

MINUTE ITEM

This Calendar Item No. 40.
was approved as Minute Item
No. 40 by the State Lands
Commission by a vote of 3
to 0 at its 8.23.79
meeting.

CALENDAR ITEM
40.

8/79
PRC 4596
PRC 4597
Everitts

DRILLING GEOTHERMAL LEASES

LEASE: PRC 4596 and 4597
LESSEE: Union Oil Company of California
Magma Power Company
Thermal Power Company
2900 Range Avenue
Santa Rosa, California 95401
COUNTY: Sonoma and Lake
AREA: Geysers Geothermal Field

PERTINENT INFORMATION:

State Geothermal Resources Leases PRC 4596 and 4597 were issued to Union Oil Company in 1971. In April, 1972, an undivided 25% interest in these leases were assigned to Magma Power Company and an undivided 25% interest was assigned to Thermal Power Company. Pursuant to the terms of the lease, Union Oil Company of California, as field operator, has requested the Commission to approve, in principal, the preparation of 13 sites and the drilling of 36 wells in Sonoma and Lake County to supply steam to proposed Power Plant 17 which is in the final stages of siting approval. Plant 17 is scheduled to go on stream in July 1982 -- generating 110 megawatts and increasing State royalty revenue by approximately \$100,000 per month. Only 2 of those sites will be prepared this year, with the remainder of the drill sites to be prepared and wells drilled over the projected life of the powerplant. Approximately 90% of the steam utilized by this plant will come from State leases. Union Oil Company additionally has requested approval, in principal, to the construction of 2 drill sites for 6 wells to serve as makeup wells for existing Power Plant 9 & 10. Plans call for construction of both sites this summer. The lessee has been

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informed, and agrees, that approval of these wells is approval in concept only and that the Commission, through its staff, reserves that right to approve or disapprove any or all of these sites and proposed wells after completion of a thorough on-site geologic and engineering evaluation of the sites and drilling programs. The staff will report back to the Commission annually on those wells and sites which have been approved.

ENVIRONMENTAL IMPACT:

The Sonoma County Board of Zoning Adjustments, acting as lead agency, prepared, circulated, and adopted Environmental Impact Reports Titled EIR for Geothermal Development of Union Oil Company Leaseholds on the Upper Portion of Squaw Creek Drainage at The Geysers, Sonoma County, California and the Union Oil Company Leasehold at The Geysers. The State Lands Commission recertified these documents in granting well approvals within the study areas covered by both EIRs. These documents cover the Sonoma County portions of the Unit 17 steamfield as well as the area requested for wells to supply Units 9 & 10.

The Lake county Planning Commission had an EIR prepared to cover the Unit 17 steamfield located in that county. The EIR was circulated through the State Clearinghouse, was certified, and a use permit was issued by resolution on September 29, 1978.

APPROVALS OBTAINED:

1. Sonoma County Board of Zoning Adjustments and Lake County Planning Commission.
2. California Division of Oil and Gas.
3. California North Coast Regional Water Quality Control Board.

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FURTHER APPROVALS REQUIRED:

1. Under the existing county use permits, preparation of the drill sites is permissible, but before drilling can commence, Authority to Construct certificates must be obtained from both the Northern Sonoma County Air Pollution Control District and from the Lake County Air Pollution Control District. It is anticipated that Authority to Construct for sites DX 17-2.3 and DX State 17-5.2 will be obtained within 30 days.

EXHIBITS: A-1. Location Map. A-2. Location Map.
B. EIR Summary;

IT IS RECOMMENDED THAT THE COMMISSION:

1. DETERMINE THAT EIRS HAVE BEEN PREPARED FOR THESE PROJECTS AND CERTIFIED BY THE SONOMA COUNTY BOARD OF ZONING ADJUSTMENTS AND THE LAKE COUNTY PLANNING COMMISSION.
2. CERTIFY THAT THE INFORMATION CONTAINED IN THE EIRS OF THE SONOMA COUNTY BOARD OF ZONING ADJUSTMENTS AND THE LAKE COUNTY PLANNING COMMISSION HAVE BEEN REVIEWED AND CONSIDERED BY THE COMMISSION.
3. DETERMINE THAT THE PROJECTS WILL NOT HAVE A SIGNIFICANT EFFECT ON THE ENVIRONMENT.
4. AUTHORIZE THE APPROVAL, IN PRINCIPAL, OF THE PREPARATION OF DRILL-SITES AND THE DRILLING OF WELLS HORNER STATE 17-10.2, 17-11.2, 17-12.3, 17-13.4; DX STATE 17-1.3, 17-2.3, 17-3.3, 17-4.3, 17-5.2, 17-6.3, 17-7.2, 17-8.3, 17-9.3, AND LF STATE 9-40.2 AND 10-30.4 IN ACCORDANCE WITH THE TERMS AND CONDITIONS OF STATE GEOTHERMAL LEASES PRC 4596 AND 4597, AND THE RULES AND REGULATIONS OF THE COMMISSION, SUBJECT TO THE INSPECTION AND WRITTEN APPROVAL BY THE COMMISSION'S STAFF OF THE GEOLOGIC AND ENGINEERING ASPECTS OF THE DRILL-SITE CONSTRUCTION AND EXPANSION.

EXHIBIT A-1

STATE LANDS COMMISSION

APPROVAL OF DRILLING OF GEOTHERMAL

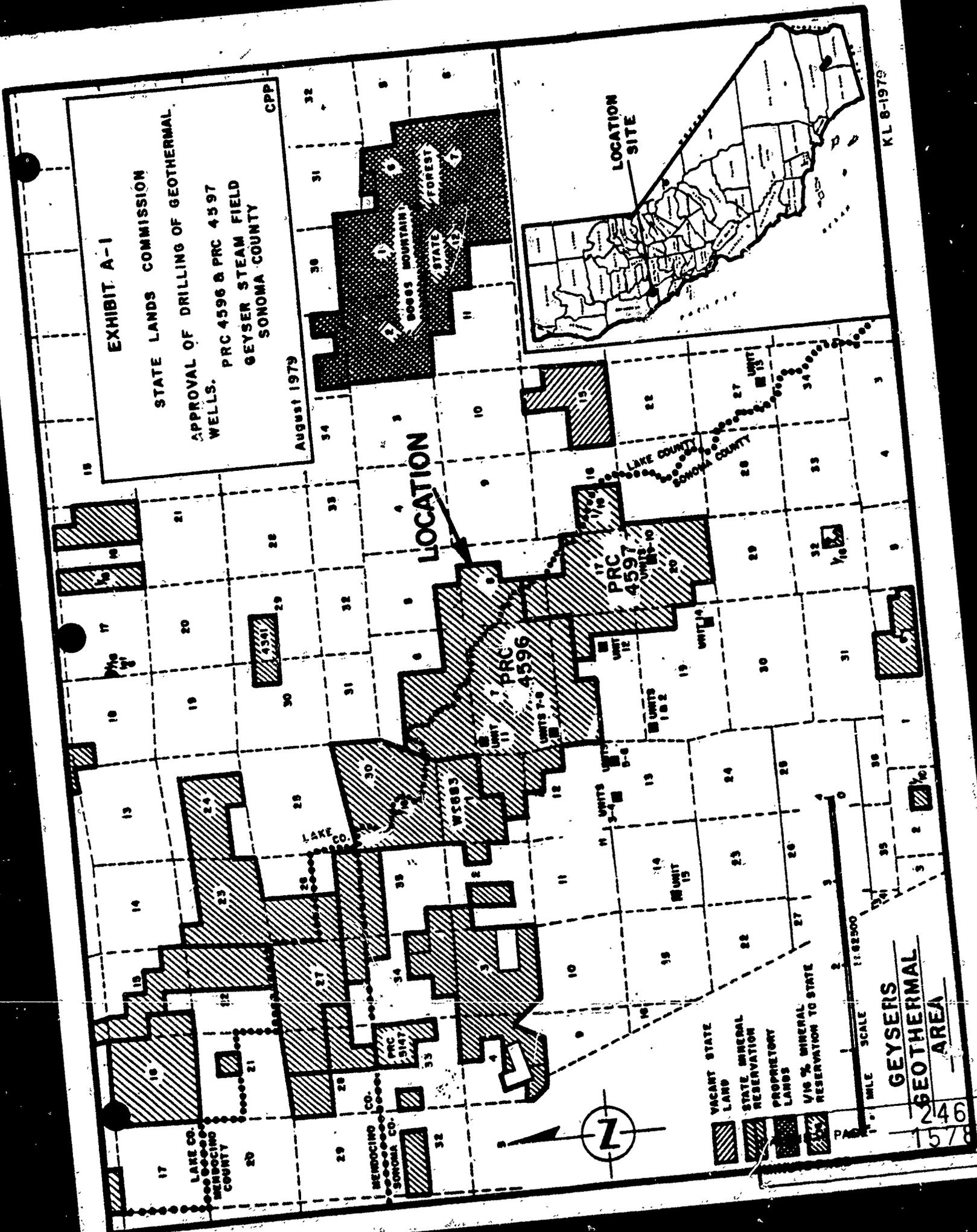
WELLS. PRC 4596 & PRC 4597

GEYSER STEAM FIELD
SONOMA COUNTY

CPP

AUGUST 1979

KL 8-1979



LOCATION

LOCATION SITE

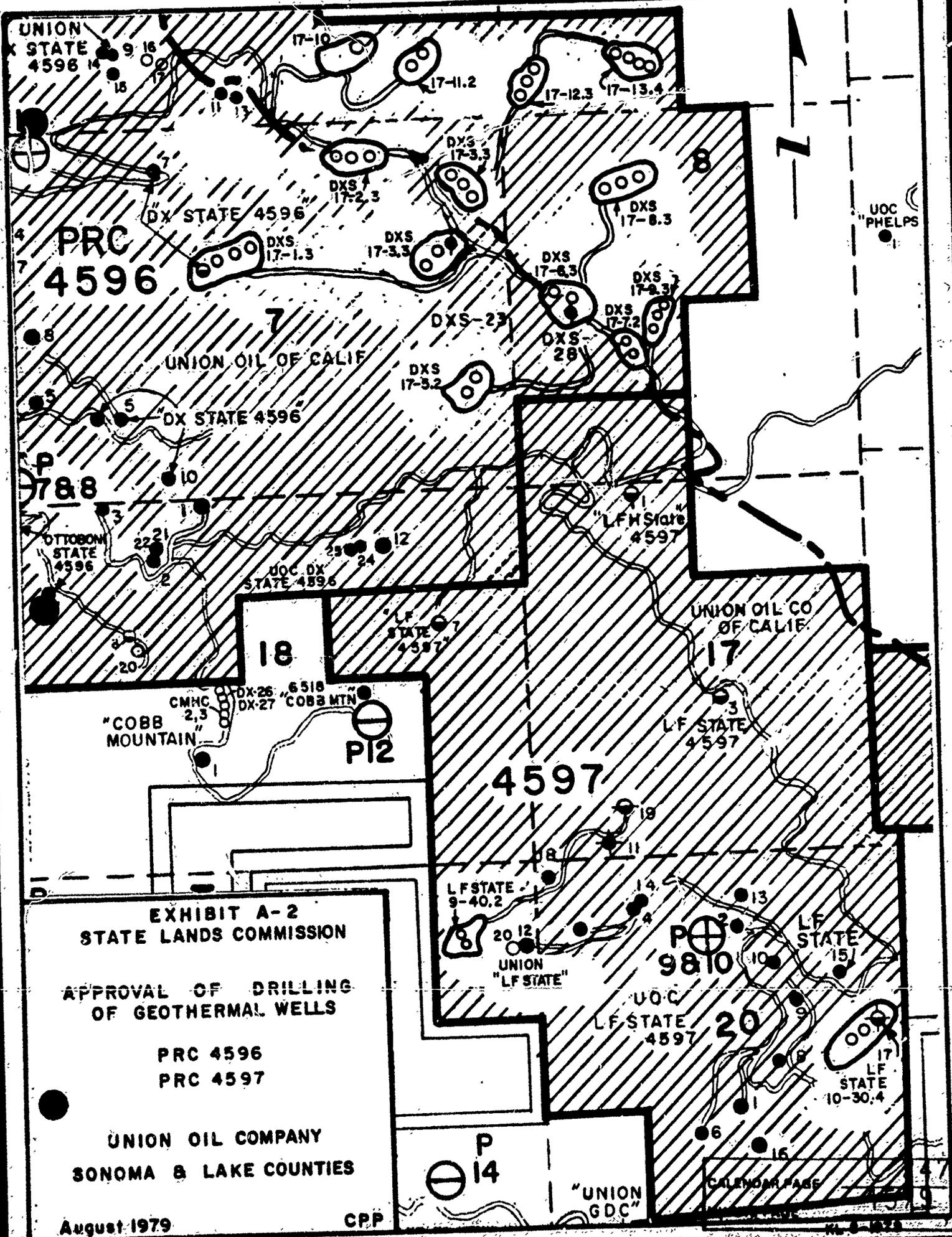


-  VACANT STATE LAND
-  STATE MINERAL RESERVATION
-  PROPRIETARY LANDS
-  1/16 % MINERAL RESERVATION TO STATE

SCALE 1" = 1 MILE 1:62500

GEYSERS GEOTHERMAL AREA

246
1578



UNION
STATE
4596

PRC
4596

DX STATE 4596

UNION OIL OF CALIF

DX STATE 4596

OTTOBOM
STATE
4596

UOC DX
STATE 4596

LF STATE
4597

UNION OIL CO
OF CALIF.

CMHC
"COBB
MOUNTAIN"
DX-26 6518
DX-27 COBB MTN

LF STATE
4597

EXHIBIT A-2
STATE LANDS COMMISSION

APPROVAL OF DRILLING
OF GEOTHERMAL WELLS

PRC 4596
PRC 4597

UNION OIL COMPANY
SONOMA & LAKE COUNTIES

August 1979

CPP

P
14

"UNION
GDC"

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EXHIBIT "C"

EIR SUMMARY

ENVIRONMENTAL IMPACT REPORT FOR UNION OIL COMPANY'S POWERPLANT 17 LEASEHOLD AT THE GEYSERS, LAKE COUNTY, CA., AND FOR PROPOSED FIELD DEVELOPMENT FOR DRILLING OF WELLS HORNER STATE 17-10.2, 17-11.2, 17-12.3, 17-13.4, DX STATE 17-2.3, 17-4.4, 17-6.3, 17-7.2, 17-8.3, 17-9.3.

An Environmental Impact Report was prepared and certified by the Lake County Planning Commission on September 21, 1978, covering the geothermal development by Union Oil Company on the Lake County portion of its Upper Squaw Creek Leasehold planned to supply steam to proposed Power Plant 17 to be located in Sonoma County. The EIR is a staged regional type analysis covering the total project area. Site specific data dealing with the proposed wells in Lake County has been included.

I. Description of the Project:

The report covers the geothermal development of Union Oil Company's Upper Squaw Creek Leasehold in the Geysers and deals with roads, drill pads and steam transmission pipelines.

II. Project Location:

The project is located in the northwest portion of the Geysers Geothermal Steamfield. The project study area includes 720 acres located in Sections 5, 6, 7 and 8, T11N, R8W, MDB & M.

III. Project Action:

The action involves the following specific steps:

1. Test boring to determine subsurface temperature profile.
2. Drilling one or more exploratory or step-out wells to prove the steam reservoir. Three such wells have already been drilled in the project area.
3. Field development planning including correlating 20-acre blocks of subsurface well target areas to potential wellhead sites at the surface. A total of 36 wells are proposed to serve Unit 17.
4. Drill pad, sump and access road preparation. Approximately 2-1/2 acres of flat area are required to accommodate a drill rig and sump together with tanks, compressors, supply and administration equipment.

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5. Field development well drilling. Fifteen to nineteen wells are required to begin operations.
6. Well testing and standby maintenance requires periodic venting of full heads of steam for several hours to several days to clear debris and condensation from the well throat.
7. Siting and construction of the generator unit including generators, condenser, cooling towers, H₂S scrubbers, condensate reinjection system and transmission towers and lines.
8. Construction of steam transfer pipelines from wells to generator.
9. Drilling, testing and connecting replacement wells to the steam supply system.

IV. Present Environmental Setting:

- | | |
|----------------------------|-----------------------------------------------------------------|
| a. Climate: | Moderate |
| b. Air Quality: | Good |
| c. Water Quality: | Good |
| d. Noise Quality: | Good |
| e. Transportation Systems: | Poor |
| f. Public Utilities: | Poor |
| g. Public Services: | Poor |
| h. Other Values: | The land is of importance as watershed and wildlife habitat. |
| i. Present Land Use: | Hunting, grazing, recreation and geothermal energy development. |

V. Environmental Impacts:

- A. Adverse
 a. Air Quality - Low; Long Term

Comment: The amount of non-condensable gases released to the atmosphere will increase. Cumulative effect by the time full field development occurs may exceed acceptable tolerance levels

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Comment: even with scrubbing installations at
Cont... power plants. There may be direct and
indirect effects of materials carried in
steam which may cause negative effects over
a long period. Some increase in odoral
effects of H₂S from wells and power plant
emissions can be expected.

b. Water Quality - Low; Long Term

Comment: The direct effect of geothermal operations
on water arises from erosion products,
solutes derived from runoff that concen-
trates, fallout substances and accidental
spillages. Land surface disturbance will
cause some increase in runoff, but since
no baseline data are available at this time,
no accurate prediction can be made regarding
the extent and probability of these effects.

Noise Quality - Low; Long Term

Comment: Audio effects can be reduced to tolerable
limits, but some unnatural noise will always
accompany geothermal operations.

d. Transportation Systems - Low; Short Term

Comment: As development of this and other geothermal
fields in the area proceeds, there will
probably be pressure from the developers,
workers or suppliers to widen and improve
roads in the area. What roads and the
extent of the impact such transportation
improvements will have depends on the direction
and speed with which the field is developed.

e. Public Utilities - Low; Short Term

Comment: The same growth induced impacts as described
in item (d).

f. Public Services - Low; Long Term

Comment: The same growth induced impacts as described
in item (d).

g. Energy Consumption - Low; Short Term

Comment: Drilling rigs are self-contained and provide
their own energy. Consumption of fuels for
compressors, lighting and rig operations is
limited to the drilling period.

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h. Growth Inducing - Moderate; Long Term

Comment: Whatever growth induced impacts there are in the fields of transportation, public utilities or public services, they will probably not occur within the project area, but mainly outside in nearby communities. There will be some slight increase in the number of permanent employees.

i. Other Values:

1. Vegetation

Direct vegetation loss arises from removal and corresponds with that of topographical modification. Some loss or decline in vigor of stands in certain areas may be expected from increases in humidity from release of steam.

2. Fauna

As with vegetation, the immediate adverse effects are not clearly known; however, loss of habitat is obvious but the extent is hypothetical.

3. Cultural

Since there are no cultural installations in the area, no direct influence may be felt that cannot be mitigated.

4. Aesthetics

Alterations caused by construction of drill pads, roads, pipelines and eventually power plants, will alter the visual aesthetics, but the area of the project is thinly populated and the power plant will not be readily visible.

B. Beneficial Effects - High; Long Term

Comment: The project is to develop geothermal resources for the production of electrical energy. There will be little social impact in the project area, but the impact will be great where the energy is used as a substitute for energy created by scarce or expensive fossil fuels.

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C. Economic Effects - High; Long Term

Comment: Completion of the project will have an economic impact on the entire county through generation of additional tax revenues. It will also generate substantial non-tax royalty revenue for the State.

VI. Adverse Environmental Effects Which Cannot Be Avoided:

The greatest impacts occur from roadbuilding, drill pad and pipeline excavation which, because of soil removal, results in loss of wildlife habitat as well as increased soil erosion. Introduction of more H₂S from drilling and venting of wells will cause additional degradation of air quality. Strict adherence to good engineering practices, rules and regulations of the Commission and the county should help minimize soil erosion. New H₂S abatement systems should reduce air quality degradation.

VII. Mitigation Measures Proposed:

Construction of access roads in accordance with good engineering practices to reduce erosion, the changes of accidental spills and loss or damage to wildlife habitat. The techniques to reduce venting of steam and scrubbing of steam released from cooling towers to eliminate gasses, particularly H₂S.

VIII. Alternatives to the Proposed Action:

Some development has already taken place on the leasehold and many of the long-range impacts have been irrevocably sustained. Except for insisting on stringent mitigation measures for the wells being proposed now and for future wells, the null alternative would serve no useful purpose.

The alternative of stopping further geothermal development, for whatever reason, outside of its present limits, is possible. However, in the light of the state of fossil fuels, this alternative would be useful mostly to those persons directly affected by noise, odors and reduced or altered visual aesthetic values. A more moderate approach would be to designate areas where these problems are most acute, then prohibit drilling until equipment and procedures are available to satisfactorily mitigate them.

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

Development of geothermal resources is, with suitable safeguards and mitigation, compatible with the restoration and maintenance of the resources of the leasehold. The geothermal resource, can in part, provide revenue necessary to manage, develop and protect those renewable resources necessary for a solid multi-use, long-range economic base in this area. In view of trends towards world-wide increases in the value of and demand for primary commodities such as wood fiber, protein foods and energy, it would appear essential to increase and sustain the long-range production capacity of the land wherever possible. To do this will require a comprehensive, multiple-use land and resource management plan for the entire KGRA. Funding for such a plan could come in part from tax revenues generated from development in the area.

X. Irreversible Environmental Changes:

Some topographical modifications and resulting increase for potential erosion will have an impact on water quality and fish and wildlife. There will also be an increase in the amount of gases vented to the air and the potential for plant damage from an increase in humidity from steam.

XI. Comments and Issues Raised:

A. D. Stockton, Geothermal Officer, Division of Oil and Gas:

COMMENT: Page 7, Part 1, states that the condensate (re injection) pipeline alignments has not been determined. If the location is chosen before the final EIR is published, it should be shown on Figure 11-1.

RESPONSE: A description of the reinjection system has been provided by Union Oil and is submitted as an attachment to the Draft EIR. Figure 11-1 has been revised.

COMMENT: Page 124, Part 2. The association between boron soils and valley fever is unproven and should be omitted.

RESPONSE: The statement reads, "High boron soils are known to be associated with Valley Fever". No further interpretation is suggested.

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COMMENT: Page 250-289. For each well pad to be built or enlarged, the discussion should include a statement to the effect that: If construction of drilling sites, roads, steamlines, or other construction could cause or be affected by unstable terrain, the operator shall submit a plan, signed by a registered civil engineer and an engineering geologist for the proposed drillsite to the Division of Oil and Gas prior to the beginning of construction. The work must be approved by the Division before a permit to drill is issued.

RESPONSE: Additional information is acknowledged.

Harmon Wong-Woo, Air Resources Board:

COMMENT: If the State H₂S air quality standard is exceeded in the area of this proposed project, the new source review rules of the Lake and Northern Sonoma County Air Pollution Control Districts will require the use of the Best Available Control Technology (BACT) and a showing of demonstrable air quality benefit from the proposed project before an authority to construct could be issued. Therefore, the current violations of the H₂S air quality standard dictate that BACT is the degree of H₂S abatement required for the project. The DEIR states that there are seven primary emission source categories associated with geothermal field development; construction equipment operations and traffic, well drilling operations, well testing and clean out, well bleeds, uncontrolled wells, "stacked" steam, and pipeline vents. The DEIR reviews the methods currently available for control of emissions from these sources; however, it neither states nor recommends which controls to be used. Since BACT will be required, the EIR should state that the BACT controls will be used and assess the extent to which these controls will mitigate H₂S impact.

RESPONSE: The assignment of BACT by the EIR author is inappropriate.

COMMENT: The localized H₂S air quality impact and the showing of demonstrable air quality benefit

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should then be addressed in detail. While the DEIR acknowledges that these showings must be made, it does not present the information required to make a conclusive finding. It could be concluded from the DEIR that the project will result in basinwide emission increases which will adversely impact the H₂S air quality and interfere with the attainment of the H₂S air quality standard.

RESPONSE: Lake County ordinance does not require that a project show a demonstrable air quality benefit.

COMMENT: We encourage geothermal development as an alternative energy source to the burning of polluting fossil fuels. However, geothermal development at the Geysers KGRA has resulted in a significant air quality management problem due to continued violation of the H₂S ambient air quality standard. The development of the steam supply field for PG&E's Unit 17 power plant will increase the H₂S emissions in the Geysers KGRA and interfere with the attainment of 1/2 the H₂S air quality standard.

RESPONSE: The determination of whether the Unit 17 development will interfere with the attainment of the H₂S air quality standard will require further air studies as proposed by LCAPD.

Thomas Bailey, State Water Resources Control Board:

COMMENT: Page 146, 1st P and Page 148, Table V-32 -- When chrome compound drilling mud thinners are used, the wastes must be removed from the drill sumps and disposed of at a site approved by the California Regional Water Quality Control Board.

RESPONSE: Additional information is acknowledged.

California Department of Fish and Game:

COMMENT: The description of fish and wildlife values and many of the proposed mitigation measures are highly commendable. For example, the identification of critical wildlife habitats, such as den and nest trees, and riparian

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areas, and the avoidance of these areas by development, respond to some of our major concerns with geothermal operations. We note, however, that other mitigations are only recommendations, rather than measures that will be incorporated in the development. To be effective, such measures should be included as part of the requirements of any use permit issued for the project.

RESPONSE: ECOVIEW concurs with the recommendations.

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