or less.

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EXHIBIT "C"

SUMMARY

ENVIRONMENTAL IMPACT REPORT FOR NORTHERN CALIFORNIA POWER AGENCY'S
COBB VALLEY GEOTHERMAL PROJECT

I. Description of the Project

An environmental report has been prepared to cover a geothermal energy project proposed by NCPA in conjunction with Resources Funding, Ltd. in the Cobb Valley area of Lake County. NCPA is an agency formed for the purpose of exercising jointly the power of its 12 publicly owned member electric utilities. Both the exploratory and development phases are described below.

II. Project Location

The study area consists of approximately 1,400 acres in Lake County, which constitutes the NCPA/RFL Geothermal Leasehold, and includes the parcel in which the State has reserved mineral interests. The area is irregularly shaped, and includes portions of Sections 20, 21, 28, 29, 30, 32, and 33 of Township 12 North, Range 8 West, M.D.B.&M.

III. Project Action

The objectives of the project can be thought of as two-phased. The first phase, or exploratory phase, is concerned with the assessment of the geothermal resource within the leasehold boundaries. The present state of the art in resource assessment for geothermal energy necessitates full scale exploratory drilling to evaluate the resource. The first phase of the project will consist of three exploratory wells on two pad sites. By drilling these wells into the fractured or steam zone, the applicant can measure the rate of flow and, through other evaluation techniques, establish the extent of the resource.

The exploration phase will be comprised of the preparation of two level pad areas designed to accommodate the equipment necessary to drill the deep geothermal exploratory wells. In addition to pad preparation, the applicant is planning to improve and extend access roads necessary to move drilling equipment onto the pad.

III. Project Action(Contd.)

The E.I.R. describes the location of drill pads, drilling procedure, resource testing, and pipelines.

If the applicant is successful in finding a commercially viable steam zone, the second phase objective would be to develop this steam resource into an electrical generating capacity. Based on past experience in other Geysers fields, the applicant has established an immediate goal of two 33-megawatt power plants to be run from the steam resource of the leasehold. The objective here would be to provide the Northern California Power Agency with electrical energy, thereby reducing its dependence on electricity generated by other sources, including fossil fuel plants. The E.I.R. also describes the power plant design, the H₂S abatement system, and power transmission lines.

IV. Present Environmental Setting:

- | | | | |
|----------------------------|--|--|--|
| a. Climate: | <input type="checkbox"/> Cool | <input checked="" type="checkbox"/> Moderate | <input type="checkbox"/> Hot |
| b. Air Quality: | <input type="checkbox"/> Poor | <input type="checkbox"/> Fair | <input checked="" type="checkbox"/> Good |
| c. Water Quality: | <input type="checkbox"/> Poor | <input type="checkbox"/> Fair | <input checked="" type="checkbox"/> Good |
| d. Noise Quality: | <input type="checkbox"/> Poor | <input type="checkbox"/> Fair | <input checked="" type="checkbox"/> Good |
| e. Transportation Systems: | <input checked="" type="checkbox"/> Poor | <input type="checkbox"/> Fair | <input type="checkbox"/> Good |
| f. Public Utilities: | <input checked="" type="checkbox"/> Poor | <input type="checkbox"/> Adequate | <input type="checkbox"/> Good |
| g. Public Services: | <input checked="" type="checkbox"/> Poor | <input type="checkbox"/> Adequate | <input type="checkbox"/> Good |

h. Other Values:

Two basic aquatic habitats are found in the project area. Nineteen archaeological sites are located here. Much of the project area lies within a Scenic Highway Corridor(Bottle Rock Road).

i. Present Land Use:

Low density, single family housing; private recreation; stock grazing; open space; sightseeing.

V. Environmental Impacts:

A. Adverse:

- | | | | | |
|-----------------|---|-------------------------------|-------------------------------|---|
| a. Air Quality: | <input checked="" type="checkbox"/> Low | <input type="checkbox"/> Mod. | <input type="checkbox"/> High | <input type="checkbox"/> Short-Term |
| | | | | <input checked="" type="checkbox"/> Long-Term |

V. Environmental Impacts: (Contd.)

d. Transportation Systems: Low Mod. High. Short-Term Long-Term

Comment: Development of this and other geothermal fields in the area will probably bring pressure to widen and improve roads to the area. Which roads and the extent of the impact such transportation improvements will be determined by the direction in which the field is developed.

e. Public Utilities: Low Mod. High Short-Term Long-Term

Comment: The growth induced impacts are almost nonexistent.

f. Public Services: Low Mod. High Short-Term Long-Term

Comment: The same growth induced impacts as described in Item (c).

g. Energy Consumption: Low Mod. High. Short-Term Long-Term

Comment: Drilling rigs are self-contained and provide their own energy. Consumption of fuels is limited to the drilling period.

h. Growth Inducing: Low Mod. High Short-Term Long-Term

Comment:

The only induced growth will be in the nearby towns, such as Glenbrook or Cobb, rather than at the field site itself. There may be a slight increase in the number of persons living in the area due to permanent employment.

V. Environmental Impacts (Contd.)

Adverse Environmental Effects Which Cannot Be Avoided:

- modification of existing topography;
- loss of habitat;
- increased traffic;
- increased level of noise;
- visual impact of steam plumes; and,
- disruption of viewshed in scenic corridor.

MITIGATION MEASURES

The present state-of-the-art should be employed to control H₂S emissions during air drilling and production testing. Conditions for the use of the abatement system should be established in concert with the Air Pollution Control Officer through the Authority to Construct process. Additional studies will be required to develop full field development H₂S abatement strategies.

The measures outlined in Chapter 70 of the Uniform Building Code (adopted by Lake County) should be carefully followed during design and construction of drill sites, earthen sumps, access roads, and, in the event that production is developed, the distribution pipeline routes and power plant sites.

It is imperative that the mitigation measures outlined in California Division of Mines and Geology, Special Report 122, be considered.

Use existing road alignments as much as possible and keep pad sizes to a minimum so as to disturb the least area of vegetation. Revegetation should be done by professionals on all exposed surfaces at the completion of road and pad construction, prior to the first winter rains.

To minimize fire hazards, fuel tanks should be located a safe distance from the drill rig and provided with a fire guard of base mineral soil. Burnable refuse should be placed in appropriate receptacles. A person should be designated as responsible for fire control measures, including a prearranged system of contacting fire control units.

Provision for venting the plant through a rock equivalent muffler must be made. To meet standards, the air drilling rig will probably require an acoustical enclosure. Well testing muffler performance must be improved by 5 dB over the Aminoil system if flows of 150,000 lbs/hr are encountered.

Traffic control in the vicinity of Camp Beaverbrook should be imposed during the summer months to reduce hazards. Other means of reducing conflicts should be explored.

Power plant and steam pipeline systems should be designed to blend into the surrounding area to the extent possible. Consideration should be given to camouflaging the pipeline if it is to cross Kelsey Creek. A type of covered bridge should be considered to provide a visual barrier.

Where the pipeline could interfere with the Scenic Corridor viewshed, a visual barrier should be established by methods such as a vegetation screen, placing the pipeline in a trench and/or constructing an earthen berm, or, if distances are not great, running the pipeline underground.

ALTERNATIVES TO THE PROPOSED ACTION

In terms of the geologic and seismic environment, alternative uses of the land would probably involve as much or more of an environmental impact as geothermal development. Alternative uses such as residential development or development of further recreational activities would involve significant amounts of grading for access roads, building sites and necessary related facilities. This grading would generate similar impacts to the grading involved in the proposed geothermal development and would be subject to similar mitigation measures. Additionally, residential development would be energy consuming as opposed to energy generating and resources such as water supplies would be irretrievably committed.

Alternate uses could be made of steam produced in this area, if the resource does indeed exist. However, the impact of the geologic environment would remain the same as graded well sites, access roads and distribution pipelines would still be necessary.

As there are no mines or recognized localities of economically valuable mineral reserves, mining is not a viable alternative for this area.

The "No Project" alternative would mean the geothermal resource in the area, if it exists, could not be utilized. Geothermal areas are of very limited areal extent in California and throughout the world. Geothermal energy can only be developed where very hot rocks and associated steam and/or hot water exist close to the ground surface. The project site apparently is one such area. The alternative of "No Project" would ultimately mean that alternative sources of energy would be necessary.

RELATION BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE
MAINTAINANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

It is incumbent upon Lake County to carefully balance the positive and negative aspects of this project. It is important to compare the benefits associated with the project to the burdens that such development may impose upon those within the development area and those responsible for it.

Any analysis of the impacts must be made with the full realization that it is very difficult to estimate certain outcomes. For example, the percentage of employees hired locally and the amount of local expenditures resulting from this project will be difficult to estimate with any reliability. Adding to the difficulty of project evaluation and rendering the analysis more complex is the fact that the geothermal project is placed within a small county which is experiencing expanding economic activity and that numerous other potential projects of varying magnitudes and size also appear to be developing concurrently as this project unfolds and takes place (if permit approval is forthcoming).

The long run costs associated with the proposed project relating to the redevelopment and land reclamation are yet unknown. It is possible that burdens might remain upon County government as a result of the environmental conditions existing after the steam runs out and the plants are abandoned. The estimated time and life of a geothermal plant development is 30 to 35 years. After 30 to 35 years of operation, an increase of sediment in the well site area may be significant and may require additional county service expenditures.

LIST OF PERSONS, ORGANIZATIONS, AND PUBLIC
AGENCIES COMMENTING ON THE DRAFT EIR

Lake County Environmental Assessment Committee

Lake County Air Pollution Control Director

Lake County Planning Commission

U.S. Fish and Wildlife Service

Division of Oil and Gas

Energy Resources Conservation and Development Commission

State Water Resources Control Board

Air Resources Board

Department of Fish and Game

Department of Parks and Recreation

Sierra Club

The Lake County Energy Council

Clyde E. Kuhn

Mary-Dean Anderson

Muriel Jordan

Bennie Lamorte

EXHIBIT "D"

SUMMARY

ENVIRONMENTAL IMPACT REPORT FOR
BURMAH OIL AND GAS COMPANY'S DOMENICHELLI LEASEHOLD
AND PROPOSED WELL NO. "SQUAW CREEK" 1

An environmental report was prepared and certified to cover geothermal development by Burmah Oil and Gas Company in the Squaw Creek drainage system for an as yet undesignated electrical generation plant. An addenda environmental impact report was prepared and certified for the drilling of Well No. "Squaw Creek" 1.

I. Description of the Project:

The overall report covers geothermal development of Burmah Oil and Gas Company's leaseholds on the upper part of the Squaw Creek drainage northwest of The Geysers Field, Sonoma County. Items covered include roads, drill sites and pads, pipelines and the power plant site. An area in excess of that needed for the proper number of wells to supply steam for a generating plant was covered to be certain to include several areas stable enough to support a plant's structure.

II. Project Location:

The area under study includes most of Sections 28 and 33 and the eastern portions of Sections 29 and 32, T. 12 N., R. 9 W., M. D. B&M; the north line of Sections 32 and 33 separating Sonoma and Mendocino Counties. The northern boundary of the area is roughly the north line of Section 28 and the southern boundary approximates the south line of Section 33. The proposed drill site is just south of the Sonoma County line, near the center of the study area at an elevation of 2,750 feet.

III. Project Action:

The action involves the following specific steps:

1. Drilling an exploratory well to approximately 8,000 feet total depth to establish the existence of commercial quantities of geothermal steam. Construction of a drill site, including a drill pad for drilling equipment, drilling mast, tanks, compressors and other equipment plus a sump, requires approximately 2½ acres of flat area. An access road will add some 1½ acres, bringing the total to 4 acres.
2. If the exploratory well indicates a good potential steam supply, further drilling will be undertaken. Ten to fifteen wells will be required to establish generation capacity. Final normal development in The Geysers Field is 20 acres per well; up to 40 wells, over the life expectancy of a plant, are necessary to serve each generation plant.

3. Well testing and stand-by maintenance operations require periodic venting of full heads of steam for periods extending from a few hours to several days in order to clear debris and condensation from the wellbore.
4. The siting and construction of a generation plant includes generators, condensers, cooling towers, H₂S scrubbers, condensate reinjection system plus transmission towers and lines.
5. Construction of steam transfer pipelines from the well sites to the generation plant.
6. At future dates, additional wells for replacement (up to the 40 wells mentioned in No. 2.) in order to maintain the steam supply, will require drilling, testing and the laying of pipelines.

IV. Present Environmental Setting:

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|----------------------------|--|--|--|
| a. Climate: | <input type="checkbox"/> Cool | <input checked="" type="checkbox"/> Moderate | <input type="checkbox"/> Hot |
| b. Air Quality: | <input type="checkbox"/> Poor | <input type="checkbox"/> Fair | <input checked="" type="checkbox"/> Good |
| c. Water Quality: | <input type="checkbox"/> Poor | <input type="checkbox"/> Fair | <input checked="" type="checkbox"/> Good |
| d. Noise Quality: | <input type="checkbox"/> Poor | <input type="checkbox"/> Fair | <input checked="" type="checkbox"/> Good |
| e. Transportation Systems: | <input checked="" type="checkbox"/> Poor | <input type="checkbox"/> Fair | <input type="checkbox"/> Good |
| f. Public Utilities: | <input checked="" type="checkbox"/> Poor | <input type="checkbox"/> Adequate | <input type="checkbox"/> Good |
| g. Public Services: | <input checked="" type="checkbox"/> Poor | <input type="checkbox"/> Adequate | <input type="checkbox"/> Good |
| h. Other Values: | | | |

The land is of importance as a watershed and wildlife habitat. In addition, there are several springs in the area from which much of the wildlife in the area obtain their water supply and there are several archaeological areas.

i. Present Land Use: The land has been primarily used as a deer hunting preserve. Some grazing of cattle does occur in the lower savannahs, but most of the browse is largely unpalatable to cattle.

V. Environmental Impacts:

A. Adverse:

- a. Air Quality:

- | | | | |
|---|-------------------------------|-------------------------------|---|
| <input checked="" type="checkbox"/> Low | <input type="checkbox"/> Mod. | <input type="checkbox"/> High | <input type="checkbox"/> Short-Term |
| | | | <input checked="" type="checkbox"/> Long-Term |

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Comment: The amount of noncondensable gases released to the atmosphere will increase. The cumulative effect at the time the field is fully developed may well exceed acceptable ambient, air tolerance levels even if scrubbing installations are installed at power plants. Materials carried in steam may cause impacts if accumulated over a long period. These may be indirect or direct effects. Cooling tower drift potentially is an additional problem. Considerable research is needed in order to recognize symptoms, to determine rates of action, dispersion patterns, etc. The determination could then be made whether conditions are beneficial or adverse.

b. Water Quality: Low Mod. High Short-Term
 Long-Term

Comment: The direct effect of geothermal operations on water quality is a result of erosion products, solutions derived from runoff after it is concentrated, fallout substances and accidental spillage. There is no baseline data available at this time and no accurate prediction can be made regarding the extent and probability of these effects.

c. Noise Quality: Low Mod. High Short-Term
 Long-Term

Comment: Audio effects can be reduced to tolerable limits, but some unnatural noise will always accompany exploratory well drilling and geothermal operations. It is unlikely that the nearest residents, some 2½ miles away, will be bothered by excessive noise.

d. Transportation Systems: Low Mod. High Short-Term
 Long-Term

Comment: Development of this and other geothermal fields in the area will probably bring pressure to widen and improve roads to the area. Which roads and the extent of the impact such transportation improvements will be determined by the direction in which the field is developed.

e. Public Utilities: Low Mod. High Short-Term
 Long-Term

Comment: The growth induced impacts are almost nonexistent.

f. Public Services: Low Mod. High Short-Term
 Long-Term

Comment: The same growth induced impacts as described in Item (e).

g. Energy Consumption: Low Mod. High Short-Term
 Long-Term

Comment: Drilling rigs are self-contained and provide their own energy. Consumption of fuels is limited to the drilling period.

h. Growth Inducing: Low Mod. High Short-Term
 Long-Term

Comment: The only induced growth will be in the nearby towns, such as Cobb or Middletown, rather than at the field site itself. There may be a slight increase in the number of persons living in the area due to permanent employment.

i. Other Values:

1. Vegetation

There will be some vegetation loss due to removal in preparation of the drill site. There will be overall a loss or decline in vigor of stands in certain areas due to increased humidity from the release of steam.

2. Fauna

The immediate adverse effect is not clearly known, however, there is a loss of habitat, but the extent is hypothetical.

3. Cultural

There are no cultural installations in the area.

4. Aesthetics

Visual effects of the installation will be long termed. Mitigation will be very slow.

B. Beneficial Effects:

a. Social: Low Mod. High Short-Term
 Long-Term

prohibit drilling in such areas until equipment and procedures are available to satisfactorily mitigate them. Such reasons for disallowing geothermal development in the proposed area are insignificant on an environmental basis. A second alternative would be to allow only the testing of the possible existence of commercial steam source. If commercially productive steam was not found in the drill site covered, the land could then be reverted to its previous uses with a minimum of adverse problems. Third, is to have a delayed development alternative and this would be to insure that the proper technology was available to mitigate objectionable impacts. The major drawback in this alternative is the great uncertainty regarding the lifetime necessary to make such technological advances. The fourth alternative, is to take a mitigated action decision to impose reasonable restrictions that current technology can supply. The application of this alternative is suggested in this EIR and should be a line with specific requirements of appropriate agencies exercising jurisdiction over the area. Additional stringent requirements may be applied by the county or the state agencies.

XI. Relationship Between Local Short-Term Uses of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity:

Previously the area under study has had a burning program conducted by the landowner in order to improve the wildlife habitat quality, specifically for game management and hunting purposes. There was an increase in wildlife utilization, but these game animals comprised a very limited recreational hunting resource. Geothermal development will conflict with these hunting activities and the burning program, by necessity, will be greatly modified.

The watershed resource is a controlling factor in the natural quality and in the downstream flood control methods. Previously, these values have not figured in land use methods. Natural drainage has been greatly modified by water impoundment by the landowner. There are many areas in which the soil has been exposed to the full impact of heavy rains and results have been an increase in runoff and acceleration of erosion and sedimentation.

A fundamental decision to be made is whether the revenue of geothermal resource development and the resultant energy generation at this site for use elsewhere offset the cost of land restoration and the impacts to the water quality or to the air quality. The direct or indirect cost is either to the public at large or should be paid by those directly affected. The decision, who by necessity, requires a change in attitude of those exploring the resource in the area.

Geothermal extraction can be compatible with existing and future renewable and nonrenewable resources, but the methods will have to be changed. Stringent mitigation measures are essential in underlying this concept. Trade-offs must be made by necessity, but these can be made acceptable over the long term.

X. Irreversible Environmental Changes:

Limited topographical modification and the resulting increase in erosion will have an impact on water quality and on fish and wildlife. There will also be an increase in the amount of gases vented to the air and an increase in humidity from the vented steam.

XI. Comments and Issues Raised:

1. The Sierra Club made some objections, in that the EIR process was incomplete for giving too little attention to the proposed well site itself. Additional comments were made by the Sierra Club and were answered by Ecoview as follows:

The discussion of the affects on residents was termed insensitive. Had the 5 or 6 residents been consulted for their opinions: Will they not be forced in any way to relocate?

The persons were contacted and it has been determined that they will not be in any way forced to relocate.

Access roads to the drill site will apparently involve the destruction of two springs. Is this justifiable?

The road was rerouted and the spring area avoided.

2. The Sonoma County Water Agency made several general comments, which were responded to by Ecoview.

In regards to the possibility of failure being a definite possibility, unless specific mitigating measures are made a part of design construction and operation at the well site.

Failure is always a possibility, but the conditions and mitigations already worked into the planning, make this exploratory well less likely to fail.

It was viewed that since no accurate prediction method can be made regarding the extent and probability of water quality problems from erosion, fall-out substances, solutes derived from concentrated runoff and accidental spillages, it is probable that no accurate prediction can ever be made considering the possible range of variables. It is felt that the high probability of significant adverse impact and that reasonable mitigative measures should be used based on the best estimates of such adverse impacts. Then, as more precise data is developed, adjustments to the scale of mitigative measures could be made.

This is precisely what has been done. However, there still is no pre-project or post-project monitoring to establish any data to detect the inadequacy or "over-kill of mitigation".

3. County of Napa Conservation, Development and Planning Department reiterated the policy adopted by Napa County to oppose geothermal leasing of Federal lands because of the potential hazardous effects of geothermal activities on grape growing activities, irrigation and domestic water supplies, recreation usage, the adverse impact on fish and wildlife areas, and the primitive state of programs to mitigate adverse impacts. Several points of alleged inadequacy were indicated, but no specific points or elements identified to which a response could be formulated.

We would be glad to do so if these points were clarified and stated as specific questions or errors that need correction.

4. California Department of Fish and Game referred to the fact that if the initial well is successful, additional wells, roads, sumps, pipelines, and a power plant and related transmission lines will be constructed. Requested that a master plan for the production facility should be developed and the environmental impact discussed before exploration drilling is permitted.

These comments are the same as those to previous EIR's and our response to them is the same. It is not feasible to proceed much farther in identifying field impacts than we already have until the field can be identified, otherwise the potential problems and ramifications are answered to the best data currently available.

Reference made to fish resource in Alder Creek, Squaw Creek and Big Sulphur Creek without discussing the species present and their habitat needs.

These fisheries were discussed in Neilson, et al., 1974a.

Mitigative measures described are not binding on the developing company and therefore, the report is misleading.

The EIR can only state the condition and suggest alternative mitigative procedures to minimize the impacts. It is only through the interpretation of the EIR by the person preparing the use permit or permit to construct that any thing said in the EIR is made binding and then only to the extent that the language legally permits. Any permit issued by the State Lands Commission will be subject to the mitigation measures.

5. The California State Lands Division referred to the fact that 31 of 49 drill pads referred to in the Pacific Energy EIR will be located on areas classified in land sensitivity classes 4 and 5, which indicates that these sites have high to very high impact sensitivities. The Division feels that each site should be analyzed individually to determine if such impacts really exist and to suggest mitigation measures where applicable.

Landslide potential was discussed and it was felt that the report failed to significantly treat environmental impacts associated with construction activities on these slides. However, well sites on State land will be investigated by State Lands Division staff prior to approval of well proposals.

6. The California Air Resources Board referred to the fact that the EIR treats the project only as the drilling of a single exploratory well. The Air Resources Board recommended that the EIR address, at least briefly, the problems associated with ultimate development of power-generation facilities on the leasehold.

The impacts of total field development are discussed generally. Data will not be available to discuss potential impacts in greater detail until a resource has been identified. Upon discovery of geothermal resources, the preferential right to convert the permit into a geothermal lease will be subject to an additional or supplemental EIR covering proposed commercial operations.