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Beowawe

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UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
Area Geothermal Supervisor's Office
Conservation Division, MS 92
345 Middlefield Road
Menlo Park, CA 94025

OCT 16 1979

Memorandum

To: INTERESTED PARTIES

From: Area Geothermal Supervisor

Subject: Unit Plan of Operation, Chevron USA, Inc., Beowawe Area, Lander and Eureka Counties, NV
Ref: 2404-02 Beowawe Unit (POO for EA #141-80)

Chevron USA, Inc. has submitted a Unit Plan of Operation in accordance with 30 CFR 270.34 to drill up to nineteen (19) exploratory wells in the Beowawe Unit, Lander and Eureka Counties, Nevada. A copy of the plan is enclosed for your review and files.

A Geothermal Environmental Advisory Panel (GEAP) meeting was held on April 19, 1977 in Elko, Nevada concerning environmental impacts of geothermal development in the Beowawe area. Environmental Assessment (EA) #55-7 was prepared by the Area Geothermal Supervisor's Office in 1977 for seven of the wells proposed by the current plan. The current plan proposes twelve additional wells for a total of nineteen. A checklist Environmental Assessment (EA #141-80) will be prepared by the office of the Area Geothermal Supervisor for the proposed action.

You are invited to participate in a field inspection led by Bernie Moroz, Reno District Geothermal Supervisor, USGS, on November 7, 1979. Participants are asked to meet at 8:00 AM at the Elko District Office of the Bureau of Land Management (BLM), 2002 Idaho Street, Elko, Nevada.

All comments concerning the proposed actions should be received no later than November 21, 1979 by:

Area Geothermal Supervisor
U.S. Geological Survey
Conservation Division
345 Middlefield Road, MS 92
Menlo Park, CA 94025
(415) 323-8111 X2845; (FTS) 467-2841

All comments will be given serious consideration in the preparation of the Environmental Assessment and any subsequent conditions of approval.

We urge you to send written commentary and will appreciate hearing from you even if you are of the opinion that the existing regulations, lease terms and operational orders provide adequate environmental protection.

The Area Geothermal Supervisor's Office will not send a draft Environmental Assessment to interested parties for the proposed action. Certain parties, however, such as the surface managing agency, the lessee, the Geothermal Environmental Advisory Panel and the U.S. Fish and Wildlife Service will receive a copy of the completed EA. Other interested parties will not receive a copy of the final EA unless such parties comment on the proposed action in writing or request a copy of the particular EA pursuant to the Freedom of Information Act. Copies of Environmental Assessments are available for inspection during normal business hours at the Area Geothermal Supervisor's office, The Battle Mountain Bureau of Land Management, District Manager's office and the Elko Bureau of Land Management, District Manager's office.

Reid T. Stone

Enclosure

INTERESTED PARTIES EA #141-80

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Beowawe Unit
Beowawe, Nevada

* * * * *

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Unit Plan of Operations

Beowawe Unit

Lander and Eureka Counties, Nevada

Chevron U.S.A. Inc.

August 1979

Table of Contents

Exhibits

Unit Plan of Operations
Beowawe Unit
Lander and Eureka Counties, Nevada

I. Introduction

An Initial Plan of Operations was prepared and submitted in July, 1976 covering operations planned at that time. The lease inspection by Interested Parties was held October 13, 1976, the draft Environmental Analysis (EA #5) was issued March 31, 1977, the Geothermal Environmental Advisory Panel met on April 19, 1977, and their final recommendations were issued May 12, 1977. Chevron did not submit a Unit Agreement so final approval of that Initial Plan of Operation has not been issued.

Chevron is now securing landowner consents to the Unit Agreement and has revised the Initial Plan of Operation. The Plan is essentially the same as before but now incorporates twenty potential drilling sites and includes archaeological surveys of the increased area of operation. The Unit Agreement will be submitted for final approval as soon as Chevron has secured sufficient commitments to assure effective control of operations within the Unit.

The Application for Permit to Drill (Form 9-331-C) previously submitted is no longer valid. A new Form 9-331-C will be prepared and the Blowout Contingency Plan revised for the specific well to be drilled. These will be submitted at a later date.

II. Objective

The objective of this exploratory work is to discover and ultimately develop a geothermal resource of sufficient size and quality to provide energy for commercial generation of electricity.

III. General Program

Chevron has drilled two deep holes in the Beowawe Area. Well Ginn 1-13 was drilled to 9551' in June 1974 and Rossi 21-19 was drilled to 5680' in December 1976. These wells have encouraged Chevron to continue exploratory work in the form of gravity surveys, seismic surveys, a program of temperature gradient holes and a self potential survey.

When the current work is completed, it is planned to drill one or more exploratory wells to $\pm$4000' (shallower if commercial production is encountered) at locations shown on Exhibit "A". The selection of the first location to be drilled will be based on all available data and will be made after completion of the current programs. Location and order of drilling of subsequent wells will depend on data gained from the first well. It is anticipated that the first well will be drilled in the fourth quarter 1979.

Exhibit "A" identifies the two existing wells and twenty potential drilling sites. It is probable that some will not be in suitable locations to encounter the geothermal resource, but others will. It is hoped that one or more will be satisfactory for the initial Unit well. A supplementary Plan of Operations will be submitted if additional locations are required.

IV. Production Testing

To determine if geothermal resources found in a well are commercial, it may be necessary to conduct production tests. The test program will entail installation of temporary surface facilities for measuring flow rate, measuring temperature, obtaining fluid samples, etc. In addition, downhole pressure-temperature data will be obtained to help assess reservoir size and performance.

The best data can be obtained at highest attainable production rate. Obviously, the capability of any well cannot be predicted; but facilities will be provided for rates up to 300,000-500,000± lb/hr. Duration of testing will be approximately 30-60± days. The steam will be vented to atmosphere and the water will be allowed to flow into the natural drainage channels in the area where it will join the runoff from the existing "geysers" wells. Since the objective zone is the source of fluid in the "geysers" and since analysis of fluid from the Rossi and Ginn wells shows the same composition, it is anticipated that produced fluid will be the same as the existing flow (Exhibit F). However, before a production test is made, formation fluid will be analyzed to be sure that geochemistry is similar. Discharge of fluid onto the ground will be controlled and temporary structures provided to prevent damage from erosion.

If the fluid is not suitable for discharge onto the ground, it will be necessary to install a pipeline to the Rossi or Ginn well. This line will be routed along existing roads as shown on Exhibit A. Surface disturbance would be minimal in that the pipeline would be laid on wood timbers to support it off the ground. No grading would be required except where the terrain may be too rough for the pipe to conform.

V. Well Locations

All of the potential well sites are shown on Exhibit "A". Access roads will be required and grading is necessary on site to accommodate the drilling rig. A typical rig layout is shown on Exhibit "B". Actual dimensions will depend on the equipment available at the time.

Grading will be kept at a minimum and will be done in a way to prevent foundation failure and soil erosion.

VI. Access Roads

Access to the wells will utilize existing county and BLM roads for the most part, so new construction is required only at individual sites. Requirement for construction material will be minimal and will be obtained on site or from commercial sources.

VII. Water Supply

It is planned to obtain water for the drilling operation from the nearby geysers flow. Drinking water will be obtained from commercial sources.

VIII. Support Facilities

The total compliment for the drilling operation is approximately 25 men; however, only 6 are normally on duty. In addition, various service personnel will occasionally be present for specific operations so as many as 12 may be on site at any one time. Personnel will be housed at Battle Mountain, Carlin, etc., so no campsite will be required.

No permanent storage yard or facilities will be installed at this time.

IX. Areas of Potential Surface Disturbance

The proposed well sites are located on unimproved land. Access roads pass through grazing land and now exist except for a short distance near each site. Activities will be confined to the access roads and well sites, so we foresee no other areas of surface disturbance.

X. Waste Disposal

All refuse (papersacks, boxes, wood, rags, etc.) accumulated during the operation will be burned and/or buried on site.

It is planned to dispose of cuttings and mud on site by evaporation and mixing with native soil. The planned drilling fluid will be a simple clay-water system with addition of small amounts of caustic and lignite which is not a toxic fluid.

XI. Environmental Protection

Chevron has drilled two other wells in this area with no adverse effect on the environment.

Drilling operations will be conducted with good practices proven in years of oil and gas drilling and more recently in the drilling of geothermal wells. The drill site is remote and will not create any nuisance for people in the area. Only the minimum area required for the equipment and for access will be used. Dust abatement will be accomplished as required by grading and water sprinkling.

1. Fire

Exhaust stacks on all engines will be equipped with mufflers or water cooled exhaust for spark control. Smoking will be allowed only in designated areas.

The drilling rig will have adequate dry chemical fire extinquishers and water pumping capacity. Water storage of at least 200 bbl. (8000 gal.) will be provided.

2. Soil Erosion

Rig locations and access roads will be graded to prevent soil erosion. Where necessary, existing drainage channels will be rerouted and re-seeding will be done to stabilize the soil.

3. Ground and Surface Water

The proposed drilling progarm will entail cementing a 20" conductor and a 13-3/8 surface casing so ground water will be protected prior to penetrating geothermal zones.

The surface location will be graded to drain all working fluids into the drilling pit so it will be kept on location and not allowed to mix with surface waters.

4. Damage to Fish and Wildlife or Other Natural Resources

All operations will be confined to well sites and access roads to minimize the effect on fish and wildlife. Those locations (#8, 9, 10 and 11) nearest to active raptor nesting will not be worked on between mid-February and mid-July subject to authorization of the Geothermal Supervisor and District Manager of the BLM.

5. Air and Noise Pollution

Noise level around the site will be maintained within guidelines specified by Federal OSHA Regulations.

Air quality will comply with air pollution control standards. While drilling and testing nearby Ginn 1-13 and Rossi 21-19 wells, no non-condensible gases were detected, and it is anticipated that the fluids at these wells will be similar.

6. Hazards to Public Health and Safety

All operations will be restricted to the well site and access roads will be conducted using proven drilling procedures. Persons not directly involved in the operation will not be allowed on site.

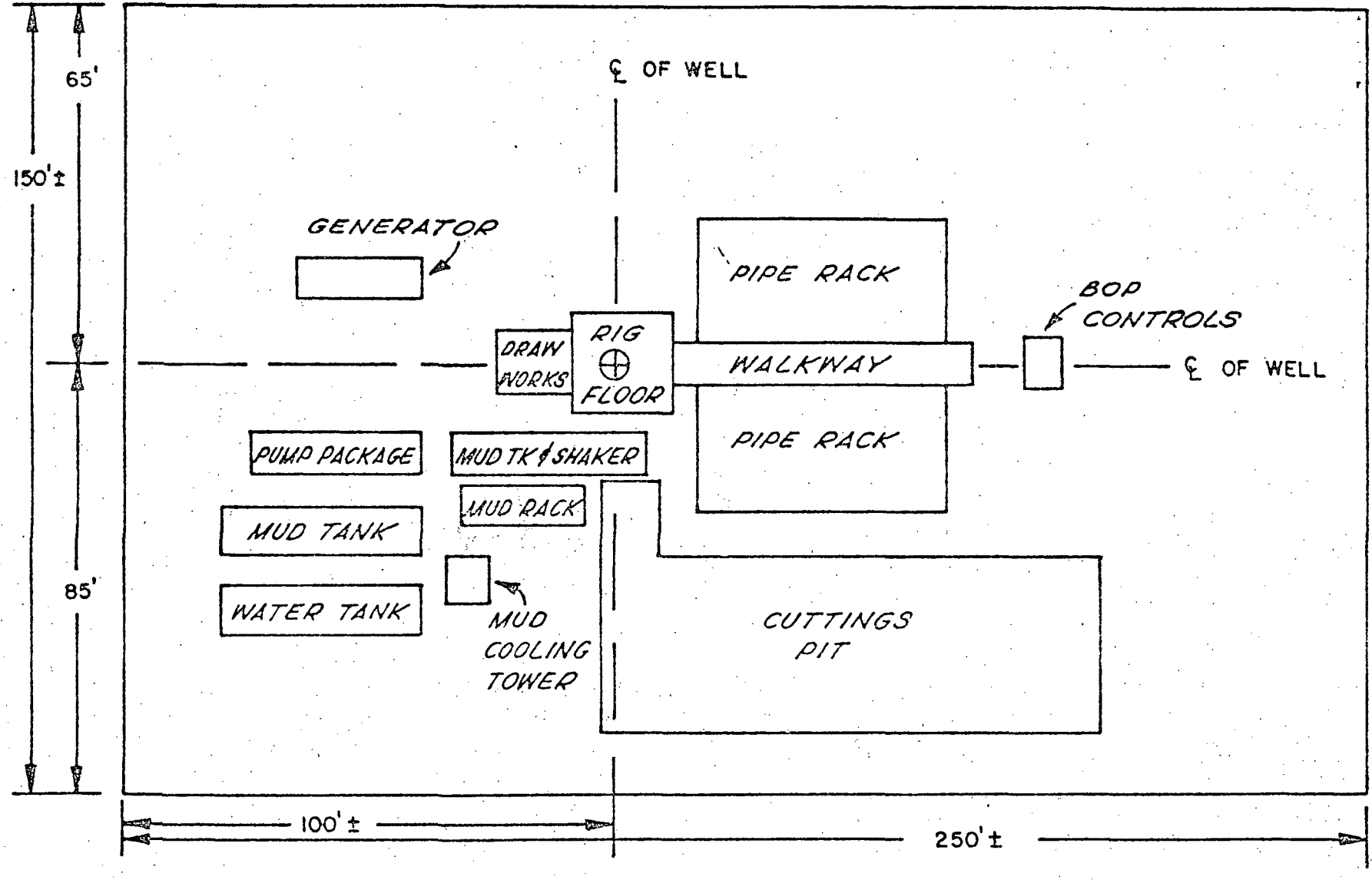
7. Cultural Resources

A comprehensive Archaeological Reconnaissance has been made of the area of potential operations. Three separate surveys were made: Exhibit "C", July 13, 14, 1976 and Exhibit "D", March 8, 1979, by Nevada State Museum; Exhibit "E", March 27-29, 1979, by Desert Research Institute.

These surveys identified a number of sites in the area which will be avoided as much as possible. Where a site cannot be avoided, proper mitigation measures will be taken.

XII. Baseline Studies

If this exploratory work and subsequent testing demonstrates that there exists a resource that can be made commercial, then a comprehensive data gathering program would be implemented to determine the impacts of development.



PLOT PLAN
TYPICAL EQUIPMENT LAYOUT
GEOTHERMAL WELLS

EXHIBIT B