Occidental Geothermal, Inc

PLAN OF OPERATION—

EXPLORATION

UNITED STATES GEOTHERMAL LEASE

Serial No.: CA 5637

IN

LAKE COUNTY

CALIFORNIA

DRILL SITE B

May 18, 1979

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A. SCOPE

This Plan of Operation covers all activities required to construct roads, and a multiple-well drill site for drilling exploratory wells on the above captioned lease. The proposed drill site (site B) and access road are shown on the exhibits attached hereto.

This site has been selected to prove the geothermal resource of the land included in U. S. Geothermal Lease CA 5637.

Additional exploratory drilling could follow this phase if there is sufficient encouragement from the well or wells to be drilled from site B.

It is possible that a total of six multiple drilling sites will be required to support final development of the resource on this lease.

Occidental Geothermal, Inc. is presently negotiating with several agencies for the construction of a power plant to be supported by the geothermal resource from this lease.

B. CONSTRUCTION

1. Location

This phase of the project is located entirely in Lake

County and encompasses a total area of 468.91 acres more or less. Land is described as follows:

Parcel 6: CA 5637
T11N R8W MDM
Sec 21: Lots 5, 6, 11 and 12, and E1/2 NE1/4,
Sec 22: NE1/4 NW1/4; W1/2 W1/2 and NE1/4 SW1/4

The location of the project including topographic features and drainage patterns of the land is shown on Exhibit A.

2. Access

At the present time the only access to the project is an improved fire road originating from the Socrates Mines Road in Lake County.

Additional access roads will be developed as part of the total project.

The right to utilize private existing access roads outside the project limits will also be secured.

Proposed alignment of the access road to drill site B is shown on the Exhibit A.

3. Right to Construct Surface Facilities

Occidental Geothermal, Inc. will secure all necessary leases and other agreements required to construct roads and other surface facilities on private lands within the project area.

Top soil will be stockpiled for utilization on the of fill slopes to support revegetation.

Waste material generated during drilling operations will be disposed within the confines of a drilling waste sump constructed adjacent to the drilling platform and lined with an impervious clay liner. The liner will be two feet in thickness and will be constructed to provide a permeability of 10^{-6} cm. per second.

In the unlikely event of an oil spill around drilling equipment, provisions will be made to divert the oil into the drilling waste sump.

Drilling wastes that cannot be accommodated within the sump will be transported and disposed to an authorized Class II disposal site.

6. Source of Construction Materials

The construction of all surface facilities will not require the importation or exportation of soil.

All construction will be engineered to minimize disturbance of surface areas and to result in a balanced cut and fill.

Excess soil will be disposed on designated disposal sites within the project limits.

Rock required for building roads and drilling locations will be purchased from commercial rock producers near Middletown.

7. Construction and Drilling Facilities

The construction activities will be directed from the contractor's office in Middletown.

Office and shop facilities required for drilling operations will be located at each of the drill sites.

Construction support facilities and equipment will be secured through contracts with local contractors. No on-site housing facilities are required. Personnel will reside in housing facilities in nearby communities.

8. Construction Specifications

All surface facilities will be constructed on the basis of Drawing and Specifications developed and certified by a Registered Civil Engineer.

The construction Drawing and Specifications will also be reviewed and certified by a Registered Engineering Geologist.

The following are minimum design parameters that will be incorporated in the design of the surface facilities:

All drill sites will be developed for multiple wells (up to 4).

Engineered cut slopes: Not steeper than 1 horizontal to 1 vertical.

Engineered fil slopes: Not steeper than 1.5 horizontal to 1 vertical.

Slopes of drainage facilities: Not less than 2%

Drainage facilities will be designed for a 100 year storm intensity for the area.

Maximum road grade not to exceed 15%.

Compaction of engineered fills shall be not less than 90% based on ASTM Method D-1557-70.

Preliminary layout of drill site B including a typical arrangement of drilling equipment is shown on Exhibit B in the Appendix.

9. Geotechnical Investigations

Prior to finalizing the design of the surface facilities, certain geotechnical investigations will be performed to determine the stability of each drilling site and also to develop design parameters.

The extent of the geotechnical investigation will depend on evaluation of existing data as supplemented by field reconnaisance surveys.

The geotechnical investigation may include the following activities:

a. Field surface geological reconnaisance.

b. Seismic refraction surveys.

c. Test pits and test trenches.

d. Exploratory borings.

10. Construction Surveys

All construction will be performed on the basis of surveys.

Clearing limits will be defined by surveys.

No overclearing will be allowed.

A written description of the geotechnical phase will be filed prior to performing any work.

C. ENVIRONMENTAL CONSIDERATIONS

1. Environmental Assessment

The environmental aspects of this development were the subject of a study entitled "Proposed Geothermal Leasing Environmental Assessemnt Record" prepared by the Bureau of Land Management, Ukiah District, dated September, 1978. An existing Environmental Impact Report entitled "Ford Flat Geothermal Steam Area, Lake County" prepared by Atlantis Scientific is also on file with the USGS and Lake County. This report covers the lands included in CA5637 and will be referenced and supplemented to provide site specific data for this project.

2. Sensitivity

Portions of the project area are environmentally sensitive. There are two particular items of concern:

a. The project area lies near a potential nesting habitat of the peregrine falcon, an endangered and fully protected species.

b. Within the area are the headwaters of Anderson and Gunning Creeks, a source for domestic water for near-by communities.

Construction of the access road to Site B will entail crossing an unnamed stream which is one of the headwaters of Anderson Creek. Using sound engineering practice, this stream can be crossed with little or no impact on the aquatic habitat. Steps will be taken to prevent erosion and related siltation - see Paragraph 6.

3. Vegetation

In order to determine the presence of rare, threatened and endangered plants, a field reconnaisance will be performed by a qualified horticulturalist familiar with the vegetation encountered in the area.

The reconnaisance will be performed within a strip encompassing the expected area of disturbance. A written report will be submitted on the results of this reconnaisance.

4. Cultural Resources

Within the expected area of disturbance a field reconnaisance will be performed by an archaeologist to identify any archealogical sites and other cultural finds. A written report will be submitted on the results of this reconnaisance.

Selection of final access roads and drilling sites will take into consideration the findings and recommendations of such a survey.

The American Native Heritage Committee will be consulted during the proposed archealogical investigation.

5. Fire Prevention Measures

To mitigate environmental impacts due to fires the following measures will be taken:

a. All construction and drilling equipment will be equipped with exhaust spark arresters.

b. Water trucks, fire hoses, and spray nozzles will be available during construction and drilling activities.

c. Stored water required for drilling will be available for fire fighting.

d. Fire extinguishers will be located at strategic locations around drilling equipment.

e. Safe smoking regulations will be developed and enforced.

f. Fire hazard warning signs will be posted at the entrances to the project.

6. Soil Erosion and Siltation

In order to minimize soil erosion and related siltation of streams the following measures will be incorporated in the construction of access roads and drilling sites.

a. All fill slopes will be compacted using rollers and "walked" with a crawler tractor.

b. Discharge points of culverts shall have energy dissipators.

c. Where the slope of the drainage ditches are over 10% the ditches will be lined with rock.

d. Discharge points of culverts shall be carried to natural drainage channels.

e. All cut and fill slopes will receive erosion protection by the application of straw and hydromulching.

f. If required, siltation basins will be constructed.

7. Pollution Control of Surface and Ground Waters

To control possible pollution of surface water streams from spillage of fuel and oils around drilling equipment, ditches will be constructed around all equipment to divert such spillage into the drilling waste sump.

To control pollution of ground water, the drilling waste sump will be lined with an impervious clay liner.

Casing and cementing procedures during drilling operations will prevent contamination of ground waters.

8. Protection of Fish and Wildlife

Surface disturbance will be confined only to the areas required for the construction of access roads and drilling locations.

In those areas revegetation programs will be established to replace the lost growth. Such revegetation programs will be under the direction of a horticulturalist or landscape architect.

Siltation of streams effecting spawning and fish habitat will be controlled as outlined above.

9. Air and Noise Pollution Control

Air pollution created from drilling operations while drilling with air will be minimized by the use of a cyclonic separator and muffler. Such separators have been developed over the years by other developers at the Geysers and have been proven effective.

Their effectiveness is particularly increased by the introduction of water sprays in the blooie line and separator.

It is proposed that a similar muffler-separator will be used in the drilling operations on this project.

Noise generated by the drilling equipment will be controlled by mufflers. It is anticipated that the noise generated by the drilling operations will not exceed 65 db(A) at a distance of one-half mile, and that the noise level at the nearest community two miles away will not exceed 55 db(A).

10. Protection Against Hazards to Public Health and Safety

a. Hard hats will be worn by all construction and drilling personnel.

b. Sanitary facilities will be provided through contract with a private company.

c. Bottled drinking water will be provided.

d. First-aid facility will be provided.

e. Industrial safety and OSHA regulations will be followed.

f. Radio or telephone communications will be provided for emergency calls.

D. COLLECTION OF BASE LINE DATA

Occidental Geothermal, Inc. is presently collecting base line data for water quality, noise, seismic and land subsidence activities and data on other ecological systems.

A program for the collection of such base line data is under way and such data will be available at the time the total plan of development is submitted.

APPENDIX