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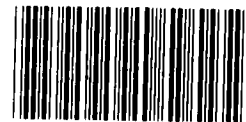
General Accounting Office

Reasons For The Termination Of, And DOE Losses In, A Geothermal Demonstration Powerplant Project

The 50-megawatt Baca geothermal demonstration powerplant project, located in northern New Mexico, was the Department of Energy's (DOE's) initial effort to demonstrate geothermal powerplant technology. The project, started in 1978, was believed to have a high probability of success, and its cost was to be shared equally with the industry participants.

GAO's review showed that the project was terminated in January 1982 because sufficient geothermal steam to operate the powerplant could not be obtained. The early termination resulted in DOE paying a disproportionate share--\$45 million, or 64 percent--of the \$70 million spent on the project because it had paid the majority of the powerplant-related costs at that time. However, a portion of these costs may be recovered through the sale of powerplant equipment.

DOE indicated that it learned lessons from this experience and will act to prevent these problems from occurring on other projects.



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RESOURCES, COMMUNITY,
AND ECONOMIC DEVELOPMENT
DIVISION

B-212917

The Honorable Sam Nunn
Ranking Minority Member, Permanent
Subcommittee on Investigations
Committee on Governmental Affairs
United States Senate

Dear Senator Nunn:

Your letter dated November 8, 1982, requested that we examine the history and the problems surrounding the Department of Energy's (DOE's) Baca geothermal demonstration powerplant project. This project was undertaken as a joint effort by DOE and industry¹ to demonstrate the feasibility of operating a 50-megawatt electric powerplant with steam obtained from the Baca geothermal reservoir in northern New Mexico. The total cost of this project was expected to be \$133 million. However, sufficient steam to operate the powerplant could not be obtained from the Baca reservoir and the project was terminated. Although the cost of the project was to be equally shared, DOE paid about \$45 million, or 64 percent, of the \$70 million spent on the project before it was terminated.

As agreed with your office, we focused our work on determining the causes for the project's termination, the reasons why DOE paid a disproportionate share of the project costs, and the lessons learned which could be applied to other DOE projects. A brief summary of the results is presented below. The details of our review are contained in appendix I. Appendix II contains our objectives, scope, and methodology.

The Baca geothermal demonstration project, which was started in July 1978, was DOE's initial attempt to demonstrate the commercial feasibility of producing electricity from geothermal resources. Preliminary information on the Baca reservoir, which was to provide the steam to operate the powerplant's turbine, indicated there was ample steam and that obtaining this steam

¹The industry participants on the project were the Public Service Company of New Mexico (PNM) and the Union Geothermal Company of New Mexico (Union), a subsidiary of the Union Oil Company of California.

would not be difficult. However, the project was terminated in January 1982 because only about one-third of the steam needed to operate the powerplant was obtained during the course of the project. Unexpected problems with the reservoir and with difficulties in drilling in the reservoir prevented the steam production activities from being successfully completed.

While the project's cost was intended to be equally shared, DOE paid a disproportionate amount. DOE's costs on the project were high because it had paid about 88 percent of the \$23 million in powerplant-related costs incurred before the steam production problems were realized. DOE paid these costs due to provisions of the project's cooperative agreement, which made DOE responsible for early, non-equipment powerplant costs, and DOE's decision to pay additional powerplant equipment costs in order to prevent a delay on the project. However, a portion of these costs may be recovered by DOE through the sale of the powerplant equipment.

There are some lessons which DOE learned from this project which can be applied to other DOE projects. These are

- when dealing with geothermal energy projects, or other projects in which the availability of the energy supply is a crucial and unknown factor, strong emphasis should be given to developing the energy supply before financial commitments are made towards other project activities, such as powerplant procurement and construction.
- when negotiating future cost-sharing agreements with project participants, DOE should strive to have costs borne equally by DOE and other project participants throughout all phases of the projects.

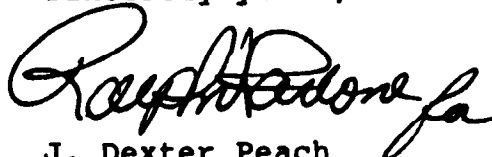
DOE geothermal officials said that actions are being taken to ensure that problems similar to those which contributed to DOE's losses on this project are avoided on future projects.

A draft of this report was provided to DOE, Union, and PNM for review and comment. Union generally agreed with the factual content of the draft report. PNM said that its project costs were approximately \$1 million higher than the report identified; however, we did not include this additional amount since these costs were not incurred under the cooperative agreement. DOE did not provide written comments.

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Unless you publicly announce this report's contents earlier, we plan no further distribution until 30 days from the date of the report's issuance. At that time, we will send copies to the Chairmen, House and Senate Committees on Appropriations, the Secretary of Energy, and other interested parties. We will also make copies available to others upon request.

Sincerely yours,

A handwritten signature in cursive script, appearing to read "J. Dexter Peach".

J. Dexter Peach
Director

C o n t e n t s

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ABBREVIATIONS

DOE	Department of Energy
GAO	General Accounting Office
PNM	Public Service Company of New Mexico

REASONS FOR THE TERMINATION OF, AND
DOE LOSSES IN, A GEOTHERMAL DEMONSTRATION
POWERPLANT PROJECT

The Baca geothermal demonstration powerplant project was undertaken in response to requirements of the Geothermal Energy Research, Development, and Demonstration Act of 1974 (Public Law 93-410, Sept. 3, 1974), which directed that the Department of Energy (DOE) initiate demonstration projects using geothermal energy.² This project was DOE's initial effort to show the feasibility of using liquid-dominated hydrothermal resources for commercial electric power production.³ The project, located at the Baca hydrothermal reservoir in the Jemez Mountains, approximately 60 miles north of Albuquerque, New Mexico, was to be a 50-megawatt flash-steam electric powerplant (in which hot geothermal fluids are brought to the surface where they 'flash' into steam under the reduced surface pressure and drive a turbine). The major objectives of the project were to demonstrate the economically and environmentally acceptable production of electricity from hydrothermal reservoirs and to give developers, utilities, and the financial community the confidence needed to fully use these resources.

The project was conducted under a July 1978 cooperative agreement between the Public Service Company of New Mexico (PNM), the Union Geothermal Company of New Mexico (Union), and DOE. Its expected cost was \$124 million for construction and \$9 million for data collection and dissemination, for a total of \$133 million. Operation of the powerplant was expected to begin in early 1982,

²Geothermal energy is the internal heat of the Earth and is found in the following five major resource types: hydrothermal resources, which are porous or fractured rock with entrapped steam (steam-dominated reservoirs) or hot water (liquid-dominated reservoirs); geopressed resources which contain hot water and dissolved methane trapped under high pressure; hot dry rock resources, which are high temperature rock formations with an absence of water; normal gradient heat, the normal convection of heat from within the Earth; and magma, or molten rock. Only the extraction of energy from hydrothermal resources is currently considered feasible.

³Electricity is already being produced at the Geysers in northern California, which is a geothermal resource that produces superheated steam. However, this type of resource is rare, and no commercial-scale development has been performed in the United States on the more abundant liquid-dominated resources.

followed by a 5-year demonstration period. The construction of the project was the management responsibility of the industry participants, with PNM responsible for the construction of the powerplant and Union responsible for the development of the geothermal wells and steam production facilities. DOE was responsible for the conduct of the collection, evaluation, and dissemination of technical, performance, and economic data on the project. This data was to be provided to other potential geothermal energy users in order to stimulate more geothermal energy development. In accordance with the cooperative agreement, the costs of the project would be shared on an approximately equal basis between the industry participants and DOE, as follows:

Planned Baca Geothermal Project Costs
(millions)

	<u>Powerplant</u>	<u>Wells and Steam Production</u>	<u>Data Collection and Dissemination</u>	<u>Total</u>
PNM	\$26	-	-	\$ 26
Union	-	\$42	-	42
DOE	24	32	\$9	65
	<u>\$50</u>	<u>\$74</u>	<u>\$9</u>	<u>\$133</u>

DOE believed the project to have a high probability of success and to be a low financial risk because

- sufficient drilling activities had been accomplished by Union before project initiation to indicate that there was adequate geothermal steam in the Baca reservoir to support a 50-megawatt powerplant.
- the flash-steam technology planned for the project is similar to that used successfully in geothermal electric powerplants in Mexico and other countries.
- DOE's cost was limited to the amounts stated in the cooperative agreement unless there were cost overruns caused by DOE. In addition, DOE would recover up to 50 percent of its construction costs from project revenues during the demonstration period.

In January 1982, 3-1/2 years after its initiation, DOE, PNM, and Union decided to terminate the project. Union has completed its closeout activities on the project, and PNM activities are complete except for its disposal of powerplant equipment purchased for the project. Total costs incurred by all three participants are about \$70 million. DOE's share of this cost is \$44.8 million

while the Union and PNM share is \$22.5 million and \$2.9 million, respectively.

PROJECT TERMINATED DUE TO INABILITY
TO OBTAIN SUFFICIENT GEOTHERMAL STEAM
TO OPERATE POWERPLANT

The Baca geothermal project was terminated because sufficient geothermal steam needed to operate the project's powerplant could not be obtained. While adequate steam supplies from the Baca reservoir were believed to be obtainable, unexpected problems with the reservoir limited steam production to levels far below those required to run the powerplant.

In order for the Baca geothermal project to be successful, approximately 900,000 pounds of steam per hour, at a pressure of 125 pounds per square inch, were needed to operate the powerplant's turbine. At the inception of the project, the needed steam had not yet been obtained; however, the participants believed that little risk existed in obtaining this amount of steam from the reservoir. The reservoir is located in an ancient, collapsed volcano and consists of fractured underground rock containing hot geothermal fluids of temperatures near 600 degrees Fahrenheit. Both Union and the U.S. Geological Survey estimated that the Baca reservoir contained substantial amounts of geothermal steam. Union had been conducting geothermal drilling activities at the reservoir since 1971 and, based on the information obtained from these drilling activities, Union estimated that it contained enough steam to supply 400 megawatts of generating capacity. U.S. Geological Survey estimates of the reservoir potential were even higher. It estimated in 1978 that the reservoir could provide steam for as much as 2,700 megawatts of generating capacity. Further, Union activities prior to the start of the project had already obtained about one-third of the steam needed to operate the powerplant. Four successful wells had been drilled, producing 320,000 pounds of steam per hour at sufficient pressure, and an estimated 10 more successful wells producing an average of 60,000 pounds of steam per hour were needed to provide the remaining steam to operate the powerplant.

However, once the project started, the participants had little success in obtaining additional steam. Between June 1980 and April 1981, Union drilled 12 wells (including redrills of problem wells), but steam production increased only marginally. Only one of these wells, producing 30,000 pounds of steam, was successful. The other wells either did not produce steam of sufficient pressure, or, as in one case, produced sufficient high-pressure steam, but it plugged up and had to be abandoned. Consequently, by April 1981, a total of only 350,000 pounds of steam per hour had been obtained, far short of the 900,000 pounds needed to operate the powerplant.

Because little additional steam was found, DOE stopped all efforts in April 1981 and established an independent team to review the reservoir data and drilling plans. DOE, Union, and PNM decided in May 1981 on a new drilling plan to locate more steam and to increase the production of existing wells. This drilling was to be completed by December 1981. During this 8-month period, three wells were drilled to deeper depths to determine if steam was more abundant at lower levels, and one well was hydraulically fractured⁴ in an attempt to stimulate steam production. However, these efforts were not successful. In addition, one producing well was lost due to problems with the well casing, which reduced the amount of steam obtained to 268,000 pounds per hour. Consequently, the project participants met and decided in January 1982 that the project was no longer viable and should be terminated.

According to DOE officials from its geothermal program and San Francisco Operations Office, and reports on the project prepared by Union and DOE's Lawrence Berkeley Laboratory, the inability to obtain the steam needed to operate the plant was the result of problems with the permeability⁵ of the Baca reservoir and the difficulty of drilling in the reservoir. While the early, pre-project success of Union in locating steam indicated that there were no major barriers to obtaining the additional steam for the project, subsequent drilling showed that the reservoir had low permeability. Although steam was produced in many of these unsuccessful wells, it was not of sufficient amounts and pressure to enable it to be used for operating the turbine. Subsequent Union tests on the Baca reservoir have shown it to be about one-third to one-twentieth as permeable as other known hydrothermal reservoirs.

Additionally, drilling in the Baca reservoir proved difficult and expensive. Due to the hard rock and low reservoir pressure, which prevented the use of standard drilling fluids, drilling at the project encountered numerous problems, such as stuck or broken drill pipe or collapsed drill-holes. According to the Lawrence Berkeley Laboratory report, drilling problems were encountered in

⁴A process in which fluids are pumped under high pressure into a well in order to induce additional fractures in the surrounding rock. These additional fractures may intersect existing fractures containing geothermal fluids and thereby increase steam production. One other well was hydraulically fractured earlier in the project.

⁵Permeability relates to the fractures in the rock through which geothermal fluids flow. The number and size of the fractures determine the extent of the reservoir's permeability, and the more permeable the reservoir, the better it can produce the steam needed to operate a geothermal powerplant.

over 70 percent of the wells, and 29 percent of the wells were lost during the well drilling and completion process. The cost of drilling a well averaged about \$1.6 million, considerably more than the expected cost of about \$1 million per well, and including the deep drilling attempts, costs were rising to \$2 million to \$3 million per well.

Representatives of all the participants in the project agreed that the Baca reservoir is more complex than originally believed and that the extractable energy potential of the reservoir is now uncertain. Union and PNM representatives stated that they still believe that sufficient steam exists in the reservoir to operate a geothermal powerplant, and that development may proceed in the future as more is learned about extracting geothermal energy. However, representatives of the Lawrence Berkeley Laboratory who studied the results of the drilling activities expressed doubt over whether the area of the Baca reservoir that was to be used on the project could ever support the planned powerplant. They stated that this reservoir area does not appear to have the capacity to support a 50-megawatt powerplant for its expected 30-year operating life.

DOE geothermal program officials stated that, based upon the data available at the start of the project, the problems with the Baca reservoir were not expected and the results were very disappointing. The officials believe all prudent efforts to locate the steam were undertaken, and the decision to terminate the project was the only action possible when the steam could not be obtained. They added that, because of the steam problems, the project never achieved its stated objective of demonstrating the economical and environmentally acceptable production of electricity from hydrothermal resources.

DOE'S COST SHARE WAS DISPROPORTIONATE DUE TO EARLY POWERPLANT EXPENSES

While the cost of the Baca geothermal demonstration project was intended to be equally shared, DOE paid the majority of the project costs. DOE's costs on the project were high because of the substantial powerplant-related costs which were incurred before the steam production problems were realized. These costs were paid primarily by DOE due to provisions of the project's cooperative agreement, which placed many of DOE's powerplant costs first, and DOE's decision to pay additional powerplant costs in order to prevent a delay in the project schedule.

At the time of the Baca geothermal project's termination, over \$70 million had been spent on the project. Most of these funds were for wells and steam production activities, whose costs were equally shared with Union, and a small amount was spent

for data collection, which was DOE's cost responsibility. DOE spent over \$24 million on these activities. However, a substantial amount of funds--over \$23 million--were spent on early powerplant-related costs before the steam production problems were realized, and \$20 million, or 88 percent, of these costs were paid by DOE. As a result of its payments for the powerplant costs, DOE paid a higher than expected share of the total project costs, as shown in the following table.

DISTRIBUTION OF BACA GEOTHERMAL
PROJECT COSTS

	<u>Wells & Steam Production</u>		<u>Powerplant</u>		<u>Data Collection</u>		<u>Total</u>	
	<u>Cost</u>	<u>Percent</u>	<u>Cost</u>	<u>Percent</u>	<u>Cost</u>	<u>Percent</u>	<u>Cost</u>	<u>Percent</u>
DOE	\$22.9	50.4	\$20.4	87.6	\$ 1.5	100.0	\$44.8	63.8
Union	22.5	49.6	-	-	-	-	22.5	32.1
PNM	-	-	2.9	12.4	-	-	2.9	4.1
Total	\$45.4	100.0	\$23.3	100.0	\$ 1.5	100.0	\$70.2	100.0

According to DOE geothermal program officials, when the project's construction schedule was established in 1979 it was believed the project had little risk and the early initiation of powerplant activities would be beneficial. Concurrent development of the powerplant and the well field was expected to keep costs at projected levels by reducing the construction timeframe and thus the impact of inflation. Also, concurrent development was intended to allow the project to operate at an earlier date and achieve its demonstration objectives sooner. Consequently, expenses for items such as plant design and engineering, site preparation, and the purchase of the plant's turbine generator and other long lead time items, were incurred before the steam problems were realized.

DOE paid the majority of these costs due to provisions of the project's cooperative agreement and its decision to pay additional costs to prevent a project delay. Under the terms of the cooperative agreement, DOE was responsible for early, non-equipment powerplant costs. While DOE and PNM were to share the powerplant costs on an approximately equal basis by the end of the project, specific powerplant cost elements were designated the responsibility of either DOE or PNM. DOE's powerplant costs related to non-equipment and consumable items that would normally be incurred

early in a project. Consequently, DOE was responsible for most of the early powerplant costs such as powerplant design and engineering and site preparation. DOE's costs on these items totaled over \$12 million before the project was terminated.

Further, DOE paid additional powerplant costs which were to have been paid by PNM. PNM was responsible for the project's long lead time powerplant equipment, such as the turbine generator, steam condensor, and structural steel, and was to purchase this equipment once it obtained a Certificate of Public Convenience and Necessity from the New Mexico Public Service Commission. An environmental impact statement was needed to obtain the certificate, and DOE agreed, in the cooperative agreement, to issue the project's environmental impact statement by August 1979 so that PNM could obtain the certificate and begin procuring this equipment in late 1979 and early 1980. However, DOE was unable to complete the environmental impact statement process until May 1980-- nine months later than planned. According to DOE geothermal program officials, this was due to unexpected delays in obtaining and analyzing data needed to develop the statement, additional environmental issues, and the complexity of the environmental impact statement process. As a result, PNM could not procure the long lead time equipment in the planned time frame, and the project was falling behind schedule. Project costs were expected to increase by \$1 million for each month the project fell behind schedule, and these cost increases would be DOE's responsibility since they were the result of a DOE delay.

In order to maintain the project schedule and to keep its costs from increasing, DOE agreed to fund the purchase of the long lead time equipment for PNM. In a December 1979, modification to the cooperative agreement, DOE agreed to pay \$8 million towards this equipment cost, with PNM to reimburse DOE when the necessary certificate was obtained. However, the certificate was not obtained by PNM before the steam problems were realized and the project terminated. Therefore, PNM is not required to reimburse DOE for these costs in accordance with the cooperative agreement provision.

In discussing the project costs with DOE geothermal program officials, they agreed that DOE's costs were higher than the other participants due to its expenditures on the powerplant. The officials stated that DOE took a risk in incurring these costs early in the project; however, this risk was perceived as low due to the high regard then held for the Baca reservoir. The officials pointed out that, had the steam been obtained, the cost levels would have been maintained and the project would have started operating on schedule because of the early initiation of powerplant activities, and the cost sharing would have evened out over the course of the project. They further stated that the

steam problems and termination just happened to occur at a time when DOE was most vulnerable to absorbing most of the cost burden.

The geothermal program officials added that the powerplant blueprints and equipment, which cost a total of about \$12 million, have yet to be disposed of, and the proceeds from their sale will reduce DOE's costs. DOE is to receive 88 percent of the proceeds from the sale of these assets. Bids for the blueprints and equipment have been solicited, and while no satisfactory offers have yet been received, DOE officials are confident that more than half of this \$12 million cost can be recovered.

OBSERVATIONS

The termination of the Baca geothermal demonstration project appears to have been unavoidable. Information available at the time the project was initiated did not disclose any potential problems with the Baca reservoir. All the project participants and technical experts we talked with and reports on the project we reviewed indicated that the ensuing efforts to locate adequate geothermal steam were reasonable. Further, the project has been closed out, except for the final disposal of powerplant assets, and there does not appear to be any additional measures that DOE could have taken to terminate the project sooner or to reduce its project costs.

However, officials from DOE's geothermal program and its Office of Project and Facilities Management pointed out that there are lessons that can be learned from DOE's experience on this project.

--When dealing with geothermal energy projects, or other projects in which the availability of the energy supply is a crucial and unknown factor, strong emphasis should be given to developing the energy supply before major financial commitments are made towards other project activities, such as powerplant procurement and construction. We agree with this lesson. Emphasis on developing the energy supply, to the point where its availability is assured, is a financially prudent course of action, particularly when considering the research and development nature of these projects. There are usually substantial risks to demonstration-type projects, hence the need for Federal involvement, and a more logical project progression which emphasizes energy resource development first would reduce Federal risks by assuring that the needed energy supplies do indeed exist before further financial commitments are made. While we recognize that there are benefits to getting projects in operation as soon as possible, this must be carefully weighed against the potential for large financial losses.

--When negotiating future cost-sharing agreements with project participants, DOE should strive to have costs borne equally by DOE and other project participants throughout all phases of the projects. Again, we agree that this is a valuable lesson to be learned. While the cost of the Baca project was to be equally shared, the early financial risk was placed mostly on DOE, and consequently, when the project was terminated, DOE had the greatest financial losses. Future cost-sharing agreements should equalize risk by requiring matching contributions from the start of the project. Such a requirement on the Baca project would have reduced DOE's losses, since it would have limited DOE's powerplant costs to an amount equal to PNM's.

These officials added that actions are being taken so that problems such as those that occurred with the Baca project will no longer occur. For example, they stated that, on a second geothermal project⁶ which DOE is undertaking, sufficient geothermal fluid supplies are better assured and the cost sharing on the project requires dollar-for-dollar matching cost contributions by DOE and the other project participants. These DOE officials said that it should be recognized that DOE is currently directing its activities away from demonstration-type projects, and that there will be fewer projects upon which these lessons can be applied. Nevertheless, on any future projects, more caution and less DOE risk will be encouraged.

AGENCY AND PROJECT PARTICIPANTS' COMMENTS AND OUR EVALUATION

A draft of this report was provided to DOE, Union, and PNM for review and comment. DOE did not provide written comments on our draft report. Union agreed with the factual basis of the report and provided comments of an editorial nature which we incorporated in the report as appropriate.

PNM, in its comments, did not take issue with the draft report but did state that it was not very comprehensive considering the efforts expended by the participants to complete the

⁶DOE's second geothermal project, in Heber, California, is also a 50-megawatt electric powerplant. This project differs from the Baca project in that it employs a binary cycle technology which uses the geothermal fluids to heat a secondary working fluid that in turn operates a turbine. According to DOE officials, the hydrothermal reservoir to be used by this project is composed of permeable sandstone with much more predictable performance than that of the Baca reservoir.

project. PNM also stated that approximately 40 percent of the steam requirement was achieved by Union at the point of project termination. Further, PNM contended that its project costs were approximately \$1 million higher than the amount identified in the report.

With regard to the comprehensiveness of our report, we agree that more detail could be provided on the actions taken by the participants on this project; however, our review was limited to the issues we were requested to examine, and in our view, additional detail on the participants' efforts would not shed further light on the reasons for the project's termination and DOE's financial losses. PNM's comment that approximately 40 percent of the steam needed was achieved does not accurately reflect the situation at the time of termination. While that amount was achieved at one point during the project, Union documents state that a lesser amount (268,000 pounds per hour, or approximately 30 percent of the steam requirement) was available at the project's termination. We note that Union did not disagree with the steam production amounts stated in the report. As to PNM's contention that its costs were \$1 million higher, the only costs we included were those incurred under the project's cooperative agreement. The additional costs identified by PNM were preproject and financing expenses, and these were not included as project costs under the cooperative agreement. We do not believe that it would be appropriate to include these additional PNM project costs unless we were to obtain costs incurred outside the cooperative agreement provisions by DOE and Union. PNM also provided comments of an editorial nature which we incorporated in the report.

OBJECTIVES, SCOPE, AND METHODOLOGY

The objectives of our review were to determine (1) the history of the Baca geothermal demonstration project; (2) the reasons for the termination of the project, the efforts made to prevent its termination, and whether the project could have been terminated earlier to save funds; and (3) the amount of funds expended by DOE and the industry participants on this project under the cooperative agreement, the justification for these expenditures, and any actions which may have increased DOE costs.

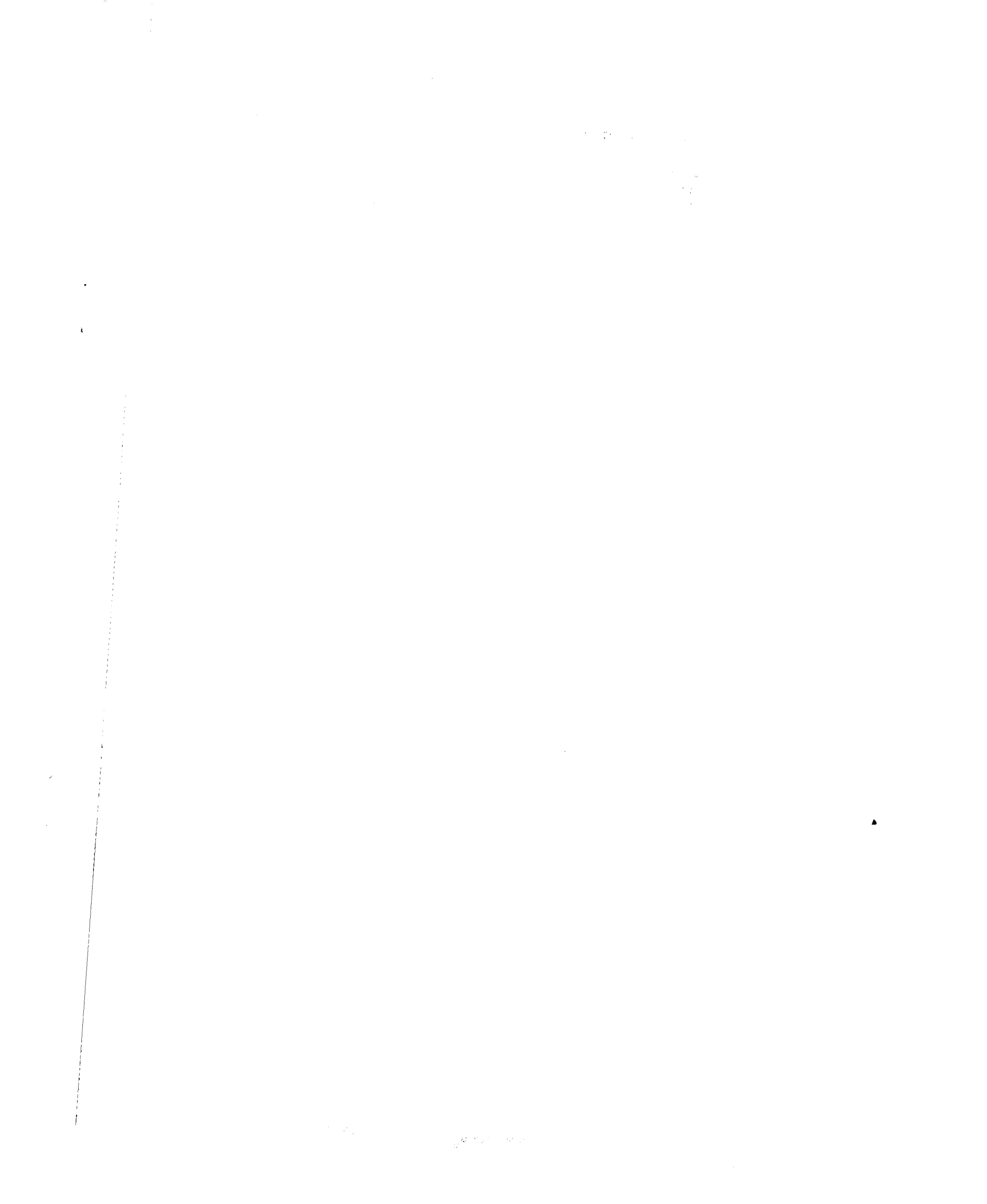
To satisfy these objectives, we obtained information relating to the project at DOE headquarters in Washington, D.C. and at DOE's San Francisco Operations Office in Oakland, California. We interviewed DOE headquarters officials responsible for geothermal energy activities and for initiating and terminating the demonstration project. We also discussed the management of the project with officials from DOE's Office of Project and Facilities Management, and the legal aspects of DOE's funding of the project with an official from DOE's Office of General Counsel. Further, we interviewed officials from DOE's San Francisco Operations Office who were responsible for the day-to-day project management and the disbursement of project funds, and who are implementing the actions necessary to effect the project's termination. We limited our examination to costs and activities included under the project's cooperative agreement between DOE and the industry participants, and as such we obtained and reviewed the cooperative agreement and its modifications, the project proposal, project plans and charters, DOE and industry progress reports, miscellaneous correspondence, and various documents related to the project's termination and the disposal of project assets.

In addition, we discussed the project with representatives of the industry participants--the Public Service Company of New Mexico and the Union Oil Company of California--to obtain their perspective, and we visited the project site to verify the current status of the project and of the geothermal activities at that location. We also discussed the project and the causes of its termination with officials of the Electric Power Research Institute and three utilities experienced in the development of geothermal resources for the production of electricity.

Except as noted above, our review was performed in accordance with generally accepted government audit standards. Our examination was conducted from December 1982 to April 1983.

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