

PHILLIPS PETROLEUM COMPANY

RESPONSE TO A
REQUEST FOR PROPOSAL

NO. ET - 78 - R - 08 - 0003

GEOHERMAL RESERVOIR ASSESSMENT CASE STUDY
NORTHERN BASIN AND RANGE PROVINCE

UNITED STATES DEPARTMENT OF ENERGY

NEVADA OPERATIONS OFFICE

P. O. BOX 14100

LAS VEGAS, NEVADA 89114

MAY 30, 1978

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REQUEST FOR PROPOSAL (REP) NO. ET-78-R008-0003

GEOHERMAL RESERVOIR ASSESSMENT CASE STUDY

NORTHERN BASIN AND RANGE PROVINCE

A. Proposer's Name and Address: Phillips Petroleum Company
Geothermal Operations
P. O. Box 752
Del Mar, California 92014
(714) 755-0131

It is requested that eleven copies of this RFP be returned promptly to Phillips Petroleum Company at the above address after award of the contract. The Department of Energy Source Evaluation Panel is to retain one copy.

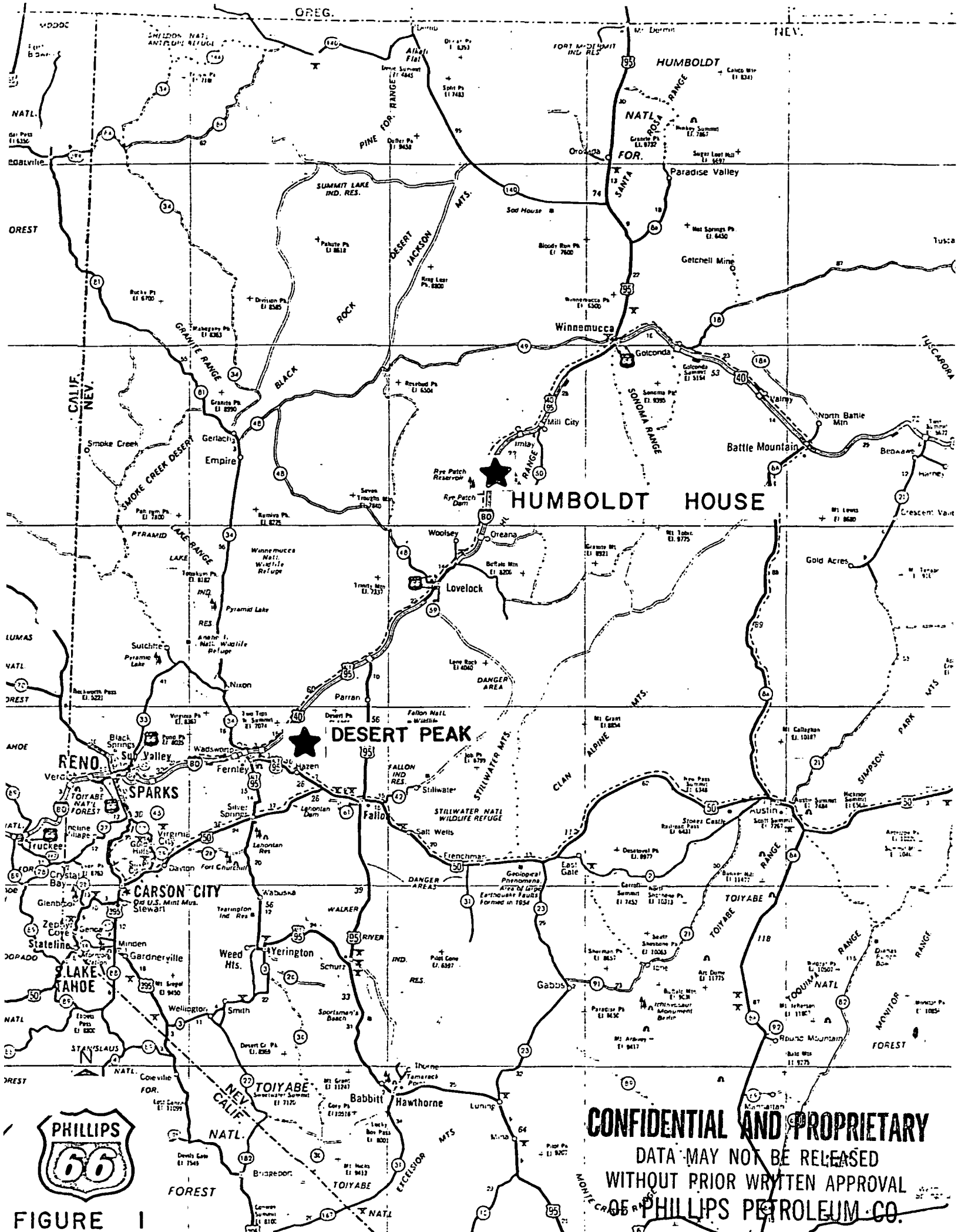
Phillips Petroleum Company acknowledges receipt of Amendment No. 1 to this proposal dated May 12, 1978.

B. Technical Proposal

1. Investigation Site or Area

This proposal consists of drilling one exploratory geothermal well in each of two areas in the Northern Basin and Range Province in northwest Nevada. Phillips Petroleum Company and others have done considerable work and commercially productive geothermal wells presently exist in both areas. The proposed new wells will give much needed information on the extent and nature of the reservoirs and their producing capabilities. Successful completion of these two wells will be a major step to commercialization of both areas for electrical power generation. Phillips holds substantial acreage under geothermal leases in the areas and has 100% working interest in both proposed drill sites. The proposed wells are identified as Desert Peak B 23-1 and Humboldt House, Campbell E-2 (See Figure 1). Geothermal lands in this area are usually a checkerboard pattern of fee or private ownership and ownership by the Federal government. (See Figures 2 and 3).

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FIGURE 1

DESERT PEAK

a. Legal Description

Well is to be located in SW SW NW Section 23, T22N-R27E, MDM, Churchill County, Nevada.

b. Status of Ownership

Phillips has a 100% working interest in the geothermal lease on which the proposed well is to be drilled. (See Figure 2)

c. Geologic Description

Regional Geology

The geology at the surface of the Desert Peak geothermal prospect is generally covered by a veneer of sand and Quaternary alluvium. Therefore, this discussion of the geology is based on the geology observed in the deeper drill holes and the geology exposed at the surface in nearby mountain ranges. (See geologic map of Churchill County Plate 1, detailed geologic map Plate 2, the geologic cross sections A-A' Plate 3 and B-B' Plate 4 of the Desert Peak area which are in the map pocket)

The basement rocks in the area are medium to coarse-grained intrusives ranging in composition from basalt to diorite. A hornblendite (basalt which crystallized under high water pressure) was encountered below 7300 feet in well 29-1. Presumably this intrusive extends to a great depth. It is not possible to estimate its lateral extent. About four miles northeast of the Phillips wells, a small diorite stock is exposed at the surface.

Overlying, and intruded by, this basement is a series of metamorphosed sediments and volcanics of Mesozoic age which have not yet been mapped in detail. The reservoir, as recognized to date, occurs in these metamorphic rocks. These metamorphic rocks are exposed at the surface in numerous areas in western Nevada but no comprehensive studies of the stratigraphy or structure in northwestern Churchill County have yet been published. The nearest outcrop of these rocks to the Phillips wells is about 10 miles in a northwesterly direction. At the surface, these rocks are folded and faulted. They are also presumed to be structurally complex beneath the Desert Peak area. In well 29-1, 2750 feet of the metamorphics were present. Lithologies encountered were phyllite, quartzite, limestone, mafic volcanics, and a small amount of siliceous volcanics. All of the limestone had been contact metamorphosed to marble, possibly by the hornblendite. In wells B 21-1 and B 21-2, only greenstone and very minor limestone were encountered, however, neither well penetrated more than 700 feet into the metamorphics. To date, the reservoir is found in fractured greenstone. The greenstones are low grade metamorphosed andesitic flows and pyroclastics. The greenstones lack any primary permeability and porosity. It is not yet known if the reservoir is totally confined to the greenstones or if other competent units such as quartzite may also retain fractures and, therefore, behave as a reservoir.

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The metamorphics are unconformably overlain by 1500 to 2000 feet of dacite to rhyolite tuffs of Oligocene (?) and Miocene age. The volcanic rocks are exposed about half a mile east of the producing wells. They are predominately ashflow tuffs and correlate with other ash flows of the same age which are exposed at many places in western Nevada. As of now, this volcanic section appears incapable of production, although temperatures of up to 400°F are present. During drilling, lost circulation problems are rare in this interval.

Unconformably overlying the rhyolites is a series of basalts (Chlorophagus fm.) with interbedded lacustrine sediments, limestone, gravels, diatomite beds, and thin tuffs. This unit varies in thickness from a few hundred feet in well B 21-2 of the area to over 2000 feet in well 29-1. This basaltic section is mostly Pliocene in age and is regionally extensive. It forms all of the outcrops for over one mile to the north and west of wells B 21-1 and B 21-2.

Overlying the basalts is a series of tuffaceous sediments, diatomite and limestones known as the Truckee Formation. These rocks are extensively exposed to the southeast of wells B 21-1 and B 21-2. This unit is about 200 feet thick in the vicinity of the wells and is not an important part of the section encountered in the wells.

The youngest igneous rock in the area is a 200-foot-thick ash-flow sheet which was unconformably deposited on limestone and diatomite of the Truckee Formation. This sheet forms most of the plateau in the eastern part of the geothermal area. On the Churchill County geologic map, this unit is shown as an andesite flow (Ta). Plagioclase from the top of the unit gives a K-Ar date of 11.2 million years. There is no evidence that a magma is supplying the heat at Desert Peak. Quaternary basalts are found 11 miles to the southeast of the producing wells at Upsal Hogback.

The youngest material in the area is Quaternary alluvium and fixed dune sand which covers most of the area of interest, obscuring contacts and effectively hiding much of the structure.

Structurally, the Desert Peak geothermal area is located within the horst which forms the northern part of the Hot Springs Mountains. This large horst is broken into many smaller horsts and grabens by numerous northeasterly trending high-angle normal faults. This area is currently being mapped in detail but the lack of outcrops means that some unanswered questions will remain. However, it may be more important to understand the older structures in the metamorphic rocks. This can only be achieved through drilling more deep holes.

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Local Geology

The surface geology in the vicinity of the proposed well B 23-1 and the two deep wells (B 21-1 and B 21-2) is about 95% fixed, small sand dunes. There are a few scattered bedrock outcrops in this area. What is known about the geology in this area has been obtained from the stratigraphic tests and deep tests or has been extrapolated from outside the area.

The geology of the Desert Peak geothermal field is currently being mapped by John Hiner, a graduate student at the Mackay School of Mines, as part of his masters thesis. Part of his nearly completed map is included as Plate 2 in the map pocket. In addition to the geology, the locations of preexisting drill holes, geologic cross sections and the proposed well are shown. Also shown are the outlines of two blocks which may define possible reservoir boundaries. The blocks as shown are interpretive and not easily visible in the field. These blocks may be interpreted as central keystone blocks in a large southerly plunging complex anticline. The anticlinal nature of the area is shown on geologic cross section B-B'.

Well 29-1 is outside of both blocks and did not intersect the reservoir. Wells B 21-1 and B 21-2 are both within the western block. B 23-1, the proposed well, will be the first well located within the eastern block.

Cross Section B-B' shows well B 21-2 and B 23-1 to be located on opposite sides of a normal fault which uplifts and exposes the Miocene rhyolitic rocks at the surface. This fault is interpreted to be the boundary between the eastern and western blocks. It is felt that the Mesozoic rocks make their closest approach to the surface in these two blocks. On either side of these blocks the Mesozoic section is stepped down to greater depths along normal faults. One possible reservoir boundary is shown near the west edge of Cross Section B-B'.

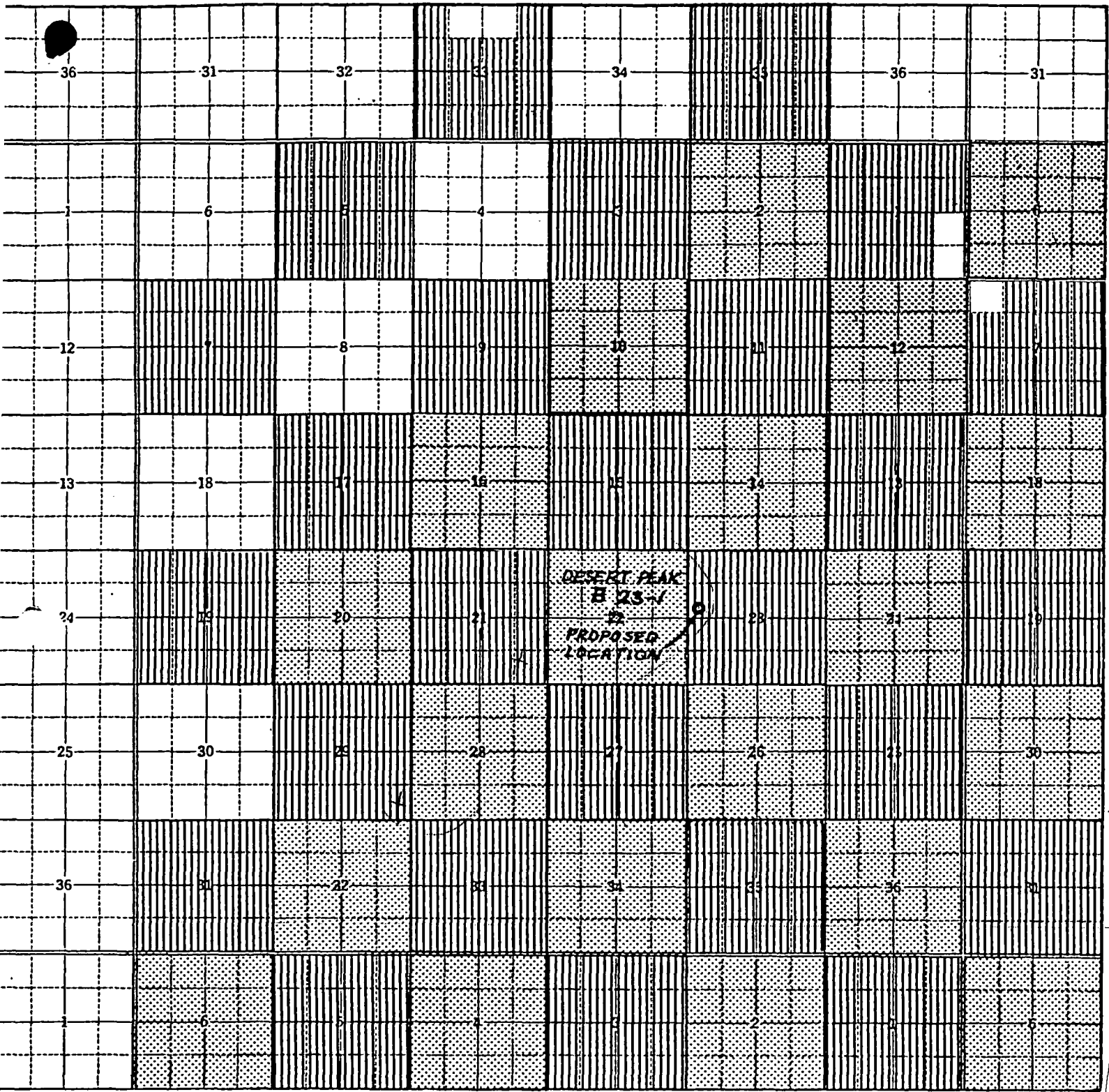
The geology in the proposed well to a depth of 1944 feet is known from Stratigraphic Test No. 7 which is located about 300 feet north of the proposed well. A lithologic log of Stratigraphic Test No. 7 is included as Figure 3.

It is expected that the top of the Mesozoic section, which contains the known geothermal reservoir, will be reached at a depth of about 3500 feet. It is not yet possible to predict the lithology (s) which will be encountered within the Mesozoic section in well B 23-1. In wells B 21-1 and B 21-2 the reservoir has been confined to greenstone, which is metamorphosed volcanic rocks of intermediate composition.

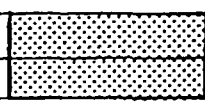
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Standard Township Plat

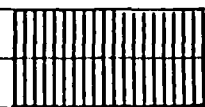
DESERT PEAK PROSPECT



KENTZEL BLUE PRINT CO., P. O. Box 141, Casper, Wyoming



FEDERAL LEASES CONTROLLED BY PHILLIPS



SOUTHERN PACIFIC LAND CO. ACREAGE UNDER LEASE TO PHILLIPS

FIG. 2

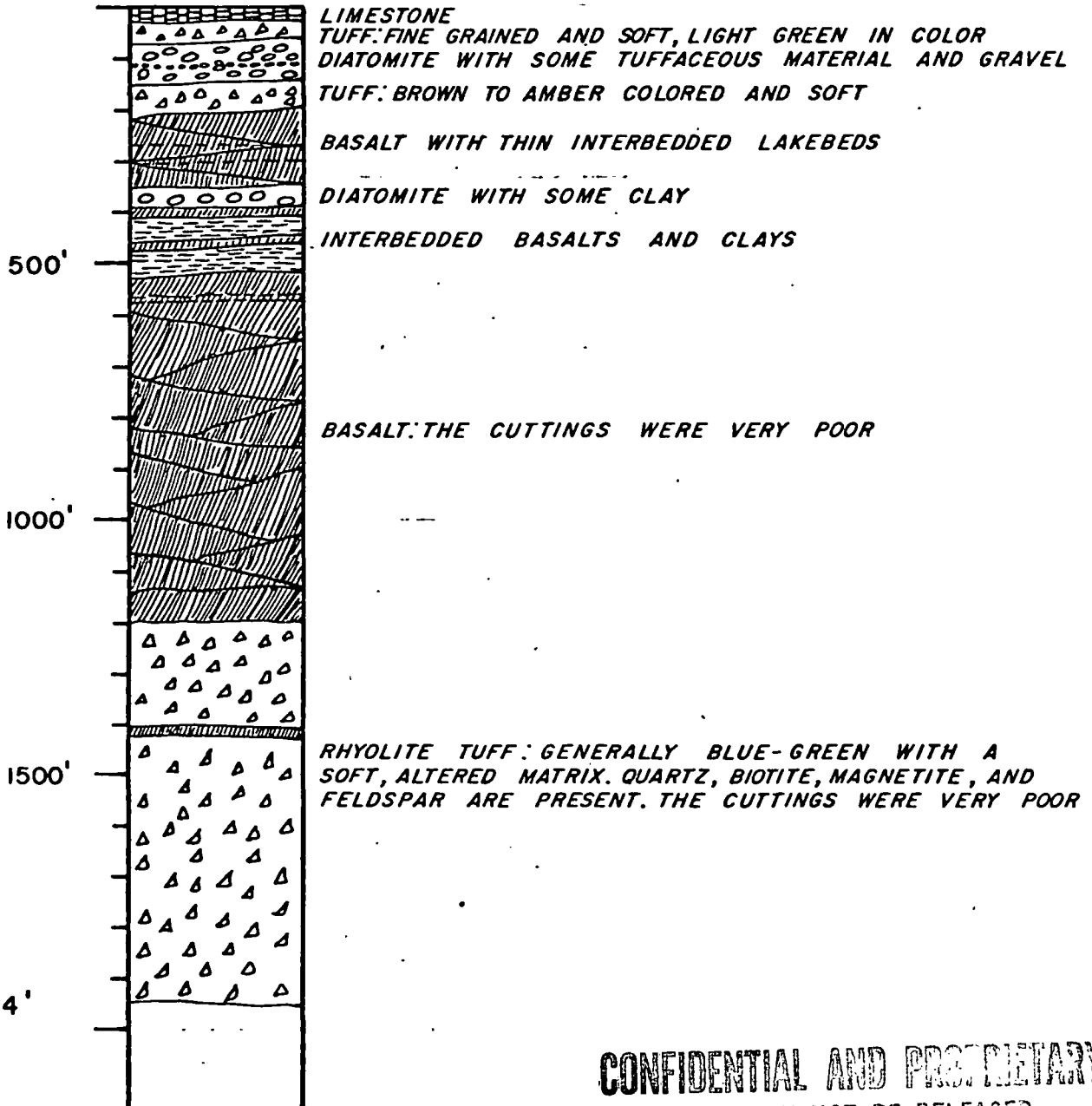
LITHOLOGIC LOG OF DESERT PEAK STRATIGRAPHIC TEST NO.7

**LOCATION: SW 1/2 NW 1/4 SEC.23,T.22 N.,R.27E.
CHURCHILL COUNTY, NEVADA**

DATE STARTED: APRIL 27, 1977

DATE COMPLETED: MAY 6, 1977

COLLAR ELEVATION = 4610'



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FIG.3

d. Technical Reasons for Site Selection

The proposed well (B 23-1) is located in the SW $\frac{1}{4}$ of the NW $\frac{1}{4}$ of Section 23, T22N-R27E. This section is owned by the Southern Pacific Railroad and it is expected that there will be no governmental delays involved in drilling this well as might be the case in another section.

B 23-1 is to be located 6300 feet from B 21-2 and 7300 feet from B 21-1. B 21-1 intersected a reservoir with a temperature of 406 $^{\circ}$ F. B 21-2 intersected the same reservoir as B 21-1, however, the reservoir temperature of B 21-2 is 392 $^{\circ}$ F. Both wells are capable of producing between 400,000 and 500,000 pounds per hour of steam and water. The James method described in New Zealand Engineering, 1966, was used to calculate the flow rates. The reservoir intersection by wells B 21-1 and B 21-2 consists of highly fractured, metamorphosed, intermediate composition volcanic rocks of Mesozoic age. Stratigraphic Test No. 7, a 1944 foot temperature-gradient hole, has been drilled about 300 feet north of the B 23-1 location. Extrapolating the geology encountered in Stratigraphic Test No. 7 suggests that the Mesozoic section should be encountered at a depth of 3500 feet. This extrapolation is based on the relatively constant thickness of the rhyolitic sequence observed in wells 29-1, B 21-1 and B 21-2. A temperature profile of Stratigraphic Test No. 7 (Plate 5 in map pocket) shows a linear temperature gradient of 11.7 $^{\circ}$ F/100 feet from 1200 to 1928 feet. The temperature at 1928 feet is 244 $^{\circ}$ F. Extrapolating this gradient suggests that a temperature of 400 $^{\circ}$ F will be present at a depth of about 3300 feet.

Comparison of previous Stratigraphic Tests with nearby deep wells in the Desert Peak area (see temperature profiles of B 21-1 and Stratigraphic Test No. 2 and B 21-2 and Stratigraphic Test No. 5, Plates 6 and 7 in map pocket) suggests that it is valid to extrapolate temperature data obtained below a depth of 1200 feet. However, extrapolating data to estimate the depth to reservoir temperature and to the reservoir itself are not necessarily consistent. For instance, well B 21-1 reached reservoir temperatures about 2000 feet above the reservoir itself. In the case of Stratigraphic Test No. 7, both the geology and the temperature gradients when extrapolated, suggest a common depth for the top of the reservoir at 3300 to 3500 feet.

Stratigraphic Test No. 7 is in communication with the Desert Peak geothermal reservoir as shown by the drop in water level in Stratigraphic Test No. 7 during a two month flow test of well B 21-2. The details of this drop are not clearly understood, however, it does prove communication between Stratigraphic Test No. 7, which did not intersect the reservoir.

Magnetotelluric data at a depth of 3500 feet (Plate 8 in map pocket) shows wells B 21-1 and B 21-2 and B 23-1 to have nearly identical resistivities. Well B 23-1 will be located near the edge of a moderately shallow resistivity low. The reason for the relatively high apparent resistivities over the reservoir is not known.

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A successful geothermal well located at the site of B 23-1 will provide much additional reservoir data. With three wells capable of production, it should be possible to obtain data about the distance and direction to possible reservoir boundaries from interference tests. The proposed well will not only give a better idea as to the average temperature of the known reservoir but open new possibilities for deeper geothermal production.

Lastly, if well B 23-1 is successful it will prove that the eastern block (see local geology section) is capable of production. This could add a minimum of four square miles to the size of the known reservoir and suggest that other blocks in the area may also be productive.

Comparisons between the Desert Peak Geothermal Field and other Geothermal Systems in the northwestern part of the Basin and Range Province

In many ways the Desert Peak geothermal field is similar to other geothermal fields in northwestern Nevada, both known and as yet undiscovered.

The reservoir at Desert Peak occurs in competent, deformed rocks of Mesozoic age. The reservoir at Humboldt House, Nevada is in Mesozoic carbonates. The geology surrounding most of the better geothermal prospects in northwestern Nevada suggests that these reservoirs have a high probability of occurring in Mesozoic rocks.

With the exception of Steamboat Hot Springs, none of the most attractive geothermal prospects in the northwestern part of the Basin and Range Province have young siliceous igneous rocks which might indicate the presence of magma at depth. Geothermal systems which do not appear to be associated with recent volcanism have not been studied in detail. Further evaluation of the Desert Peak area by deeper drilling will yield information which should be applicable to many of the less explored geothermal systems in the region.

The 400°F temperatures recorded at Desert Peak are very close to the maximum known temperatures for several other geothermal systems in the region. Also some less explored geothermal systems are expected, on the basis of geochemistry and geology, to have reservoir temperatures near 400°F.

The geothermal water at Desert Peak is a moderately saline, sodium chloride water. There are many geothermal systems in northwestern Nevada which have similar water chemistry (Table 1). If geothermal fluid of this composition and temperature can be economically produced at Desert Peak, then these other geothermal systems should become more attractive targets.

In the Desert Peak area, there are at least three near surface, subhorizontal, thermal aquifers which greatly complicate exploration problems. Deeper drilling at several other northwestern Nevada geothermal prospects shows this type of aquifer to be very common. When more is known about these thermal aquifers at Desert Peak, it is hoped that exploration methods which are capable of recognizing and negating the strong temperature and electrical influence of these aquifers at an early stage will be developed.

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HUMBOLDT HOUSE

a. Legal Description

Well is to be located in NW NW SE Section 15, T31N, R33E, MDM, Pershing County, Nevada.

b. Status of Ownership

Phillips has a 100% working interest in the geothermal lease. (See Figure 4)

c. Geological Description

Geology

The Humboldt House geothermal prospect is located in Pershing County, Nevada along highway I-80 about halfway between Lovelock and Winnemucca (Figure 1). The geothermal prospect is mostly within the Humboldt River Valley graben which is situated between fault blocks of the Humboldt Range on the east, the Eugene Mountains on the north, the Antelope Range on the west and the Trinity Mountains on the southwest.

The geothermal area is located on the pediment east of the Rye Patch Reservoir and appears to extend into the western portion of the Humboldt Range. The northeastern portion of the Humboldt House geothermal prospect is covered by the geologic map of the Imlay Quadrangle (Plate 7 Humboldt House in map pocket). There is no published geologic map of the Rye Patch quadrangle to the west. Quaternary alluvial fan and lacustrine sediments overlie the western part of the prospect. These Tertiary and Quaternary sediments fill a basin several thousand feet deep. Presumably the finer lacustrine sediments are concentrated near the center of the valley and interfinger with the coarser debris found along the basin margins.

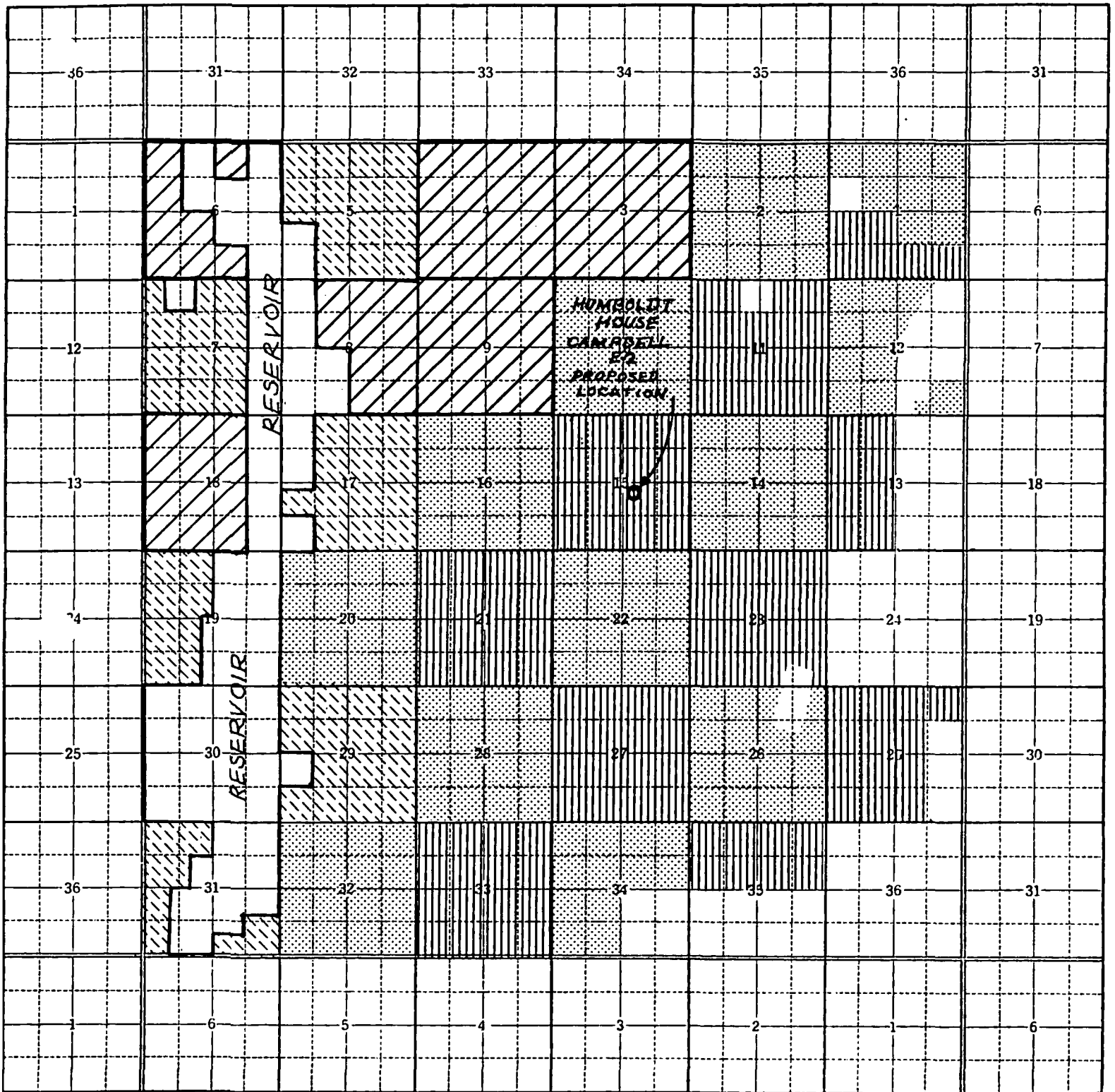
Drilling has shown that the bedrock underlying the eastern part of this basin is the same as that exposed and mapped in the Humboldt Range. The drilling to date has encountered middle Triassic carbonate rocks and the upper Triassic Grass Valley Formation below the Tertiary valley fill. The Grass Valley Formation is a relatively impermeable unit consisting of slate, phyllite, argillite, impure micaceous siltstone, and fine-grained sandstone. The carbonates are highly permeable. This permeability appears to be caused by a combination of faulting or fracturing and solution channels.

The dominant structure in the geothermal prospect area is the frontal fault or faults which have uplifted the Humboldt Range. In the northern part of the geothermal prospect this fault begins to change from a north-south strike to a northeast-southwest strike. A second, and possibly

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Island Township Plat

HUMBOLDT HOUSE PROSPECT



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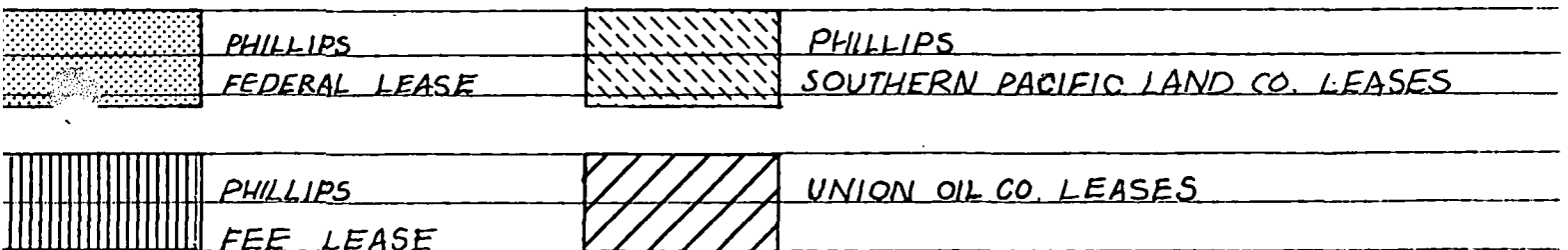


FIG. 4

significant, fault in the area is the Humboldt City thrust fault. This fault is well exposed in the Humboldt Range where it has thrust intensely deformed Grass Valley and Natchez Pass Formations over the carbonate Prida Formation. This fault must underlie the Humboldt House geothermal prospect.

To date, the reservoir has been found within permeable Triassic carbonate rocks. The relatively impermeable Tertiary valley fill appears to act as a caprock. It is possible that the finely clastic Grass Valley Formation could also act as a caprock. A possible outline of the geothermal reservoir is shown on Plate 1 (in map pocket). This boundary is based on an interpretation of information obtained from shallow (less than 500 feet deep) and deeper (500-2000 feet deep) temperature-gradient holes. The boundary encompasses approximately 10 square miles.

In December, 1977, Phillips Petroleum Company completed the Campbell E-1 geothermal well in what is thought to be the southern part of the geothermal reservoir. This well was completed at 1835 feet due to severe lost circulation problems in middle Triassic carbonate rocks. A lithologic log for Campbell E-1 is included as Plate 2. Campbell E-1 has a bottomhole temperature of 356°F and bottomhole temperature gradient of 29°F/100 feet (Plate 3). If this gradient continues temperatures of 450-490°F should be present within the next 500 feet. Temperatures of 450-490°F are predicted by the silica and Na-K-Ca geothermometers from fluids produced by Campbell E-1.

Geothermal fluids can only enter the Campbell E-1 well in the lowest 82 feet of borehole which is uncased. This fluid has a pressure of 200 psig at the wellhead and can flash to steam only at the surface. During a 17-hour flow test this well produced about 800,000 pounds of fluid per hour at a temperature of 350°F.

d. Technical Reasons for Site Selection

The proposed well (Campbell E-2) is located halfway between Campbell E-1 and Stratigraphic Test No. 4, a 1900-foot temperature-observation well, and approximately in the center of the postulated area of the geothermal reservoir. Stratigraphic Test No. 4 has a bottom-hole temperature of 198°F and a temperature gradient of 7.8°F/100 feet over the lower 463 of the profile (Plate 4).

In addition to Stratigraphic Test No. 4 and Campbell E-1, shallow holes have been drilled in the area of the proposed well. This data is in agreement with that obtained from Stratigraphic Test No. 4 and Campbell E-1. The data from these wells gives a projected temperature of 400°F at a depth of about 4200 feet.

A geologic cross section (Plate 5) was constructed across the postulated geothermal reservoir and through the proposed well site. This cross section is based on known geology, drill-hole data, and cross section D-D' on the Imlay Quadrangle geologic map (Plate 7). The geothermal reservoir could occur at a depth as shallow as 3500 feet

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in this area. A reservoir in this area would probably be capped by the relatively impermeable Grass Valley Formation.

A portion of a magnetotelluric "slice map" at a depth of 3000 feet is shown on Plate 6. This map shows an area of anomalously low resistivity which is approximately coincident with the postulated geothermal reservoir. The Campbell E-1 well and the proposed well are both within this anomaly.

To summarize, a geothermal well capable of production temperature-observation hole, geological, geochemical and resistivity data indicate that in the area of the proposed well (Campbell E-2) geothermal fluids at a temperature of 400-490°F should be encountered at a depth between 3000 and 4200 feet. The possibility of finding geothermal reservoirs at higher temperatures at greater depths is discussed in the later section entitled Program Description.

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2. Program Data Offered

All new data generated in the drilling and testing phases of both wells will be furnished the Department of Energy or its designated agency within 60 days after conclusion of drilling and initial testing operations. Such new data is to include a daily drilling report, casing and cementing information, open hole logs, core analyses, mud logging data, temperature surveys, production tests, water analyses, drilling fluid properties, bit records, lithologic sample description and any other information which may be obtained. This proposal does not involve existing data, surface investigations, or subsequent evaluation of data (reservoir engineering studies), but consists only of new data generated in drilling the wells and final down-hole logging, temperature surveys and preliminary 24 hour flow tests (if such tests are possible). However, if Phillips Petroleum Company is awarded a contract as a result of this proposal, it will be willing to discuss during negotiations the possibility of furnishing additional (prior) data at no additional cost.

Although this proposal involves the drilling of two wells in the area of interest, costs are submitted separately on each well, Phillips is agreeable to negotiating a DOE contract on both or either of the wells.

3. Program Description

The attached prognoses (Exhibits I and II) outline details of the proposed wells. It is the intent of Phillips to drill the wells to the indicated total depth, viz., Desert Peak B 23-1 to 10,000' and Humboldt House Campbell E-2 to 8,000'. If, however, during drilling operations conditions develop which in the judgment of Phillips which would make it desirable to discontinue drilling, these projected total depths will not be reached. Decisions regarding all aspects of drilling and testing of the wells will be made by Phillips without prior discussions or approval by the DOE or other governmental agency. Earlier drilling at Desert Peak and Humboldt House areas by Phillips Petroleum Company did not reach originally programmed total depths. Largely unanticipated drilling problems associated with shallow reservoirs at both prospects prompted the decision to terminate drilling operations. The following geologic evidence, some direct and some circumstantial, suggests that deeper, hotter reservoirs may be present in both geothermal areas.

a. Chemical Data

Short time flow tests from Desert Peak and Humboldt House geothermal wells permitted some sampling of reservoir waters. True formation waters were probably sampled; however, the shorter duration of flow at Humboldt House, 17 hours as opposed to 1,368 hours maximum at Desert Peak, leaves some possibility that complete cleanup from well bore contamination had not occurred there.

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Chemical balance checks were carried out on multiple analyses to assure quality control. Silica, sodium, potassium and calcium values in ppm were used to estimate reservoir base temperatures.

Well	Species, ppm				Geothermometers, ppm		
	SiO ₂	Na	K	Ca	SiO ₂	Na/K	Na/k/Ca
Desert Peak B 21-1	428	1,950	220	94	460	389	440
Humboldt House Campbell E-1	410	1,312	276	46	453	556	513

The silica geothermometer temperatures were calculated on the assumption of formation water being in equilibrium with quartz in the reservoir. The Na/K/Ca temperature was estimated using the $\beta < 1/3$ condition of Fournier and Truesdell.

The best composite estimation of base reservoir temperatures at Desert Peak and Humboldt House are 450°F and 480°F, respectively.

Phillips' consultant, Dr. Franco Tonani has made an independent chemical estimation of the base temperature at Desert Peak in addition to an evaluation of data quality, possible mixing and indications of possible disequilibrium conditions. His work suggests a temperature of 446°F ± 45°F, based on all water sampled over the prospect.

The maximum measured temperature at Desert Peak, 406°F in well B 21-1, falls at the lower end of the range allowed by the chemical constraints. The best estimate with available data, however, is 40°F higher than the maximum recorded temperature. The best estimate of chemical temperature at Humboldt House, 480°F, is 123° higher than the 357°F maximum measured temperature in the Campbell E-1 well. These data are reconciled with a model wherein water from a deeper hotter reservoir leaks into a shallow cooler reservoir.

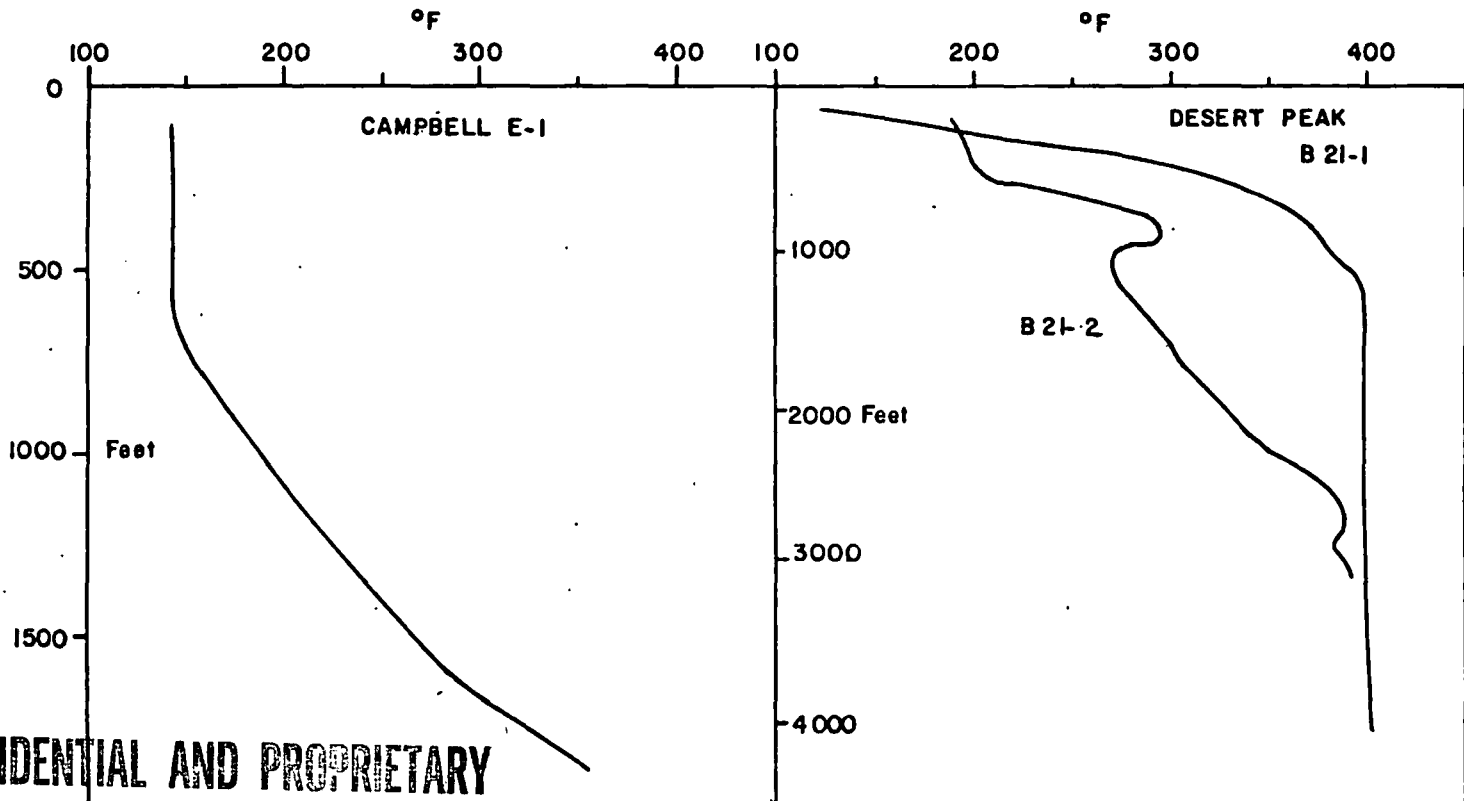
b. Conductive Temperature Gradients

Reservoirs in which heat distribution is accomplished largely by convective motion tend to be characterized by relatively constant temperatures. Available temperature logs show isothermal zones in such reservoirs.

Temperatures in the Humboldt House Campbell E-1, Desert Peak B 21-1 and B 21-2 wells are graphed below. Both the Campbell E-1 and Desert Peak B 21-2 logs appear conductive, increasing at higher than normal gradients to total depth. From these

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data the assumption can be made that the temperatures will continue to increase with depth to some base temperature higher than the maximums which have been recorded at their respective total depths. The possibility remains, however, that these two wells reached the very top of a reservoir when drilling ceased, and that if temperatures could be measured to some greater depth, an isothermal zone would be revealed.



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The Desert Peak B 21-1 well is near isothermal from 1,200 ft. to 4,000 ft. TD, and the above argument cannot be extended to this well.

If a deeper hotter reservoir does exist, a longer temperature log would presumably show a conductive zone between the two reservoirs.

c. Unsealed Reservoir

Unlike nearly all known geothermal reservoirs (Muffler, 1975*), the shallow Desert Peak reservoir does not have a sealed cap.

* Muffler, L.J.P., 1975, Geology, hydrology and geothermal systems: 2nd U.N. Symposium on the Development and Use of Geothermal Resources, v. 1, p xlv-111.

Reservoir pressures are slightly below hydrothermal. Water rises in the borehole to approximately 104 ft. below ground level in the Desert Peak B 21-1 well and is continuous with the water table mapped areally with shallow gradient holes. Moreover, transient pressure waves have been observed in the shallow gradient holes during flow tests of the productive wells. Further, silica, calcite or other secondary minerals that might constitute a seal have not been identified in formation cuttings above the water table.

These observations, coupled with the higher geochemical temperatures suggest the following model. The higher geochemical temperatures are a leakage manifestation of a deeper, hotter reservoir into the know shallow, cooler reservoir at Desert Peak. The deeper reservoir is probably at a pressure greater than hydrostatic in order to drive the fluids upward through the zone of leakage. Except for the restricted paths along which leakage occurs, the deeper reservoir may be a normal, sealed geothermal reservoir.

d. Examples of Deeper Hotter Reservoirs

The fact that fluids with higher temperatures have been encountered beneath cooler, shallow reservoirs in production in several geothermal localities worldwide lends by analogy credibility to the existence of hotter fluids at greater depths in the Desert Peak and Humboldt House areas.

Geothermal Field	Shallow Max. Temp.	Typical Depth	Deeper Temp.	Typical Depth
Cerro Prieto, Mex. ^{1a}	570°F	4,000 ft.	650-700°F	6,200 ft.
Broadlands, NZ ^{1c}	514	2,460	520	7,050
Larderello, Italy ^{1b}	388	1,900	425	3,500
Salton Sea, USA ²	500	2,800	585	5,250

- References: 1. Proceedings, Second United Nations Symposium on the Development and Use of Geothermal Resources: San Francisco 1975 a. p5, b. p62, c. p378 and 421.
2. Tewhey, J. D., 1977. Geologic characteristics of a portion of the Salton Sea Geothermal Field: Lawrence Livermore Lab., UCRL.

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At the time final well depths are reached and 24 hour production tests have been completed, work under this proposal will terminate. Subsequent utilization of the wells, whether completed as production wells, injection wells, long range test wells or to plug and abandon will be at the discretion of Phillips Petroleum Company. The United States government or any of its departments or agencies shall not acquire any ownership in the proposed wells or related leases as a result of a DOE contract, but shall be entitled only to such data and information as provided in this proposal. All work will be performed as expeditiously as conditions will permit and in accordance with all applicable environmental and safety regulations.

4. Schedule

It is proposed that both wells be drilled during the last quarter of 1978 and first quarter of 1979; such timing, however, will be dependent upon obtaining necessary permits and drilling rig availability. The final report, consisting only of new data will be submitted within 60 days after conclusion of 24 hour flow test on the last well. Phillips will authorize immediate release of all data by DOE.

It is believed that all necessary permits can be obtained and a drilling rig contracted so that drilling of the first well (Desert Peak B 23-1) can commence within 60 days of the date of a DOE contract.

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5. Environmental Evaluation

Climate - The areas are arid, receiving from two to five inches of precipitation per year which occurs as snow, occasional gentle rains, and summer thunder storms with short but intense activity. Temperatures vary from 0^oF in the winter to near 100^oF in the summer. Often winter days can be very pleasant.

Vegetation - Vegetation is limited to small desert-type plants, some of which are scrub sagebrush, shadscale and sand grass. In one year out of about ten or twelve moisture conditions are favorable for the growth of a variety of wildflowers. The spring of 1978 has been one of those years when there has been a profusion of wild flowers.

There are no trees, and the plant communities occurring are mostly of the Salt Desert Shrub vegetation type. There is very little forage, and the range condition is considered poor to fair.

The impact well drilling on vegetation and grazing potential would be slight, since vegetative cover averages only about twenty percent.

Land Use - Currently there are no people living within four miles of the proposed drill sites. There is some intermittent prospecting for the abundant diatomite found in the area. Several long-abandoned gold mines are also present. A buried transcontinental telephone cable runs through the area. Recreational use of this land appears to be minimal. The most valuable current use of the land is cattle grazing, however, there is a minimal amount of feed and water sources are almost non-existent.

As the Desert Peak and Humboldt House Areas are considered to be poor range land, land-use conflicts are not anticipated. The drill sites will require approximately two and a half acres each and depending on the requirements for holding ponds or other surface facilities, this land would be essentially undisturbed.

Groundwater Resources - The water table in the geothermal areas is known to vary from the surface to at least 470' below the surface. Nearly all waters in the area collected from below 4000' in elevation are sodium-chloride waters with total dissolved solids contents ranging from 2000 ppm to 12,000 ppm. Often the groundwater is more saline than waters produced from the geothermal wells. At elevations above 4000' it is possible to collect samples of fresh water but the supply is very limited. It is doubtful that there is enough fresh water in the area to be put to any beneficial use which is cost efficient. There is little chance that geothermal development could harm the groundwater quality.

Wildlife - The dominant animals present in the geothermal areas are rodents, lizards, cattle, a few rattlesnakes, birds, jackrabbits, a few coyotes and a small band of burros. The shortage of water and food places highly restrictive limits on the ability of large mammals to survive in this area. No fish are present.

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C. Cost

1. Optional Form 60, along with Phillips Cost Estimates are attached as Exhibits III and IV for drilling and testing both proposed geothermal wells. Total estimated costs are: Desert Peak B 23-1 \$735,500 and Humboldt House 15-1 \$674,000.
2. Proposed total cost to the government will be 50% of actual costs, not to exceed \$1,300,000. Every effort will be made to keep costs to a minimum. A significant savings may be possible, particularly in rig moving costs, if one rig can be used to drill both wells consecutively. If either of the wells is plugged and abandoned immediately after drilling and initial testing operations, before the drilling rig is moved off, such plugging and site restoration expenses will be charged to the contract. If, however, the wells are utilized for any further purpose, all subsequent expenses including later plugging and abandonment and site restoration will be at the expense of Phillips Petroleum Company.

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D. Business and Management

1. Phillips Petroleum Company, one of the major international oil companies which operates in the United States and nearly forty other countries, has been actively involved in geothermal exploration for almost ten years. Since 1975, it has drilled more than 35 geothermal stratigraphic test wells, 14 deep tests and hundreds of temperature gradient holes. Active areas of operation have included the Salton Sea area, Imperial County, California; Clearwater Lake area, Lake County, California; Desert Peak area, Churchill County, Nevada; Humboldt House area, Pershing County, Nevada; Sulphurdale area, Millard County, Utah; Roosevelt Hot Springs KGRA, Beaver County, Utah and western Idaho.

2. Principal Program Personnel Are:

C. W. Berge, Manager of Geothermal Operations
R. C. Lenzer, Director of Exploration
Earl G. Hoff, Director of Development and Operations
R. T. Forest, Manager Reno Office
O. C. Rolls, Drilling Superintendent
W. R. Benoit, Geologist
W. L. Desormier, Geologist

Resumes are attached as Exhibit V

3. Phillips Petroleum Company proposes to use its existing methods of drilling and testing geothermal wells including procurement of materials and services, supervision and reporting. The expertise of its personnel in the areas of geology, geophysics, engineering, drilling and management will be utilized along with reputable specialized consultants as may be considered necessary. No progress reports or milestones other than notification of commencement to drill are planned prior to the final report.

4. Phillips Primary Business and Technical Contacts:

C. W. Berge, P. O. Box 752, Del Mar, CA 92014 (714) 755-0131
R. T. Forest, P. O. Box 10566, Reno, NV 89510 (702) 786-2273
Earl G. Hoff, P. O. Box 752, Del Mar, CA 92014 (714) 755-0131

5. Provisions of the Draft Contract Schedule are acceptable to Phillips Petroleum Company as a basis for contract negotiations except Article 4 b(1). Rather than being paid on a footage basis for drilling the wells, Phillips is to be paid 50% of actual total drilling and testing costs upon presentation of the final report and invoice. Such total cost to the government not to exceed \$1,300,000.

6. The "Program Technical Scope" set forth in the RFP has been reviewed and Phillips Petroleum Company agrees that all data which will be furnished pursuant to a contract may be published. Phillips Petroleum Company, however, specifically excludes all information submitted in support of this RFP from publication or disclosure: Such information has been clearly identified as "CONFIDENTIAL AND PROPRIETARY".

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7. 1977 Annual Report for Phillips Petroleum Company is attached as Exhibit VI.
8. This proposal will expire at midnight September 30, 1978.
9. Mr. C. W. Berge, signator to this proposal, has the necessary authority to commit Phillips Petroleum Company to all provisions contained therein.
10. GSA Form 19 B, "Representations and Certifications" is attached as Exhibit VII.

E. Disclosure of Information

All data included in this RFP and marked "CONFIDENTIAL AND PROPRIETARY" not be used or disclosed, except for evaluation purposes, provided that if a contract is awarded to Phillips Petroleum Company as a result of the submission of this proposal, the Department of Energy shall have the right to use or disclose any data to the extent provided in the contract. This restriction does not limit the right of the Department of Energy to use or disclose any technical data obtained from another source.

GEOHERMAL WELL PROGNOSIS

PHILLIPS PETROLEUM COMPANY LEASE: Desert Peak B Well No. 23-1

LOCATION: SW SW NW Sec. 23, T22N, R27E, MDM, Churchill County, Nevada

FIELD NAME: Desert Peak PROJECTED TD: 10,000' ELEVATION: 4,605' KB

PHILLIPS ACREAGE AND EXPIRATION DATE: 42,433.44 acres; February 14, 1984

WORKING INTEREST OWNERS: PHILLIPS PETROLEUM COMPANY 100%

DETAILS OF WORK: Move in and rig up rotary drilling rig. Drill 26' D. hole to +100'. Run 20" O.D., 94#, K-55 VETCO thread casing. Cement to surface using 50% excess of Class "G" cement with 3% CaCl₂. Cut off 20" casing and nipple up flow line.

Drill 17½" D. hole to +1,800'; condition hole with mud and lost circulation material. Run 13 3/8" O.D., 54.5#, K-55 Buttress thread casing. Cement to surface (2 stage) with geothermal cement mixture.

Nipple up and test BOP.

Drill 12½" D. hole to +6,000'. Anticipate severe lost circulation zone 2,800-2,900'. If cannot drill ahead with mud, rig up to drill with air, detergent and water. Run 9 5/8", 40# and 43.5# K-55 Buttress thread casing. Perform two-stage cement job using geothermal cement mixture. W.O.C., nipple up and test casing.

Drill to TD with 8½" D. bit.

ANTICIPATED FORMATION TOPS: Sand, silt and claystone 0-500'; tuff with rhyolite and andesite 500'-3,700'; low grade metamorphics consisting of greenstones, phyllites, marbles and arkosic quartzites 3,700'-TD.

SAMPLE PROGRAM: Cuttings collected on shaker every ten feet, washed and dried; mud filtrate samples collected every 100'. Mud logging unit will monitor CO₂, NH₃, H₂S and hydrocarbon gasses and prepare a lithologic log.

SPECIAL DRILLING PRACTICES: No drill stem tests are planned; moderate to severe lost circulation is expected throughout much of the drilling operations. Bottom-hole assemblies will be used whenever safe to do so. Coring may be attempted, depending on well conditions.

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LOGGING PROGRAM: Prior to running 9 5/8" casing at + 6,000': Dual Induction (IES), CNL-Formation Density, Sonic and Temperature logs.

At total depth: Same suite of logs with Gamma Ray to surface.

COMPLETION PROGRAM: Complete well open-hole.

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GEOHERMAL WELL PROGNOSIS

PHILLIPS PETROLEUM COMPANY LEASE: Campbell "E" Well No. 2

LOCATION: NW NW SE Sec. 15, T31N, R33E, MDM, Pershing County, Nevada

FIELD NAME: Humboldt House PROJECTED TD: 8,000' ELEVATION: 4,790' KB

PHILLIPS ACREAGE AND EXPIRATION DATE: 23,015.40 acres; January 22, 1986

WORKING INTEREST OWNERS: Phillips Petroleum Company 100%

DETAILS OF WORK: Move in and rig up rotary drilling rig. Drill 26" D. hole to + 100'. Run 20" O.D., 94#, 8R thread, K-55 casing. Cement to surface using 50% excess of Class "G" cement with 3% CaCl₂. Cut off casing, nipple up 20" Hydril BOP and flow line.

Drill 17½" D. hole to + 1,500'. If lost circulation zones are encountered, seal zones with cement. Run 13 3/8" O.D., 54.5#, K-55 Buttress thread casing. Cement to surface (2 stage) with geothermal cement. Nipple up and test BOP.

Drill 12½" D. hole to + 4,000'. If hot water flow is encountered, control with 11.5 ppg. mud. Run 9 5/8", 40#, K-55 Buttress thread casing. Perform two-stage cement job using geothermal cement mixture. Nipple up and test BOP.

Drill to TD with 8½" D. bit.

ANTICIPATED FORMATION TOPS: Coarse, clastic alluvium 0-500'; volcanics and fanglomerate 500'-1200'; Triassic metamorphic rocks, slate, phyllite, argillite, quartzites and impure limestones 1200'-TD.

SAMPLE PROGRAM: Cuttings collected, washed and dried off shaker every ten feet, except when drilling rates are unusually high, then every twenty feet. A lithologic log will be prepared by a commercial mud logger. Mud filtrate samples will be collected at 100' intervals.

SPECIAL DRILLING PRACTICES: No drill stem tests are planned; some lost circulation is expected throughout much of the drilling operations. Bottom hole assemblies will be used whenever it is safe to do so. Coring may be attempted, depending on well conditions.

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LOGGING PROGRAM: Prior to running 9 5/8" casing at + 4,000': Dual Induction (IES), CNL-Formation Density, Sonic and Temperature logs.

At total depth: same suite of logs with Gamma Ray to surface.

COMPLETION PROGRAM: Complete well open-hole.

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CONTRACT PRICING PROPOSAL (RESEARCH AND DEVELOPMENT)				Office of Management and Budget Approval No. 29-RO184	
This form is for use when (1) submission of cost or pricing data (see FPR 1-5.807-3) is required and (2) substitution for the Optional Form 39 is authorized by the contracting officer.				PAGE NO. 1	NO. OF PAGES 4
NAME OF OFFEROR Phillips Petroleum Company		SUPPLIES AND/OR SERVICES TO BE FURNISHED Data from drilling geothermal well Desert Peak B23-1 Churchill County, Nevada			
HOME OFFICE ADDRESS Bartlesville, Oklahoma 74004		DIVISION(S) AND LOCATION(S) WHERE WORK IS TO BE PERFORMED Geothermal Operations, Reno, Nevada		TOTAL AMOUNT OF PROPOSAL \$ 735,500	GOV'T SOLICITATION NO. RFP ET-78-R-08-0003
DETAIL DESCRIPTION OF COST ELEMENTS					
1. DIRECT MATERIAL (Itemize on Exhibit A)			EST COST (\$)	TOTAL EST COST*	REFER- ENCE ²
a. PURCHASED PARTS Casing, Wellhead equip. & misc. connections			181,000		
b. SUBCONTRACTED ITEMS Drilling bits, mud			130,000		
c. OTHER—(1) RAW MATERIAL					
(2) YOUR STANDARD COMMERCIAL ITEMS					
(3) INTERDIVISIONAL TRANSFERS (At other than cost)					
TOTAL DIRECT MATERIAL				311,000	
2. MATERIAL OVERHEAD ³ (Rate % XS base) - 0 -					
3. DIRECT LABOR (Specify)		ESTIMATED HOURS	RATE/HOUR	EST COST (\$)	
Phillips Petroleum Co. personnel only		40 days	\$100/day	4,000	
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4. LABOR OVERHEAD (Specify Department or Cost Center) ⁴		O.M. RATE	R. BASE =	EST COST (\$)	
Natural Resources Group		46%	4,000	2,000	
TOTAL LABOR OVERHEAD				2,000	
5. SPECIAL TESTING (Including field work at Government installations)				EST COST (\$)	
5(a) Third Party Services, including contract drilling, mud logging, cement and cement services, trucking, logging, etc.				758,000	
TOTAL SPECIAL TESTING				758,000	
6. SPECIAL EQUIPMENT (If direct charge) (Itemize on Exhibit A)				EST COST (\$)	
Tool and compressor rental				110,000	
7. TRAVEL (If direct charge). (Give details on attached Schedule)				EST COST (\$)	
a. TRANSPORTATION				3,000	
b. PER DIEM OR SUBSISTENCE					
TOTAL TRAVEL				3,000	
8. CONSULTANTS (Identify—purpose—rate)				EST COST (\$)	
Drilling consultant 60 days @ \$200				12,000	
TOTAL CONSULTANTS				12,000	
9. OTHER DIRECT COSTS (Itemize on Exhibit A)				EST COST (\$)	
Contingency				215,000	
TOTAL DIRECT COST AND OVERHEAD				1,415,000	
11. GENERAL AND ADMINISTRATIVE EXPENSE (Rate % of cost element No. 10)				EST COST (\$)	
4 %				56,000	
12. ROYALTIES ⁵				-0-	
TOTAL ESTIMATED COST				1,471,000	
14. FEE OR PROFIT				- 0 -	
15. NET TO DOE (50%)				735,500	

This proposal is submitted for use in connection with and in response to (Describe RFP, etc.)

RFP No. ET-78-R-08-0003, "GEOHERMAL RESERVOIR ASSESSMENT CASE STUDY, NORTHERN BASIN AND RANGE PROVINCE"

and reflects our best estimates as of this date, in accordance with the Instructions to Offerors and the Footnotes which follow.

TYPED NAME AND TITLE C. W. Berge Manager, Geothermal Branch	SIGNATURE 
---	---

NAME OF FIRM Phillips Petroleum Company	DATE OF SUBMISSION May 30, 1978
--	------------------------------------

EXHIBIT A--SUPPORTING SCHEDULE (Specify. If more space is needed, use reverse)

COST EL NO.	ITEM DESCRIPTION (See footnote 5)	EST COST (\$)
SEE ATTACHED COST ESTIMATE		

I. HAS ANY EXECUTIVE AGENCY OF THE UNITED STATES GOVERNMENT PERFORMED ANY REVIEW OF YOUR ACCOUNTS OR RECORDS IN CONNECTION WITH ANY OTHER GOVERNMENT PRIME CONTRACT OR SUBCONTRACT WITHIN THE PAST TWELVE MONTHS?

YES NO (If yes, identify below.) K. W. Anderson

NAME AND ADDRESS OF REVIEWING OFFICE AND INDIVIDUAL 217 NW Third St. Room 255 Defense Contract Audit Agency Oklahoma City, OK 73102	TELEPHONE NUMBER/EXTENSION (405) 231-4905
---	--

II. WILL YOU REQUIRE THE USE OF ANY GOVERNMENT PROPERTY IN THE PERFORMANCE OF THIS PROPOSED CONTRACT?

YES NO (If yes, identify on reverse or separate page)

III. DO YOU REQUIRE GOVERNMENT CONTRACT FINANCING TO PERFORM THIS PROPOSED CONTRACT?

YES NO (If yes, identify.): ADVANCE PAYMENTS PROGRESS PAYMENTS OR GUARANTEED LOANS

IV. DO YOU NOW HOLD ANY CONTRACT (Or, do you have any independently financed (IR&D) projects) FOR THE SAME OR SIMILAR WORK CALLED FOR BY THIS PROPOSED CONTRACT?

YES NO (If yes, identify.):

V. DOES THIS COST SUMMARY CONFORM WITH THE COST PRINCIPLES SET FORTH IN AGENCY REGULATIONS?

YES NO (If no, explain on reverse or separate page) To the best of our knowledge and belief.

See Reverse for Instructions and Footnotes

OPTIONAL FORM 60 (10-71)

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INSTRUCTIONS TO OFFERORS

1. The purpose of this form is to provide a standard format by which the offeror submits to the Government a summary of incurred and estimated costs (and attached supporting information) suitable for detailed review and analysis. Prior to the award of a contract resulting from this proposal the offeror shall, under the conditions stated in FPR 1-3.807-3 be required to submit a Certificate of Current Cost or Pricing Data (See FPR 1-3.807-3(h) and 1-3.807-4).

2. In addition to the specific information required by this form, the offeror is expected, in good faith, to incorporate in and submit with this form any additional data, supporting schedules, or substantiation which are reasonably required for the conduct of an appropriate review and analysis in the light of the specific facts of this procurement. For effective negotiations, it is essential that there be a clear understanding of:

- a. The existing, verifiable data.
- b. The judgmental factors applied in projecting from known data to the estimate, and
- c. The contingencies used by the offeror in his proposed price.

In short, the offeror's estimating process itself needs to be disclosed.

3. When attachment of supporting cost or pricing data to this form is impracticable, the data will be described (with schedules as appropriate), and made available to the contracting officer or his representative upon request.

4. The formats for the "Cost Elements" and the "Proposed Contract Estimate" are not intended as rigid requirements. These may be presented in different format with the prior approval of the Contracting Officer if required for more effective and efficient presentation. In all other respects this form will be completed and submitted without change.

5. By submission of this proposal the offeror grants to the Contracting Officer, or his authorized representative, the right to examine, for the purpose of verifying the cost or pricing data submitted, those books, records, documents and other supporting data which will permit adequate evaluation of such cost or pricing data, along with the computations and projections used therein. This right may be exercised in connection with any negotiations prior to contract award.

FOOTNOTES

1 Enter in this column those necessary and reasonable costs which in the judgment of the offeror will properly be incurred in the efficient performance of the contract. When any of the costs in this column have already been incurred (e.g., on a letter contract or change order), describe them on an attached supporting schedule. Identify all sales and transfers between your plants, divisions, or organizations, under a common control, which are included at other than the lower of cost to the original transferrer or current market price.

2 When space in addition to that available in Exhibit A is required, attach separate pages as necessary and identify in this "Reference" column the attachment in which the information supporting the specific cost element may be found. No standard format is prescribed; however, the cost or pricing data must be accurate, complete and current, and the judgment factors used in projecting from the data to the estimates must be stated in sufficient detail to enable the Contracting Officer to evaluate the proposal. For example, provide the basis used for pricing materials such as by vendor quotations, shop estimates, or invoice prices; the reason for use of overhead rates which depart significantly from experienced rates (reduced volume, a planned major re-arrangement, etc.); or justification for an increase in labor rates (anticipated wage and salary increases, etc.). Identify and explain any contingencies which are included in the proposed price, such as anticipated costs of rejects and defective work, or anticipated technical difficulties.

3 Indicate the rates used and provide an appropriate explanation. Where agreement has been reached with Government representatives, on the use of forward pricing rates, describe the nature of the agreement. Provide the method of computation and application of your overhead expense, including cost breakdown and showing trends and budgetary data as necessary to provide a basis for evaluation of the reasonableness of proposed rates.

4 If the total cost entered here is in excess of \$250, provide on a separate page the following information on each separate item of royalty or license fee: name and address of licensor; date of license agreement; patent numbers, patent application serial numbers, or other basis on which the royalty is payable; brief description, including any part or model numbers of each contract item or component on which the royalty is payable; percentage or dollar rate of royalty per unit; unit price of contract item; number of units; and total dollar amount of royalties. In addition, if specifically requested by the contracting officer, a copy of the current license agreement and identification of applicable claims of specific patents shall be provided.

5 Provide a list of principal items within each category indicating known or anticipated source, quantity, unit price, competition obtained, and basis of establishing source and reasonableness of cost.

CONTINUATION OF EXHIBIT A—SUPPORTING SCHEDULE AND REPLIES TO QUESTIONS II AND V.



COST ESTIMATE

Location: Desert Peak B #23-1

Date: May 30, 1978

Description of Job: 2300.8' FNL & 446.0' FWL Sec. 23-22N-27E Churchill Co., NV.

Drill 10,000' Geothermal Test

UNIT	CLASS	ITEM	DESCRIPTION (SHOW CONDITION OF USED MATERIAL AND EQUIPMENT)	QTY.	UNIT PRICE	TOTAL
			<u>Tangible Items (all new)</u>			
			20" OD 94#, K-55 Conductor Pipe	100'	\$64	\$ 6,500
			13 3/8" OD 54.5#, K-55, Surface casing	1,800'	18	32,000
			9 5/8" OD 40# and 43.5#, K-55 Casing	6,000'	17	102,000
			Wellhead Equipment			35,000
			Misc. Connections			5,500
			Total Tangibles:			\$181,000
			<u>Intangibles</u>			
			Cement & cementing service			100,000
			Bits			70,000
			Drilling Mud & Additives			60,000
			Contract Drilling - Day Work	70D	\$5,500	385,000
			Move in, Rig up, Tear Down & Move Out			100,000
			Tool Rental			50,000
			Air Compressor Rental	55D		55,000
			Trucking & Car Mileage			25,000
			Dirt Work - Road location & Pits			25,000
			Electric Logging & Temp. Logging			40,000
			Mud Logging Unit	60D		24,000
			Water Hauling			30,000
			Welding & Roustabout			7,000
			Supervision			18,000
			District Expense			56,000
			Well Plugging and Site Restoration			30,000
			Total Intangibles:			\$1,075,000
			<u>Contingency 20% of Intangibles</u>			\$215,000
			Total Net:			\$1,471,000
			50% Total Net DOE:			\$735,500
			50% TOTAL Net PPGCo			\$735,500

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REQUESTED BY _____

APPROVED BY _____

ESTIMATE GRADE _____ BY _____

CHECKED BY Earl G. Hoff

CONTRACT PRICING PROPOSAL <i>(RESEARCH AND DEVELOPMENT)</i>				Office of Management and Budget Approval No. 29-RO184	
This form is for use when (i) submission of cost or pricing data (see FPR 1-3.807-3) is required and (ii) substitution for the Optional Form 99 is authorized by the contracting officer.				PAGE NO.	NO. OF PAGES
				1	4
NAME OF OFFEROR		SUPPLIES AND/OR SERVICES TO BE FURNISHED			
Phillips Petroleum Company		Data from drilling geothermal well			
HOME OFFICE ADDRESS		Humboldt House, Campbell E No. 2			
Bartlesville, Oklahoma 74004		Pershing County, Nevada			
DIVISION(S) AND LOCATION(S) WHERE WORK IS TO BE PERFORMED		TOTAL AMOUNT OF PROPOSAL		GOVT SOLICITATION NO.	
Geothermal Operations, Reno, Nevada		\$ 674,000		RFP ET-78-R-08-0003	
DETAIL DESCRIPTION OF COST ELEMENTS					
1. DIRECT MATERIAL (Itemize on Exhibit A)			EST COST (\$)	TOTAL EST COST ¹	REFER- ENCE ²
a. PURCHASED PARTS Casing, Wellhead Equip. & Misc. Connections			133,500		
b. SUBCONTRACTED ITEMS Drilling bits, mud			105,000		
c. OTHER—(1) RAW MATERIAL					
(2) YOUR STANDARD COMMERCIAL ITEMS					
(3) INTERDIVISIONAL TRANSFERS (At other than cost)					
TOTAL DIRECT MATERIAL				238,500	
2. MATERIAL OVERHEAD ³ (Rate %Xs base=)				- 0 -	
3. DIRECT LABOR (Specify)		ESTIMATED HOURS	RATE/HOUR	EST COST (\$)	
Phillips Petroleum Company Personnel only		40 days	\$100/day	4,000	
CONFIDENTIAL AND PROPRIETARY					
DATA MAY NOT BE RELEASED WITHOUT PRIOR WRITTEN APPROVAL OF PHILLIPS PETROLEUM CO.					
TOTAL DIRECT LABOR				4,000	
4. LABOR OVERHEAD (Specify Department or Cost Center) ⁴		O.H. RATE	X BASE =	EST COST (\$)	
Natural Resources Group		46%	4,000	2,000	
TOTAL LABOR OVERHEAD				2,000	
5. SPECIAL TESTING (Including field work at Government installations)			EST COST (\$)		
5(a) Third Party Services, including contract drilling, mud logging, cement and cementing services, trucking, logging, etc.			741,000		
TOTAL SPECIAL TESTING				741,000	
6. SPECIAL EQUIPMENT (If direct charge) (Itemize on Exhibit A)			EST COST (\$)		
Tool and Compressor rental			95,000		
7. TRAVEL (If direct charge) (Give details on attached Schedule)			EST COST (\$)		
a. TRANSPORTATION			3,000		
b. PER DIEM OR SUBSISTENCE					
TOTAL TRAVEL				3,000	
8. CONSULTANTS (Identify—purpose—rate)			EST COST (\$)		
Drilling consultant 55 days at \$200			11,000		
TOTAL CONSULTANTS				11,000	
9. OTHER DIRECT COSTS (Itemize on Exhibit A)			EST COST (\$)		
Contingency			202,000		
TOTAL DIRECT COST AND OVERHEAD				1,296,500	
10. GENERAL AND ADMINISTRATIVE EXPENSE (Rate % of cost element Nos. 10 J)			EST COST (\$)		
4 %			51,500		
12. ROYALTIES ⁵			EST COST (\$)		
			-0-		
13. TOTAL ESTIMATED COST			EST COST (\$)		
			1,348,000		
14. FEE OR PROFIT			EST COST (\$)		
			-0-		
15. NET TO DOE (50%)			TOTAL ESTIMATED COST AND FEE OR PROFIT		
			674,000		

INSTRUCTIONS TO OFFERORS

1. The purpose of this form is to provide a standard format by which the offeror submits to the Government a summary of incurred and estimated costs (and attached supporting information) suitable for detailed review and analysis. Prior to the award of a contract resulting from this proposal the offeror shall, under the conditions stated in FPR 1-3.807-3 be required to submit a Certificate of Current Cost or Pricing Data (See FPR 1-3.807-3(h) and 1-3.807-4).

2. In addition to the specific information required by this form, the offeror is expected, in good faith, to incorporate in and submit with this form any additional data, supporting schedules, or substantiation which are reasonably required for the conduct of an appropriate review and analysis in the light of the specific facts of this procurement. For effective negotiations, it is essential that there be a clear understanding of:

- a. The existing, verifiable data.
- b. The judgmental factors applied in projecting from known data to the estimate, and
- c. The contingencies used by the offeror in his proposed price.

In short, the offeror's estimating process itself needs to be disclosed.

3. When attachment of supporting cost or pricing data to this form is impracticable, the data will be described (with schedules as appropriate) and made available to the contracting officer or his representative upon request.

4. The formats for the "Cost Elements" and the "Proposed Contract Estimate" are not intended as rigid requirements. These may be presented in different format with the prior approval of the Contracting Officer if required for more effective and efficient presentation. In all other respects this form will be completed and submitted without change.

5. By submission of this proposal the offeror grants to the Contracting Officer, or his authorized representative, the right to examine, for the purpose of verifying the cost or pricing data submitted, those books, records, documents and other supporting data which will permit adequate evaluation of such cost or pricing data, along with the computations and projections used therein. This right may be exercised in connection with any negotiations prior to contract award.

FOOTNOTES

1. Enter in this column those necessary and reasonable costs which in the judgment of the offeror will properly be incurred in the efficient performance of the contract. When any of the costs in this column have already been incurred (e.g., on a letter contract or change order), describe them on an attached supporting schedule. Identify all sales and transfers between your plants, divisions, or organizations under a common control, which are included at other than the lower of cost to the original transferee or current market price.

2. When space in addition to that available in Exhibit A is required, attach separate pages as necessary and identify in this "Reference" column attachment in which the information supporting the specific cost element may be found. No standard format is prescribed; however, the cost or pricing data must be accurate, complete and current, and the judgment factors used in projecting from the data to the estimates must be stated in sufficient detail to enable the Contracting Officer to evaluate the proposal. For example, provide the basis used for pricing materials such as by vendor quotations, shop estimates, or invoice prices; the reason for use of overhead rates which depart significantly from experienced rates (reduced volume, a planned major re-arrangement, etc.); or justification for an increase in labor rates (anticipated wage and salary increases, etc.). Identify and explain any contingencies which are included in the proposed price, such as anticipated costs of rejects and defective work, or anticipated technical difficulties.

3. Indicate the rates used and provide an appropriate explanation. Where agreement has been reached with Government representative, on the use of forward pricing rates, describe the nature of the agreement. Provide the method of computation and application of your overhead expense, including cost breakdown and showing trends and budgetary data as necessary to provide a basis for evaluation of the reasonableness of proposed rates.

4. If the total cost entered here is in excess of \$250, provide on a separate page the following information on each separate item of royalty or license fee: name and address of licensor; date of license agreement; patent numbers, patent application serial numbers, or other basis on which the royalty is payable; brief description, including any part or model numbers of each contract item or component on which the royalty is payable; percentage or dollar rate of royalty per unit; unit price of contract item; number of units; and total dollar amount of royalties. In addition, if specifically requested by the contracting officer, a copy of the current license agreement and identification of applicable claims of specific patents shall be provided.

5. Provide a list of principal items within each category indicating known or anticipated source, quantity, unit price, competition obtained, and basis of establishing source and reasonableness of cost.

CONTINUATION OF EXHIBIT A—SUPPORTING SCHEDULE AND REPLIES TO QUESTIONS II AND V.



COST ESTIMATE

A. F. E. No. PE-5522

Location: Campbell "E" No. 2
 Description of Job: SE SE SE Sec. 15-31N-33E, Pershing Co., Nevada

Date: May 30, 1978

Drill 8,000' Geothermal Test

UNIT	CLASS	ITEM	DESCRIPTION (SHOW CONDITION OF USED MATERIAL AND EQUIPMENT)	QTY.	UNIT PRICE	TOTAL	
			<u>Tangible Equipment (all new)</u>				
			20" OD 94#, K-55 Contuctor Pipe	100	\$ 64	\$ 6,500	
			13 3/8" OD 54.5#, K-55 Surface Casing	1500	18	27,000	
			9 5/8" OD 40#, K-55 Casing	4000	15	60,000	
			Wellhead Equipment			35,000	
			Misc. Connections			5,000	
			Total Tangibles:				\$133,500
			<u>Intangibles</u>				
			Cement & Cement Service			90,000	
			Bits			55,000	
			Drilling Mud & Additives			50,000	
			Contract Drilling - Day Work	60D	5500	380,000	
			Move in, Rig up, Tear Down & Move out			100,000	
			Tool Rental			45,000	
			Air Compressor Rental	50D		50,000	
			Trucking & Car Mileage			23,000	
			Dirt Work - Road, Location & Pits			40,000	
			Electric & Temperature Logging			35,000	
			Mud Logging	55D	400	22,000	
			Water Hauling			20,000	
			Roustabout & Welding			6,000	
			Supervision			15,000	
			District Expense			51,500	
			Well Plugging and Site Restoration			30,000	
			Total Intangibles:				\$1,012,500
			Contingency 20% of Intangibles:				\$ 202,000
			Total Net:				\$1,348,000
			50% Total Net DOE:				\$674,000
			50% TOTAL Net PCo.				\$674,000

CONFIDENTIAL AND PROPRIETARY
 DATA MAY NOT BE RELEASED
 WITHOUT PRIOR WRITTEN APPROVAL
 OF PHILLIPS PETROLEUM CO.

REQUESTED BY _____
 ESTIMATE GRADE _____ BY _____
 CHECKED BY Earl G. Hoff

APPROVED BY _____

EXHIBIT V

RESUMES OF PRINCIPAL PROGRAM PERSONNEL

RESUME

NAME C. W. Berge
Phillips Petroleum Company
P. O. Box 752
Del Mar, California 92014

EDUCATION: 1950-1952 Coalinga College, Coalinga, CA AA-1952
1956-1958 Brigham Young Univ., Provo, UT Geology BA-1958
1958-1960 Brigham Young Univ., Provo, UT Geology MS-1960
1965-1968 Univ. of Wisconsin, Madison, WI Geology/
Oceanography PhD-1971

WORK EXPERIENCE:

1974 to Present Manager, Geothermal Operations, Phillips Petroleum Company,
Del Mar, California. Responsible to locate, develop, operate and
market geothermal resources as a profit center.

1972 to 1974 Exploration Director, Geothermal Operations, Phillips Petroleum
Company, Del Mar, California. Directed an exploration team in
identification and evaluation of geothermal prospects and early
phase field development for the purpose of developing steam re-
sources to serve as fuel for the generation of electricity.

1970 to 1972 Group Leader, Oceanography, Phillips Petroleum Company, Bartles-
ville, OK. Directed Oceanographic/Geology/Geophysical research
in offshore areas of the world for petroleum and mineral resources.

1968 to 1970 Group Leader, Oceanology Research, Geochemistry Branch, Phillips
Petroleum Company, Bartlesville, Oklahoma. Originates, implements
and directs oceanographic research in marine geology, marine geo-
chemistry and related fields to Phillips; and to advise develop-
ments in ocean technology that may be exploited by the company.

1966 to 1967 Research Department, Phillips Petroleum Company, Bartlesville, OK.
(Summer)

1965 to 1968 Teaching and Research Assistant, University of Wisconsin, Madison,
WI.

1963 to 1965 CIC Officer, Navigator, SWO, US Navy COMASWGRU-5 Staff, USS Benn-
ington.

1960 to 1963 Flight Instructor, Division Officer Assistant Aircraft Maintenance
Officer, US Navy, NAAS, New Iberia, LA.

1960 Exploration Geologist, Page T. Jenkins, Casper, WY.

1959 Park Ranger Naturalist, National Park Service, Yellowstone National
Park.

58 to 1960 Teaching Assistant, Department of Geology, Brigham Young University, Provo, UT.

1952 to 1956 Naval Aviator, Patrol Plane Commander, US Navy, VP-1, Whidbey Island, WA.

1950 to 1952 Roughneck, Cardinal Drilling Company, Beverly Hills, CA.
(Summer)

SCIENTIFIC SOCIETY AFFILIATION:

American Association of Petroleum Geologists
Sigma Gamma Epsilon
Sigma Xi
Society of Economic Paleontologists and Mineralogists
Geothermal Resources Council - Executive Committee
American Nuclear Society - Executive Committee
Association of Professional Geological Scientists

PUBLICATIONS:

1966 - Survey of the Continental Shelves and Their Potential Petroleum Resources - Phillips Petroleum Company Research and Development Department Report.

1971 - Sedimentation of Arklow Bank, Irish Sea: Unpublished Ph.D. Dissertation, University of Wisconsin, Madison, Wisconsin, 177 pages.

1971 - Geology and Petroleum Potential of the Caribbean - Phillips Petroleum Company Research and Development Department Report.

C. W. Berge,
G. W. Crosby,
R. C. Lenzer

1976 - Geothermal Exploration of Roosevelt KGRA, Utah - Phillips Petroleum Geothermal Exploration Report.

RESUME

NAME: Richard C. Lenzer
Phillips Petroleum Company
P. O. Box 752
Del Mar, California 92014

EDUCATION: University of Wisconsin, B.S. Degree in Geology, 1965
M.S. Degree in Economic Geology,
1968
Ph.D. Degree in Economic Geology,
1972

WORK EXPERIENCE:

1978 to Present Exploration Director, Geothermal Operations, Phillips Petroleum Company, San Diego, California. Supervise geothermal exploration programs in California, Utah, Idaho, Arizona, New Mexico, Colorado and Montana. Plan immediate, intermediate and long range objectives for the exploration program. Develop budget recommendations to carry out exploration program, and exercise first discretion over geological and geophysical budget in the range of 2 MM to 5 MM per year.

1977 to 1978 Senior Minerals Geologist, Geothermal Operations, Phillips Petroleum Company, San Diego, California. Directed exploration at the Roosevelt Hot Springs Unit, Beaver County, Utah and at the Sulphurdale prospect, Milford and Beaver Counties, Utah.

1972 to 1977 Exploration Geologist, Geothermal Operations, Phillips Petroleum Company, San Diego, California. Conducted property examinations in Utah, Montana and Arizona as part of an exploration program for geothermal energy. Designed, supervised, and worked on the exploration program at the Roosevelt Hot Springs KGRA, Beaver County, Utah. As a result of this work, seven deep geothermal test wells have been drilled at Roosevelt. Four of the wells appear to have commercial potential.

RESUME

NAME: Earl G. Hoff

ADDRESS: 2017 S. Bonneview Dr., Bountiful, Utah 84010
Telephone: (801) 295-0895 - Residence
(714) 755-0131 - Business

MARITAL STATUS: Married - Four children at home

DATE OF BIRTH: September 25, 1928

PLACE OF BIRTH: Tulsa, Oklahoma

EDUCATION: Central High School, Tulsa, Oklahoma - graduated 1946
The University of Tulsa - graduated 1952, BS Petroleum
Engineering
The University of Tulsa - graduated 1958, MS Petroleum
Engineering

WORK EXPERIENCE:

April
1978 to Present Director of Operations and Development, Geothermal Branch,
Phillips Petroleum Company, Del Mar, California.

1973 to 1978 Manager of Production and Engineering, Oil and Gas Dept.,
UV Industries, Inc. (formerly U.S. Smelting, Refining and
Mining Company) Salt Lake City, Utah.

1970 to 1973 Director of Production and Petroleum Engineering, American
Resources Management Corp., Salt Lake City, Utah.

1964 to 1970 Research and Development Dept., Phillips Petroleum Company,
Bartlesville, Oklahoma.

1957 to 1964 Chief Engineer to President, Walker Well Heads, Inc., Tulsa,
Oklahoma.

1955 to 1957 Active duty U.S. Coast Guard Reserve.

1952 to 1955 Petroleum Engineer, Oklahoma Div., Texaco, Inc.

1947 to 1952 Engineering Dept., Hinderliter Tool Company, Tulsa, Oklahoma.

PROFESSIONAL MEMBERSHIPS: Society of Petroleum Engineers of AIIME, registered professional
engineer in the State of Oklahoma.

RESUME

NAME Robert T. Forest
Phillips Petroleum Company
P. O. Box 10566
Reno, Nevada 89510

EDUCATION: Geological Engineer, Colorado School of Mines, 1956.

WORK EXPERIENCE:

1972 to Present Manager, Reno District, Geothermal Operations, Phillips Petroleum Company, Reno, Nevada. Supervise and work on geothermal exploration program in Nevada and Oregon. Methods used to evaluate geothermal prospects has included geological work, water geochemistry, shallow drill holes, intermediate-depth drill holes, and various geophysical methods. As a result of this work four deep geothermal test wells have been drilled in Nevada on two prospects. Three of the four wells appear to have commercial potential and have resulted in two discoveries, one called the Desert Peak area and the other the Humboldt House area.

1970 to 1972 Regional Manager, Minerals Division, Phillips Petroleum Company, Reno, Nevada. Supervised exploration program for minerals and nonferrous metals in the western states.

1963 to 1970 Exploration geologist, Minerals Division, Phillips Petroleum Company, Grants, New Mexico and Reno, Nevada. Conducted property examinations in southwestern states as part of an exploration program for minerals and nonferrous metals.

1960 to 1963 Mine Engineer, Mining and Milling Department, Phillips Petroleum Company, Grants, New Mexico. Supervisory and engineering positions were held during this period at underground uranium-mining operations.

1959 to 1960 Mine Engineer and Geologist, Rico Argentine Mining Company, Rico, Colorado. Performed duties of mine engineer, plant engineer, and geologist at underground pyrite-mining operations and sulphuric-acid plant.

1956 to 1958 Geologist, Chile Exploration Company, Chuquicamata, Chile. Performed geological mapping in open-pit copper mine and did exploration work aimed at developing other orebodies near the pit.

RESUME

NAME: O. C. Rolls
Phillips Petroleum Company
P. O. Box 752
Del Mar, California 92014

WORK EXPERIENCE:
1974 to Present

Drilling Superintendent, Geothermal Operations, Phillips Petroleum Company, Del Mar, California. Supervise drilling operations throughout the State of California, Idaho, Nevada, New Mexico, Oregon and Utah.

1964 to 1974

Drilling Supervisor and Drilling Superintendent in International Operations, Phillips Petroleum Company. Supervise drilling operations (onshore and offshore) in Libya, Egypt and Norway.

1942 to 1964

Various capacities and field operations of Phillips Petroleum Company throughout West Texas.

RESUME

NAME: Walter Richard Benoit
Phillips Petroleum Company
P. O. Box 10566
Reno, Nevada 89510

EDUCATION: M.S. in Geology - June 1972, University of Montana,
Missoula, Montana. Thesis topic - Vertical Zoning
and Differentiation in Granitic Rocks - Central
Flint Creek Range, Montana. Thesis advisor -
D. W. Hyndman

B.S. in Geology - June 1970, Western Washington
University, Bellingham, Washington.

WORK EXPERIENCE:

1974 to Present Geothermal exploration geologist with Phillips Petroleum
Company. The duties involve identifying and evaluating
geothermal prospects capable of electrical power generation.
Much of my time has been spent on the Desert Peak
Geothermal Field.

1973
May to October Hardrock uranium exploration with Exxon. This job was
principally reconnaissance work in Idaho, Nevada, and Arizona.

1972 to 1973 Research associate at the University of Montana. The re-
search involved petrochemical studies of granitic rocks in
the Flint Creek Range of Montana.

1970
June to Sept. Field assistant at the Miners Ridge copper prospect in the
North Cascades for Bear Creek Mining Company.

RESUME

NAME: William L. Desormier
Phillips Petroleum Company
P. O. Box 10566
Reno, Nevada 89510

EDUCATION: M.A. in Geology - June 1975, University of Montana,
Missoula, Montana. Specialization - Structural Geology

A.B. in Geology - June 1973, University of California,
Berkeley, California

WORK EXPERIENCE:
1975 to Present Geologist for Phillips Petroleum Company, Natural Resources
Group, Energy Minerals Division, Geothermal Operations, P. O.
Box 10566, Reno, Nevada 89510. Major responsibilities are
to discover and evaluate geothermal prospects by: 1. Con-
ducting geological, geophysical, geochemical, and literature
investigations; 2. Compile maps, charts, logs, and reports
using the data obtained from these investigations; 3. Evaluate
the results and make recommendations on the prospects.

1973 to 1975 Research Assistantship under Dr. James L. Talbot of the Uni-
versity of Montana; duties: map compilation and thesis work.

1972
(Summer) Geologic Field Assistant for the U.S. Geologic Survey assisting
Mr. W. Porter Irwin in the Klamath Mountains of California;
duties: reconnaissance mapping, map compilation, air photo
interpretation, and making thin sections.

1964 to 1970 United States Navy.

PROFESSIONAL SOCIETIES: Geological Society of America
Sigma XI

REPRESENTATIONS AND CERTIFICATIONS

(Construction and Architect-Engineer Contract)
(For use with Standard Forms 19, 21 and 252)

REFERENCE (Enter name No.(s) as on SF 19, 21 and 252)

ADDRESS OF BIDDER (No., Street, City, State, and ZIP Code)

Phillips Petroleum Company
P. O. Box 752
Del Mar, CA 92014

DATE OF BID

May 30, 1978

In negotiated procurements, "bid" and "bidder" shall be construed to mean "offer" and "offeror."

The bidder makes the following representations and certifications as a part of the bid identified above. (Check appropriate boxes.)

1. SMALL BUSINESS

He is, is not, a small business concern. (A small business concern for the purpose of Government procurement is a concern, including its affiliates, which is independently owned and operated, is not dominant in the field of operations in which it is bidding on Government contracts, and can further qualify under the criteria concerning number of employees, average annual receipts, or other criteria as prescribed by the Small Business Administration. For additional information see governing regulations of the Small Business Administration (13 CFR Part 121)).

2. MINORITY BUSINESS ENTERPRISE

He is, is not a minority business enterprise. A minority business enterprise is defined as a "business, at least 50 percent of which is owned by minority group members or, in case of publicly owned businesses, at least 51 percent of the stock of which is owned by minority group members." For the purpose of this definition, minority group members are Negroes, Spanish-speaking American persons, American-Orientals, American-Indians, American-Eskimos, and American-Alcutes.

3. CONTINGENT FEE

(a) He has, has not, employed or retained any company or person (other than a full-time bona fide employee working solely for the bidder) to solicit or secure this contract, and (b) he has, has not, paid or agreed to pay any company or person (other than a full-time bona fide employee working solely for the bidder) any fee, commission, percentage or brokerage fee, contingent upon or resulting from the award of this contract; and agrees to furnish information relating to (a) and (b) above as requested by the Contracting Officer. (For interpretation of the representation, including the term "bona fide employee," see Code of Federal Regulations, Title 41, Subpart 1-1.5.)

4. TYPE OF ORGANIZATION

He operates as an individual, partnership, joint venture, corporation, incorporated in State of Delaware.

5. INDEPENDENT PRICE DETERMINATION

(a) By submission of this bid, each bidder certifies, and in the case of a joint bid each party thereto certifies as to his own organization, that in connection with this procurement:

(1) The prices in this bid have been arrived at independently, without consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor;

(2) Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, in the case of a bid, or prior to award, in the case of a proposal, directly or indirectly to any other bidder or to any competitor; and

(3) No attempt has been made or will be made by the bidder to induce any other person or firm to submit or not to submit a bid for the purpose of restricting competition.

(b) Each person signing this bid certifies that:

(1) He is the person in the bidder's organization responsible within that organization for the decision as to the prices being bid herein and that he has not participated, and will not participate, in any action contrary to (a)(1) through (a)(3) above; or

(2) (i) He is not the person in the bidder's organization responsible within that organization for the decision as to the prices being bid herein but that he has been authorized in writing to act as agent for the persons responsible for such decision in certifying that such persons have not participated, and will not participate, in any action contrary to (a)(1) through (a)(3) above, and as their agent does hereby so certify; and (ii) he has not participated, and will not participate, in any action contrary to (a)(1) through (a)(3) above.

(c) This certification is not applicable to a foreign bidder submitting a bid for a contract which requires performance or delivery outside the United States, its possessions, and Puerto Rico.

(d) A bid will not be considered for award where (a)(1), (a)(3), or (b) above, has been deleted or modified. Where (a)(2) above, has been deleted or modified, the bid will not be considered for award unless the bidder furnishes the bid a signed statement which sets forth in detail the circumstances of the disclosure and the head of the agency, or his designee, determines that such disclosure was not made for the purpose of restricting competition.

NOTE.—Bids must set forth full, accurate, and complete information as required by this invitation for bids (including attachments). The penalty for making false statements in bids is prescribed in 18 U.S.C. 1001.

THE FOLLOWING NEED BE CHECKED ONLY IF BID EXCEEDS \$10,000 IN AMOUNT.

6. EQUAL OPPORTUNITY

He has, has not, participated in a previous contract or subcontract subject to the Equal Opportunity Clause herein, the clause originally contained in Section 301 of Executive Order No. 10925, or the clause contained in Section 201 of Executive Order No. 11114; he has, has not, filed all required compliance reports; and representations indicating submission of required compliance reports, signed by proposed subcontractors, will be obtained prior to subcontract awards.

(The above representations need not be submitted in connection with contracts or subcontracts which are exempt from the equal opportunity clause.)

7. PARENT COMPANY AND EMPLOYER IDENTIFICATION NUMBER

Each bidder shall furnish the following information by filling in the appropriate blocks:

(a) Is the bidder owned or controlled by a parent company as described below? Yes No. (For the purpose of this bid, a parent company is defined as one which either owns or controls the activities and basic business policies of the bidder. To own another company means the parent company must own at least a majority (more than 50 percent) of the voting rights in that company. To control another company, such ownership is not required; if another company is able to formulate, determine, or veto basic business policy decisions of the bidder, such other company is considered the parent company of the bidder. This control may be exercised through the use of dominant minority voting rights, use of proxy voting, contractual arrangements, or otherwise.)

(b) If the answer to (a) above is "Yes," bidder shall insert in the space below the name and main office address of the parent company.

NAME OF PARENT COMPANY	MAIN OFFICE ADDRESS (No., Street, City, State, and ZIP Code)
------------------------	--

(c) Bidder shall insert in the applicable space below, if he has no parent company, his own Employer's Identification Number (E.I. No.) (Federal Social Security Number used on Employer's Quarterly Federal Tax Returns, U.S. Treasury Department Form 941), or, if he has a parent company, the E.I. No. of his parent company.

EMPLOYER IDENTIFICATION NUMBER OF	➔	PARENT COMPANY	BIDDER 73-0400345
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8. CERTIFICATION OF NONSEGREGATED FACILITIES

Applicable to (1) contracts, (2) subcontracts, and (3) agreements with applicants who are themselves performing federally assisted construction contracts, exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity clause.)

By the submission of this bid, the bidder, offeror, applicant, or subcontractor certifies that he does not maintain or provide for his employees any segregated facilities at any of his establishments, and that he does not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. He certifies further that he will not maintain or provide for his employees any segregated facilities at any of his establishments, and that he will not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The bidder, offeror, applicant, or subcontractor agrees that a breach of this certification is a violation of the Equal Opportunity clause in this contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, or national origin, because of habit, local custom, or otherwise. He further agrees that (except where he has obtained identical certifications from proposed subcontractors for specific time periods) he will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity clause; that he will retain such certifications in his files; and that he will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods):

NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENT FOR CERTIFICATIONS OF NONSEGREGATED FACILITIES

A Certification of Nonsegregated Facilities must be submitted prior to the award of a subcontract exceeding \$10,000 which is not exempt from the provisions of the Equal Opportunity clause. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually, or annually).

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

9. CLEAN AIR AND WATER

(Applicable if the bid or offer exceeds \$100,000, or the contracting officer has determined that orders under an indefinite quantity contract in any year will exceed \$100,000, or a facility to be used has been the subject of a conviction under the Clean Air Act (42 U.S.C. 1857c-8(c)(1)) or the Federal Water Pollution Control Act (33 U.S.C. 1319(c)) and is listed by EPA, or is not otherwise exempt.)

The bidder or offeror certifies as follows:

(a) Any facility to be utilized in the performance of this proposed contract has , has not , been listed on the Environmental Protection Agency List of Violating Facilities.

(b) He will promptly notify the contracting officer, prior to award, of the receipt of any communication from the Director, Office of Federal Activities, Environmental Protection Agency, indicating that any facility which he proposes to use for the performance of the contract is under consideration to be listed on the EPA List of Violating Facilities.

(c) He will include substantially this certification, including this paragraph (c), in every nonexempt subcontract.

SUPPLEMENT TO REPRESENTATIONS AND CERTIFICATIONS

10. BUY AMERICAN CERTIFICATE

The bidder or offeror hereby certifies that each end product, except the end products listed below, is a domestic source end product (as defined in the clause entitled "Buy American Act"); and that components of unknown origin have been considered to have been mined, produced, or manufactured outside the United States.

Excluded end products (show country of origin for each excluded end product):

11. AFFIRMATIVE ACTION PROGRAM

The following paragraphs are added:

- a. The bidder or proposer represents that he (a) 1. has developed and has on file, 2. has not developed and does not have on file at each establishment an affirmative action program as required by the rules and regulations of the Secretary of Labor (41 CFR Part 60-1 and 60-2), or that he (b) has not previously had contracts subject to the written Affirmative Action Program requirement of the Secretary of Labor.

If such a program has not been developed, the bidder will complete the following:

The bidder does , does not employ more than 50 employees and has , has not been awarded a contract subject to Executive Order 11246 in the amount of \$50,000 or more since July 1, 1968. If such a contract has been awarded since July 1, 1968, give the date of such contract, but do not list contracts awarded within the last 120 days prior to the date of this representation.

- b. The bidder or proposer represents (a) that a full compliance review of the bidder's employment practices has, has not been conducted by an agency of the Federal Government; that such compliance review has, has not been conducted for the bidder's known first-tier subcontractors with a subcontract of \$50,000 or more and having 50 or more employees and (b) that the most recent compliance reviews were conducted as follows:

<u>NAME OF CONTRACTOR</u>	<u>DATE</u>	<u>FEDERAL AGENCY</u>
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First-tier subcontractors are unknown at the date of this proposal.
(include known first-tier subcontractors)

- c. The bidder or proposer represents that if the bidder has 50 or more employees and if this Contract is for \$50,000 or more, and that for each subcontractor having 50 or more employees and a subcontract for \$50,000 or more, and if he has not developed one, a written affirmative action plan will be developed for each of its establishments within 120 days from commencement of the Contract. A copy of the establishment's plan shall also be maintained at the establishment within 120 days from the date of commencement of the Contract.

The Affirmative Action Compliance Program will cover the items specifically set out in 41 CFR Part 60-2 and shall be signed by an executive of the Contractor.

- d. Where the bid of the apparent low responsible bidder is in the amount of \$1 million or more, the bidder and his known first-tier subcontractors which will be awarded subcontracts of \$1 million or more will be subject to full, preaward equal opportunity compliance reviews before the award of the Subcontract for the purpose of determining whether the bidder and his subcontractors are able to comply with the provisions of the equal opportunity clause.
- e. The bidder or proposer, if he has 100 or more employees, and all subcontractors having 100 or more employees are required to submit the Government Employer Information Report SF 100 (EEO-1), within 30 days after award, unless such report has been filed within 12 months preceding award. The EEO-1 report is due annually on or before March 31.

12. COST ACCOUNTING STANDARDS--EXEMPTION FOR CONTRACTS OF \$500,000 OR LESS--CERTIFICATION

If this proposal is expected to result in the award of a contract of \$500,000 or less and the offeror is otherwise eligible for an exemption, he shall indicate by checking the box below that the exemption to the Cost Accounting Standards clause (FPR 1-3.1204) under the provisions of 4 CFR 331.30(b)(8) (see FPR 1-3.1203(h)) is claimed. Where the offeror fails to check the box, he shall be given the opportunity to make an election in writing to the Contracting Officer prior to award. Failure to check the box below or make such an election shall mean that the offeror cannot claim the exemption to the Cost Accounting Standards clause or that the offeror elects to comply with such clause.

[] Certificate of Exemption for Contracts of \$500,000 or Less.

The offeror hereby claims an exemption from the Cost Accounting Standards clause under the provisions of 4 CFR 331.30(b)(8) and certifies that he has received notification of final acceptance of all items of work on (i) any prime contract or subcontract in excess of \$500,000 which contains the Cost Accounting Standards clause, and (ii) any prime contract or subcontract of \$500,000 or less awarded after January 1, 1975, which contains the Cost Accounting Standards clause. The offeror further certifies he will immediately notify the Contracting Officer in writing in the event he is awarded any other contract or subcontract containing the Cost Accounting Standards clause subsequent to the date of this certificate but prior to the date of any award resulting from this proposal.

13. DISCLOSURE STATEMENT--COST ACCOUNTING PRACTICES AND CERTIFICATION *

Any contract in excess of \$100,000 resulting from this solicitation except (i) when the price negotiated is based on: (A) established catalog or market prices of commercial items sold in substantial quantities to the general public, or (B) prices set by law or regulation, or (ii) contracts which are otherwise exempt (see 4 CFR 331.30(b) and FPR 1-3.1203(a)(2)) shall be subject to the requirements of the Cost Accounting Standards Board. Any offeror submitting a proposal which, if accepted, will result in a contract subject to the requirements of the Cost Accounting Standards Board must, as a condition of contracting, submit a Disclosure Statement as required by regulations of the Board. The Disclosure Statement must be submitted as a part of the offeror's proposal under this solicitation (see I. below) unless (i) the offeror, together with all divisions, subsidiaries, and affiliates under common control, did not exceed the monetary exemption for disclosure as established by the Cost Accounting Standards Board (see II. below); (ii) the offeror exceeded the monetary exemption in the Federal Fiscal Year immediately preceding the year in which this proposal was submitted but, in accordance with the regulations of the Cost Accounting Standards Board, is not yet required to submit a Disclosure Statement (see III. below); (iii) the offeror has already submitted a Disclosure Statement disclosing the practices used in connection with the pricing of this proposal (see IV. below); or (iv) postaward submission has been authorized by the Contracting Officer. See 4 CFR 351.70 for submission of copy of Disclosure Statement to the Cost Accounting Standards Board.

CAUTION: A practice disclosed in a Disclosure Statement shall not, by virtue of such disclosure, be deemed to be a proper, approved, or agreed to practice for pricing proposals or accumulating and reporting contract performance cost data.

* See ADDENDUM at end of Article 14.

Check the appropriate box below:

I. CERTIFICATE OF CONCURRENT SUBMISSION OF DISCLOSURE STATEMENT(S)

The offeror hereby certifies that he has submitted, as a part of his proposal under this solicitation, copies of the Disclosure Statement(s) as follows: (i) original and one copy to the cognizant Contracting Officer; and (ii) one copy to the cognizant contract auditor.

Date of Disclosure Statement(s): _____

Name(s) and Address(es) of Cognizant Contracting Officer(s) where filed: _____

The offeror further certifies that practices used in estimating costs in pricing this proposal are consistent with the cost accounting practices disclosed in the Disclosure Statement(s).

II. CERTIFICATE OF MONETARY EXEMPTION

The offeror hereby certifies that he, together with all divisions, subsidiaries, and affiliates under common control, did not receive net awards of negotiated national defense prime contracts subject to Cost Accounting Standards totaling more than \$10,000,000 in either Federal Fiscal Year 1974 or 1975 or net awards of negotiated national defense prime contracts and subcontracts subject to cost accounting standards totaling more than \$10,000,000 in Federal Fiscal Year 1976 or in any subsequent Federal Fiscal Year preceding the year in which this proposal was submitted.

CAUTION: Offerors who submitted or who currently are obligated to submit a Disclosure Statement under the filing requirements previously established by the Cost Accounting Standards Board are not eligible to claim this exemption unless they have received notification of final acceptance of all deliverable items on all of their prime contracts and subcontracts containing the Cost Accounting Standards clause.

III. CERTIFICATE OF INTERIM EXEMPTION

The offeror hereby certifies that (i) he first exceeded the monetary exemption for disclosure, as defined in II. above, in the Federal Fiscal Year immediately preceding the year in which this proposal was submitted, and (ii) in accordance with the regulations of the Cost Accounting Standards Board (4 CFR 351.40(f)), he is not yet required to submit a Disclosure Statement. The offeror further certifies that if an award resulting from this proposal has not been made by March 31 of the current Federal Fiscal Year, he will immediately submit a revised certificate to the Contracting Officer, in the form specified

under I. above or IV. below, as appropriate, to verify his submission of a completed Disclosure Statement.

CAUTION: Offerors may not claim this exemption if they are currently required to disclose because they exceeded monetary thresholds in Federal Fiscal Years prior to Fiscal Year 1976. Further, the exemption applies only in connection with proposals submitted prior to March 31 of the year immediately following the Federal Fiscal Year in which the monetary exemption was exceeded.

IV. CERTIFICATE OF PREVIOUSLY SUBMITTED DISCLOSURE STATEMENT(S)

The offeror hereby certifies that the Disclosure Statement(s) were filed as follows:

Date of Disclosure Statement(s): _____

Name(s) and Address(es) of Cognizant Contracting Officer(s) where filed: _____

The offeror further certifies that practices used in estimating costs in pricing this proposal are consistent with the cost accounting practices disclosed in the Disclosure Statement(s).


14. ADDITIONAL COST ACCOUNTING STANDARDS APPLICABLE TO EXISTING CONTRACTS--CERTIFICATION

(a) Cost accounting standards will be applicable and effective as promulgated by the Cost Accounting Standards Board to any award as provided in the Federal Procurement Regulations Subpart 1-3.12. If the offeror presently has contracts or subcontracts containing the Cost Accounting Standards clause, a new standard becomes applicable to such existing contracts prospectively when a new contract or subcontract containing such clause is awarded on or after the effective date of such new standard. Such new standard may require a change in the offeror's established cost accounting practices, whether or not disclosed. The offeror shall specify, by an appropriate entry below, the effect on his cost accounting practice.

(b) The offeror hereby certifies that an award under this solicitation would, would not, in accordance with paragraph (a)(3) of the Cost Accounting Standards clause, require a change in his established cost accounting practices affecting existing contracts and subcontracts.

NOTE: If the offeror has checked "would" above, and is awarded the contemplated contract, he will also be required to comply with the clause entitled Administration of Cost Accounting Standards.

Firm: Phillips Petroleum Company

Name: 

Date: May 30, 1978

Title: Manager Geothermal Branch

ADDENDUM

In respect to this RFP No. ET-78-R-08-003, Phillips Petroleum Company requests that exemption (waiver of compliance) be granted in regard to the compliance provisions of Cost Accounting Standards Board (CASB) regulations.

Authority is granted (Section 331.30 (c), CASB regulations) the FEA (DOE) to request the CASB to waive the requirements of Section 331.30 (a) of subject regulations, which requires the insertion of the contract clause prescribed in Section 331.50 in all negotiated defense contracts in excess of \$100,000 with certain exceptions.

Phillips Petroleum Company contends that the waiving of the Cost Accounting Standards for the proposed contract would be in the best interest of both the government and the proposer for the following reasons:

1. Subject contract does not qualify as a defense contract. Regulations promulgated and implemented by the Cost Accounting Standards Board are authorized by Public Law 91-379 and are applicable only to defense contracts.
2. The accounting principles and procedures followed by Phillips Petroleum Company are substantially in compliance with Cost Accounting Standards. Differences in accounting do not warrant the administrative burden and additional costs that would be imposed on Phillips to separately account for this operation under CASB regulations. The administrative burden would be grossly disproportionate to any benefits that could be expected and additional costs would increase the total administrative cost burden applicable to the contract.