

GAO

Report to the Chairman, Subcommittee
on Oversight and Investigations,
Committee on Energy and Commerce,
House of Representatives

August 1991

OIL RESERVE

Impact of NPR-1 Operations on Wildlife and Water Is Uncertain



144779

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**Resources, Community, and
Economic Development Division**

B-243258

August 1, 1991

The Honorable John Dingell
Chairman, Subcommittee on Oversight
and Investigations
Committee on Energy and Commerce
House of Representatives

Dear Mr. Chairman:

In response to your request, we reviewed the basis for the disagreements between the Department of Energy (DOE) and Argonne National Laboratory (Argonne), Argonne, Illinois—a laboratory operated for DOE—relating to Argonne's development of a supplemental environmental impact statement (SEIS) for Naval Petroleum Reserve No. 1 (NPR-1) near Bakersfield, California. Specifically, we reviewed the DOE Naval Petroleum Reserves-California (NPRC) and Argonne positions on what impacts NPR-1 operations have had on endangered species and ground water quality during the past decade and how the associated uncertainties would be discussed in the SEIS. We also reviewed whether NPR-1 was in compliance with selected environmental laws and regulations governing endangered species, wastewater¹ disposal, and historic preservation activities.

Results in Brief

Preparation of the NPR-1 SEIS highlighted the uncertainties of the impacts of NPR-1 operations in the 1980s on an endangered species—the San Joaquin kit fox—and on the quality of ground water. Argonne concluded in its draft SEIS that NPR-1 operations could not be ruled out as contributing to the decline of the fox population at NPR-1. It also concluded that wastewater disposed of at NPR-1 potentially could contaminate nearby ground water. Because of the lack of definitive data, DOE-NPRC staff do not believe either Argonne position is justified. In September 1990 DOE-NPRC notified Argonne that DOE would prepare the final SEIS. It is unclear to what extent Argonne's data and views will be reflected in the document. However, DOE and others are conducting research that could provide additional data in future years on the factors affecting the fox population and wastewater migration.

NPR-1 operations may have violated the Endangered Species Act, according to Fish and Wildlife Service representatives. In addition, NPR-1

¹Brackish water, which may contain other suspended solids, separated from crude oil.

operations did not comply with the National Historic Preservation Act regulations and possibly violated California wastewater disposal requirements. These problems occurred because of poor management controls and misunderstandings of federal and state requirements on the part of DOE-NPRC officials. Noncompliance with these requirements can result in legal action, fines, and even a possible shutdown of NPR-1 operations until compliance is achieved. The Department of the Interior's Fish and Wildlife Service had an investigation under way to determine if prosecution is warranted for possible endangered species violations. Although DOE is now taking action to address these possible problems, unless DOE improves its management controls, similar problems may occur at NPR-1 in the future.

Background

Since 1976 the production and sale of crude oil, natural gas, and other products from NPR-1, which comprises about 74 square miles, have generated over \$13 billion in federal revenues. NPR-1 is a long-term, joint operation between DOE and Chevron U.S.A., Inc.² The government owns about 78 percent of NPR-1 and Chevron owns about 22 percent. Under a 1944 contract, each has equal say on operational decisions. EG&G Energy Measurements, Inc. (EG&G), is DOE's wildlife research contractor at the reserve, and Bechtel Petroleum Operations, Inc. (Bechtel), is the day-to-day operator.

DOE published an environmental impact statement (EIS) in 1979 covering proposed increased development and anticipated environmental impacts at NPR-1. National Environmental Policy Act regulations require the preparation of an EIS when major federal actions are planned that might affect the environment. An SEIS can be prepared when planned actions go beyond those covered in the original EIS and/or additional data become available on pertinent issues. In 1987 DOE determined that the 1979 EIS did not fully reflect actual development at the reserve. In addition, officials were considering making technical changes to increase oil production that could have a greater impact on land and wildlife habitat than the impacts outlined in the 1979 EIS. As a result, in 1988 DOE contracted with Argonne to draft an SEIS to update the EIS.

Both an EIS and SEIS can assist others, including federal and state agencies with environmental management responsibilities. For example, after reviewing a draft of the 1979 EIS for NPR-1, the Fish and Wildlife

²The Department of the Navy was responsible for NPR-1 operations until October 1977 when, pursuant to the DOE Organization Act, that responsibility transferred to DOE.

Service requested that DOE consult with it about the impact of the proposed development on the endangered species at NPR-1. The NPR-1 endangered species research and wildlife management program that began in 1979 was the result of those consultations. Between 1979 and 1990 DOE spent over \$9 million for research and wildlife management activities. DOE budgeted about \$2 million for those activities in fiscal year 1991. (See app. I for additional details.)

DOE and Argonne Disagreed on NPR-1's Environmental Impacts

DOE-NPRC and Argonne staffs disagreed about how the SEIS should describe the effects of NPR-1 operations on the endangered San Joaquin kit fox³ at NPR-1 and on nearby ground water. The disagreements were due primarily to the lack of definitive data on each subject. In September 1990 DOE-NPRC notified Argonne that DOE would prepare the final SEIS. It is unclear to what extent Argonne's data and views will be reflected in the document. However, DOE and others are conducting research that could provide additional data in future years on the factors affecting both the fox population and wastewater migration.

Impacts on the Kit Fox

Between 1987 and 1989 the minimum known number of foxes living free within NPR-1's study area remained within a range of 44 to 58—down from 164 in 1981. Researchers have identified various possible reasons for the fox population's decline, including natural causes (such as drought, predation by coyotes, and cyclical population variations), and impacts caused by oil field operations (such as deaths due to vehicular traffic).

A major disagreement between Argonne and NPR-1 staffs centered on whether there was sufficient evidence to support conclusions in the SEIS that NPR-1 operations might be partly responsible for the fox population's decline. Argonne concluded in its three SEIS drafts that NPR-1 oil field operations could not be ruled out as partly contributing to the decline. Argonne also concluded that the current NPR-1 fox population was so low that it might completely disappear from NPR-1 in the near future (although a new population might be established later). DOE-NPRC

³The Endangered Species Act of 1973, as amended, provides for identification and protection of plants, mammals, birds, and invertebrates whose survival, as a species, is in jeopardy. The Fish and Wildlife Service administers the law. Three mammal and one reptile species found at NPR-1 are listed as endangered—the San Joaquin kit fox and the blunt-nosed leopard lizard (both designated in 1967), the giant kangaroo rat (designated in 1987), and the Tipton kangaroo rat (designated in 1988). One threatened plant species—Hoover's woolly-star—has been found at NPR-1, and some endangered plant species might exist there.

officials did not believe that the SEIS should conclude that NPR-1 operations might have contributed to the fox population's decline in the absence of specific conclusive evidence linking operations to the decline. DOE-NPRC's position was supported by associated NPR-1 staffs—from Chevron, EG&G, and Bechtel—who reviewed Argonne's drafts. (See app. II for details.)

An NPR-1 research study may provide clarifying information when it is completed. In 1987 DOE and Chevron began funding an Oak Ridge National Laboratory study to help determine whether NPR-1 operations could have direct or indirect toxic effects on the foxes. The study was to (1) identify oil field materials that might be toxic to the fox and (2) determine if such materials available to the fox either directly or through its food could adversely affect the population in the short or long term. The study's completion has been delayed due to problems in carrying out the research.

Wastewater Disposal Impacts on Ground Water

Large volumes—up to 100,000 barrels (4.2 million gallons) daily—of wastewater from NPR-1 operations, containing salts and other chemicals, were disposed of via NPR-1 surface pits known as sumps, wastewater injection wells, and disposal wells during the 1980s. While Argonne was preparing the draft SEISS, its staff and NPR-1 staff disagreed about whether some of this wastewater could come into contact with and contaminate ground water off-site in the San Joaquin and Buena Vista Valleys.

Argonne staff came to two conclusions. First, during the 1980s some sumped and disposal well wastewater may not have been trapped by impermeable geological layers that would prevent those waters from degrading ground water aquifers used for human and agricultural consumption. Second, the amount of wastewater sumped was large enough to saturate the immediate area so that additional sump discharges would seek percolation routes away from the disposal area and potentially contaminate ground water. DOE-NPRC's response to Argonne's November 1989 SEIS draft suggested that contamination from the continuation of sumping and wastewater disposal would probably be negligible. In this regard, some NPR-1 staff believe the sediment at NPR-1 is so moisture deficient that wastewater would be retained within the oil field boundaries. However, a DOE-NPRC official told us in a May 1991 meeting that there was some disagreement among NPR-1 staff on the potential for wastewater to contaminate ground water.

The disagreement between DOE-NPRC and Argonne is at least partially attributable to the fact that specific data on NPR-1 wastewater migration do not exist. For example, NPR-1 has no monitoring wells along its perimeter, and relatively few other wells are near the perimeter disposal well and sump locations. Thus, we believe that NPR-1 records may not provide a complete geologic picture of perimeter sediments. (NPR-1 well records with a geologic description of the first few hundred feet of sediments could help determine whether these sediments include impermeable layers to block wastewater migration to ground water.) In addition, although well data at NPR-1 can be used to measure salt concentrations, they are insufficient to establish pollutant levels for other chemicals. (See app. III for additional details.)

Argonne and NPR-1 staffs do agree on the current low potential for negative impacts on ground water use due to wastewater contamination because few water wells are close to NPR-1. However, the California Department of Water Resources expects to drill additional water wells near NPR-1 within 5 years when it implements a second development phase of the 20,000-acre Kern Water Bank section to the east of NPR-1, according to a departmental representative. This water bank section is intended to eventually supply agricultural water needs.

DOE Is Completing SEIS Without Argonne Involvement

In September 1990 DOE-NPRC formally notified Argonne that DOE would complete the subsequent SEIS draft. DOE's basis for the action was that additional revisions, if necessary, would be relatively easy to make, that Argonne and DOE technical staffs were near agreement on all substantive issues, and that the action would save DOE time and money. However, both DOE-NPRC and Argonne officials told us that the disagreements described above between DOE and Argonne on NPR-1's impact on the fox population and ground water quality remained unresolved. Because DOE-NPRC was still revising the SEIS draft in early May 1991, it was unclear to what extent Argonne's views would continue to be reflected in the DOE-NPRC SEIS draft. In May 1991 DOE-NPRC officials told us that they were adding material that indicated divergent views on some subjects, such as the impact of NPR-1 operations on the kit fox. They said that they were also revising Argonne statements that DOE believed were conclusionary to provide a balanced presentation for SEIS readers' use in making up their minds on potential impacts. They subsequently informed us that they had forwarded a draft to DOE headquarters on May 9, 1991, for review.

Actions Under Way and Planned May Help Resolve the Uncertainties

Ongoing and future research could provide additional information on whether and to what extent oil field operations have contributed to the fox population's decline. In addition to the research carried out by EG&G at NPR-1 and the Oak Ridge National Laboratory toxicology study, three other studies may provide information that could be useful in determining the causes of the fox population's decline at NPR-1. These studies are being funded by the California Energy Commission, the Smithsonian Institution, and the U.S. Army. They will examine the following issues relating to kit fox populations in other parts of the San Joaquin Valley: the impact of oil development on kit foxes, the relationship between the kit fox and the coyote, and the effect of military tank exercises on the fox, respectively. Some wildlife biologists told us that the lack of recent information on factors affecting other kit fox populations in the southern San Joaquin Valley hampers drawing conclusions on the fox population at NPR-1. Therefore, these studies could help fill that void.

In addition, DOE-NPRC has taken action to improve oversight of its wildlife research and management program. In late 1988 DOE-NPRC established an Endangered Species Advisory Committee that included biologists employed by Chevron, EG&G, Bechtel, the California Department of Fish and Game, and the Fish and Wildlife Service.⁴ This committee has provided additional expertise on the endangered species program and improved communication with state and federal environmental agencies, according to participants. Thus, it could enhance research efforts relating to the kit fox.

DOE and Chevron have also taken action to improve NPR-1 wastewater disposal practices since 1985, including closure or lining of several sumps to eliminate possible sumping over usable ground water. They are also constructing a system to use more wastewater in oil production; the system's objective would be to eliminate wastewater disposal wells in the shallower geological layers. Also, with DOE's and Chevron's approval, a subcontract task began in July 1990 (1) to develop by February 15, 1991, a ground water monitoring program that would demonstrate compliance with DOE Order 5400.1 and applicable federal, state, and local laws and regulations and (2) to assess available data from NPR-1 on the potential for contamination. The subcontractor anticipated that this task would involve research and analysis of all wastewater disposal regulations pertinent to NPR-1. As of May 1, 1991, Bechtel was reviewing the resulting report, according to a DOE-NPRC official.

⁴In October 1990 the California Energy Commission began participating also.

DOE-NPRC Has Not Fully Complied With Environmental Requirements

DOE has not ensured that NPR-1 operations comply with the Endangered Species Act and the National Historic Preservation Act's regulations. Also, Argonne concluded in its June 1990 draft SEIS that NPR-1 operations had violated California wastewater disposal requirements for sumping. DOE officials did not believe that the requirements had been violated, and the state had not made a determination. Some of the problems occurred, in part, because DOE-NPRC officials were not fully familiar with environmental requirements affecting the reserve and/or did not coordinate in a timely manner with federal and state agencies having environmental responsibilities, although contractors had brought the compliance questions to the attention of DOE-NPRC staff.

DOE-NPRC officials are taking action that addresses the three specific situations. However, the Fish and Wildlife Service's investigation concerning the death of an endangered kit fox as a result of NPR-1 operations was still under way in early May 1991. (See app. IV for details.)

Endangered Species Act Compliance

DOE may have violated provisions of the Endangered Species Act in July 1990, according to Fish and Wildlife Service officials, when a fox pup died as a result of NPR-1 operations 9 months after the September 30, 1989, expiration of DOE's "incidental take authorization" for NPR-1 (issued under section 7 of the act). Under this authorization, if an endangered species is accidentally killed or wounded in connection with agency operations, the agency is not considered to be in violation of the act provided that the agency has complied with other terms and conditions imposed by the Service. If an endangered species is harmed due to agency operations when the agency does not have an authorization, the Fish and Wildlife Service can prosecute an agency or its staff for violating the act. Penalties for each violation range up to a \$50,000 fine and a year in jail.

In March 1990 EG&G staff brought to DOE's attention the incidental take authorization's expiration and the need for an extension. DOE-NPRC officials wrote to Fish and Wildlife Service officials on April 17, 1990, that they were requesting an extension of the incidental take authorization and that they originally had planned to have the SEIS available in time to be used as the basis for an assessment needed to obtain a new authorization from the Service. On May 4, 1990, the Service's Sacramento Field Office Supervisor advised the Director of NPRC that the Service could not extend the old authorization or re-authorize NPR-1's incidental take authorization until DOE formally consulted with the Service—a process that would take several months.

With respect to obtaining a new authorization from the Service, DOE officials informed the Service on July 20, 1990—8 days after the dead pup was found—that NPR-1's biological assessment would be submitted in February/March 1991 concurrent with the release of the NPR-1 draft SEIS.

In May 1991 a Service representative said that DOE was considering alternate plans to complete the consultation process, in view of the delays in publishing the SEIS. In addition, in September 1990 Service officials referred information on the kit fox that died in July to their Division of Law Enforcement—the initial (routine) step in the enforcement process for violations of the Endangered Species Act. In early May 1991 a Fish and Wildlife Service special agent advised us that the possible endangered species violation was still under investigation to determine if prosecution should be recommended. A DOE-NPRC official said that as of May 1, 1991, the reserve had not been notified by the Service that it considered the fox's death a violation, and this particular fox pup may have been covered by EG&G's scientific research permit.

National Historic Preservation Act Compliance

DOE did not consult with the California State Historic Preservation Officer before undertaking development at NPR-1, as required under the National Historic Preservation Act's regulations, according to an official in the California Office of Historic Preservation. The act and regulations give the federal Advisory Council on Historic Preservation and state historic preservation offices the opportunity to comment on proposed development that may affect historic properties and to take steps to protect such properties.⁵ DOE-NPRC officials had not understood the consultation requirements of the act and its accompanying regulations—consultation is required before construction begins even if the site is not known to contain historic properties. Construction, such as well pads and roads, has taken place at scattered locations on NPR-1 in the past decade.

Before beginning construction, the agency is required to document that no historic properties were identified, or determine the effect of its action on any property that was discovered and seek ways to mitigate any possible adverse effects to the historic property that could result from the proposed action.

⁵"Historic property" means any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places.

Before 1988 DOE-NPRC officials assumed that NPR-1 operations complied with the act. A former DOE official, responsible for compliance with the act between January 1985 and December 1987, stated that on the basis of discussions with State Office of Historic Preservation staff, it was his understanding that the act required DOE to consult with the state historic preservation officer only if a historic site was discovered on NPR-1.⁶

In 1990 DOE took actions that will, when completed, bring it into compliance with the National Historic Preservation Act. In August 1990 DOE-NPRC transmitted to the state office a schedule of activities required to complete a management plan in July 1991, a step preceding completion of a programmatic agreement that would cover all anticipated construction sites and how any discoveries would be handled. The state office recommended that DOE-NPRC prepare a detailed cultural resources survey of areas on NPR-1 that are affected, and will be affected, by oil operations, as well as a sample survey of other areas not affected by oil operations. Upon completion of the cultural resources survey and the management plan, DOE should negotiate a programmatic agreement with the state office that will cover the entire NPR-1 and will include contingency plans for handling new discoveries of historic properties, according to a state office official. The state Office of Historic Preservation archaeologist responsible for NPR-1 told us that the office has no plans to take action against DOE for past and current noncompliance with the act because (1) DOE's operations at NPR-1 did not appear to have adversely affected any historic properties and (2) it was satisfied with DOE's progress toward meeting the consultation requirements.

State Wastewater Disposal Requirements

During the 1980s DOE may not have met California regulations governing the quality and quantity of wastewater that could be sumped in certain types of sediments at NPR-1. Argonne concluded in its June 1990 draft SEIS that wastewater sumping operations at NPR-1 had not been in compliance with a waste discharge permit issued in 1958 by a California regional water quality control board. DOE-NPRC officials did not believe that the permit's requirements had been violated. The state had not made and was not planning to make a determination. Disposal of wastewater byproducts from oil production operations is governed by both federal and state laws and regulations, depending on the disposal

⁶While NPR-1 contains some archaeological information concerning the southern San Joaquin Valley, no known unique historic properties are contained there, although the area was used for temporary camps and transit before the mid-1800s by Native American groups. It has been used for oil production since the early 1900s.

method. The laws and regulations proscribe contamination of water suitable for human and agricultural use. Wastewater disposal wells and unlined sumps—open pits on the surface—are of special regulatory interest because both result in wastewater percolation through sediments.

In 1958 a California regional water pollution control board issued a permit to the operators of NPR-1 governing the operation of wastewater sumps at the reserve. The permit required that wastewater not be sumped onto alluvial soil—sediments deposited by flowing water—or above usable ground water, if the wastewater contained more than 1,000 parts per million of total dissolved solids, 175 parts per million of chlorides (salts), or 2 parts per million of boron. The current board has generally not taken action against oil field operators who sump in emergency situations that do not meet the requirements. When the Board determines that violations have occurred, it can close the sumps that are not in compliance.⁷

Subsequently, the California Regional Water Quality Control Board adopted for the general geographical area the Water Quality Control Plan Report—Tulare Lake Basin in July 1975 and amended it in 1982. The plan generally provides that wastewater sumping be controlled so as to not substantially affect ground water quality. The plan contains limits on total dissolved solids, chlorides, and boron similar, but not identical, to those in the 1958 permit.

DOE-NPRC staff have acknowledged that some wastewater at NPR-1 was disposed of in unlined sumps located at least near alluvial soil. They also acknowledge that some of the wastewater has exceeded the limits for dissolved solids contained in the plan and the permit. Furthermore, DOE-NPRC contractor staff noted in 1985 that the amount of wastewater sumped at that time—6,800 barrels per day—may have been large enough and frequent enough to constitute “regular” sumping, which the regional board does not allow.

Staff of the California Regional Water Quality Control Board, Central Valley Region, told us that the Board had not requested data on NPR-1 wastewater sumping to determine whether or not DOE’s actions violated sumping requirements. Board staff also said that the Board had not

⁷Regulations of the California Oil and Gas Division also apply to NPR-1. The division has broad authorities under titles 14 and 26 of the California Code of Regulations. Division regulations require that unlined evaporation sumps, if they contain harmful wastes, not be located where they may come in contact with freshwater-bearing aquifers.

taken action due to insufficient staff and some uncertainty about its enforcement authority over a federal agency.

As noted above, DOE has taken steps to determine actions needed to comply with wastewater disposal regulations even though officials did not believe they had violated the requirements. Also, according to a DOE-NPRC official, by September 1990 the last of the sumps located on or near alluvial soil had been either lined or closed—a process begun in 1985.

Conclusions

Disagreements between DOE-NPRC and Argonne staffs aired questions concerning the impact of NPR-1 operations on the endangered fox population at NPR-1 and on nearby ground water. Because these disagreements were unresolved when DOE took over the preparation of the SEIS and DOE-NPRC has not completed the official SEIS draft, it is not clear how Argonne's views will be reflected in the SEIS that is published for comment.

DOE has not taken sufficient action to ensure that NPR-1 operations have complied with environmental laws and regulations governing endangered species, historic preservation, and wastewater sumping. Potentially, such noncompliance could result in fines, litigation, and even a possible court-ordered shutdown of NPR-1 operations. Several factors appear to have contributed to this situation, including an incomplete understanding by DOE-NPRC officials of environmental requirements affecting the reserve and the lack of timely action by DOE-NPRC officials in carrying out their environmental responsibilities. DOE-NPRC officials' actions to improve environmental compliance at NPR-1, when completed, should go a long way toward addressing the specific problems that occurred. However, continuing attention to environmental requirements must also be maintained to ensure that future violations do not occur.

Recommendation

To improve compliance at NPR-1 with environmental requirements, we recommend that the Secretary of Energy direct the Deputy Assistant Secretary for Naval Petroleum and Oil Shale Reserves to keep abreast of environmental requirements affecting NPR-1 operations by periodically reviewing pertinent environmental laws and regulations and coordinating with officials of cognizant state and federal agencies to ensure that both DOE and contractor staff comply with these requirements.

Our work focused on three of the topics covered in Argonne's June 1990 SEIS draft and in earlier drafts in March and November 1989: endangered species, wastewater disposal, and historic preservation (cultural resources). In reviewing the dispute between DOE-NPRC and Argonne on what impacts NPR-1 operations have had on endangered species and ground water, and how the associated uncertainties would be discussed in the SEIS, we reviewed various documents, including the first three SEIS drafts (all prepared by Argonne) and reviewers' comments. We discussed, as needed, comments on those drafts and related correspondence with DOE-NPRC, Argonne, the on-site contractors—Bechtel, EG&G, and Systematic Management Services, Inc.—and Chevron representatives.

To determine whether NPR-1 was considered to be in compliance with selected environmental laws and regulations governing endangered species, wastewater disposal, and historic preservation activities, we reviewed pertinent federal and state laws and regulations and discussed compliance issues with DOE, contractor, and federal and state agency staffs, including the Fish and Wildlife Service's Sacramento Field Office, the California Department of Fish and Game, the California Division of Oil and Gas, the California Regional Water Quality Control Board, the Kern County (California) Water Agency, and the California Department of Health Services. In addition, our senior geologist reviewed and analyzed geological, hydrological, and water quality data for the NPR-1 vicinity. Additional information on our scope and methodology is provided in appendix V.

We sought the views of representatives from DOE, Argonne, on-site contractors, Chevron, the Fish and Wildlife Service's Sacramento Field Office, and the California Department of Fish and Game on the facts discussed in this report and incorporated their comments where appropriate. As requested by your office, we did not obtain official agency comments on a draft of this report from DOE or others.

As arranged with your office, unless you publicly announce its contents earlier, we will make no further distribution of this report until 30 days from the date of this letter. At that time, we will send copies to the Secretary of Energy and other interested parties. Copies will also be made available to others upon request.

This work was done under the direction of Victor S. Rezendes, Director, Energy Issues, who may be reached at (202) 275-1441. Other major contributors to this report are listed in appendix VI.

Sincerely yours,



J. Dexter Peach
Assistant Comptroller General

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Abbreviations

CDF&G	California Department of Fish and Game
DOE	Department of Energy
EIS	environmental impact statement
GAO	General Accounting Office
FWS	Fish and Wildlife Service
NPR-1	Naval Petroleum Reserve No. 1
NPR-2	Naval Petroleum Reserve No. 2
NPRC	Naval Petroleum Reserves-California
SEIS	supplemental environmental impact statement
SHPO	State Historic Preservation Officer
SMS	Systematic Management Services, Inc.

NPR-1's SEIS and Participants' Roles in Its Preparation

In 1987 the Department of Energy (DOE) determined that a supplemental environmental impact statement (SEIS) should be prepared to assess the environmental impact of additional planned development at Naval Petroleum Reserve No. 1 (NPR-1). On the basis of its plans and public hearings in early 1988, DOE selected five alternatives to be evaluated with respect to environmental impact. These alternatives included the development DOE favored involving the expanded use of steamflood-enhanced oil recovery and four alternative development scenarios—using non-steamflood-enhanced oil recovery;¹ future development as planned, but without expansion of enhanced recovery; no future development; and selling the government's interest in NPR-1. DOE subsequently decided to drop the last alternative from the SEIS after the Congress did not act on the proposed divestiture legislation.² (See GAO Related Products.)

Argonne's June 1990 SEIS draft describes each of the remaining alternatives. It also describes the existing environment at NPR-1, including the geology and soils, waste generation and management, air and water resources, animal and plant life, cultural resources, land use, and socioeconomics (such as human population, income, and employment). The SEIS draft also identifies and discusses the potential risks associated with NPR-1 operations, such as oil spills. With those concerns as background, the draft discusses the environmental impacts of the remaining alternatives and draws conclusions. The SEIS draft also presents the preferred development alternative after environmental impacts are considered and the associated unavoidable adverse impacts such development would have on the environment.

Role of Participants in Developing SEIS

NPR-1 owners' representatives—DOE and Chevron U.S.A., Inc.(Chevron)—and several contractors had roles in compiling data for the SEIS and in reviewing and commenting on the several drafts of the SEIS.

¹Enhanced oil recovery at NPR-1 involves injecting steam or unheated water into petroleum-bearing rocks via special wells to displace the oil and move it to production wells.

²In 1990 DOE was exploring leasing the government's interest in NPR-1, but the leasing proposal did not contain sufficient detail to permit analysis of the possible impacts in Argonne National Laboratory's (Argonne) June 1990 SEIS draft.

DOE

The Director of Naval Petroleum Reserves-California (NPRC) represents DOE in administering the daily operations of NPR-1.³ After determining that an SEIS was needed, DOE-NPRC had overall responsibility for its completion. DOE-NPRC staff obtained a proposal for preparing the SEIS drafts from Argonne in 1987 and negotiated a work task to be performed under DOE's prime contract with Argonne. DOE-NPRC staff were responsible for monitoring Argonne's technical and financial progress, ensuring that needed data were provided to Argonne, and obtaining technical reviews and comments on the SEIS drafts.

DOE-NPRC officials planned to provide their SEIS draft to DOE headquarters for the official review and approval of the Assistant Secretary of Environment, Safety and Health and the Office of General Counsel—a required step before providing it to interested parties for public comment. As of May 1, 1991, DOE-NPRC officials said that they were nearly finished revising a draft to be provided for DOE headquarters review.

Argonne National
Laboratory

Argonne, which is operated for DOE by the University of Chicago, was responsible for gathering sufficient data to assess the environmental impact of possible alternative actions or operating plans, and to provide to DOE-NPRC a draft SEIS in accordance with National Environmental Policy Act requirements.

Contractors Performing
Daily Operations

Bechtel Petroleum Operations, Inc. (Bechtel), and EG&G Energy Measurements, Inc. (EG&G), were sources of data for the SEIS drafts and were requested by DOE to review and comment on the drafts because of their daily work at NPR-1. Bechtel, the unit operator of NPR-1 since 1985, is now under its second 5-year contract. Because Bechtel is responsible for the daily oil and gas operations, it is the custodian of many documents Argonne needed to evaluate potential environmental impacts on air and water quality, on the land, and on socioeconomics. Bechtel employees also carry out many of the day-to-day activities that minimize and mitigate impacts on endangered species.

EG&G has been gathering research and population data on endangered species at NPR-1 since 1979. EG&G also devises and conducts activities, such as pre-activity surveys, to minimize and mitigate the impact of oil

³DOE-NPRC reports to the Deputy Assistant Secretary for Naval Petroleum and Oil Shale Reserves, a part of DOE's Fossil Energy group. DOE-NPRC also administers Naval Petroleum Reserve No. 2 (NPR-2) located to the south of NPR-1.

**Appendix I
NPR-1's SEIS and Participants' Roles in
Its Preparation**

field activities on endangered species and any cultural resources. In addition, EG&G contracted for and supervises a study by the Oak Ridge National Laboratory on the toxicological effects of oil field operations on the endangered kit fox.

Systematic Management Services, Inc. (SMS), also participated in the review and completion of the SEIS. SMS is a contractor providing administrative, secretarial, accounting, and engineering support services to DOE-NPRC. Two SMS employees served as Project Coordinator for the SEIS. Their duties included distributing copies of the SEIS drafts for comment and consolidating the resulting comments for transmittal to Argonne on the two 1989 drafts.

Chevron

Chevron has a 50-percent vote on the two-member NPR-1 Operating Committee. The Operating Committee is responsible for setting the number of wells to be drilled to meet the production rate set by DOE; determining the location, depth, and production rate of each well; inspecting and supervising all exploration, development, and production operations; and acting on other matters referred to the Committee. Chevron has a staff of about 25 located at NPR-1. Chevron's staff hydrogeologist and biologists who reviewed and commented on the SEIS drafts and provided supplemental data to Argonne are located in Bakersfield and San Francisco, respectively.

Additional Information on NPR-1 Endangered Species

Of the four endangered mammal and reptile species living at NPR-1, the San Joaquin kit fox is potentially affected most often by the main oil field operations. It has been studied the most, but the full extent of the impact of operations on the fox is uncertain, although some impacts are known.¹

Possible Causes of Kit Fox Population Decline

Although definitive data are lacking according to biologists, several natural causes may have contributed to the kit fox population's decline, including the following:

- Drought. The Bakersfield area has experienced drought conditions since 1986. The drought is believed by EG&G staff and a Chevron representative to have reduced the foxes' food supply—especially rabbits.²
- Predation. Coyote predation has been the most frequent cause of fox deaths at NPR-1, when the cause of death could be determined. According to Argonne, the larger and wider ranging coyote frequently preys on the fox at NPR-1 to eliminate a competitor for the same food supply. Argonne and DOE-NPRC biologists agree that declining rabbit populations may have caused the foxes to forage for food for longer periods of time, thus increasing their exposure to coyote predation.
- Cyclical population variations. Wildlife biologists have observed cyclical population highs and lows in other species. One decade of data is insufficient to determine if the NPR-1 fox population is experiencing such a cycle.

In addition, operations at NPR-1 may have contributed to the decline in the fox population. Development may affect endangered species in a variety of ways, such as disturbing a species' habits and habitat and/or affecting its prey and predators.

- Vehicular traffic accounted for 10.7 percent of fox deaths at NPR-1 from 1980 to 1986—7 percent on over 1,000 miles of NPR-1 controlled roads, the rest on about 10 miles of public roads.³

¹The giant kangaroo rat and the blunt-nosed leopard lizard have been affected by pipeline construction along or across NPR-1's perimeter. The lizard can also be affected by oil spills in washes (gullies) it occupies. Little is known about the extent of the impact on these two species. The fourth endangered species—the Tipton kangaroo rat—occupies acreage with no oil or gas development.

²The fox usually feeds on nocturnal prey, including cottontail and jack rabbits, small rodents (including the endangered giant kangaroo rat), birds, reptiles (including the endangered blunt-nosed leopard lizard), and insects.

³Speed limits on NPR-1 controlled roads are set by DOE with the advice and consent of the Fish and Wildlife Service. State Highway 119 and a county road with regular speed limits also cross NPR-1.

- **Modification of the habitat.** Habitat modification may have improved the predator coyote's habitat due to a ban on public hunting at NPR-1, may have permanently disturbed the food chain, and may have exposed foxes to products that are detrimental to their immediate or longer term health, according to Argonne.

NPR-1 foxes examined—both alive and dead—have not appeared to be diseased or starving, and no fox deaths at NPR-1 have been attributed to toxicity since EG&G's research began in 1979. However, the long-term effect of the foxes' exposure to NPR-1 oil field chemicals, some of which are considered toxic to other species, is still unknown, according to DOE-NPRC officials.

Basis for Disagreements About Impact of NPR-1 Operations on the Kit Fox

On the basis of their review of research on the foxes, Argonne staff concluded that oil field operations at NPR-1 could not be ruled out as partly contributing to the decline of the kit fox population. The conclusion was also partly based on analyses of EG&G's data from radio-monitored and/or ear-tagged foxes and population surveys indicating that (1) the fox population may have been eliminated from NPR-1's upland areas, where most development is located, and (2) data did not support attributing differences in the size of the fox populations on upland and lowland areas of NPR-1 to natural causes, such as climate and the relative abundance of prey and predators.

Our analysis indicated that DOE-NPRC's consolidated comments provided to Argonne on the November 1989 SEIS draft proposed modified wording in several cases that placed more emphasis on natural causes to explain the decline and less emphasis on NPR-1 operations as a possible cause. For example, the comments proposed deleting four of nine references to toxins having a possible effect on the kit fox or NPR-1 animals in general. EG&G staff told us that they believed that natural causes were primarily responsible for the fox population's decline, and a Chevron reviewer told us that he believed there was not enough evidence to support a conclusion that oil field operations were negatively affecting NPR-1 wildlife.

Several NPR-1 contractor staff also questioned whether Argonne's drafts had given enough credit to mitigative actions at NPR-1. After evaluating the mitigative actions, Argonne staff determined that there were not enough data to show whether the endangered species were as well off or better off after a mitigative action than they would have been if no mitigative action had been necessary. According to Argonne staff, for

example, it had not been proven that the NPR-1 practice of avoiding disturbing a site within a certain distance of a fox den (depending on the type of den) is as effective as not disturbing the general area at all, nor had it been proven that the distances from dens were adequate. DOE officials told us that they believed that all mitigative actions required by the Fish and Wildlife Service should be listed in the SEIS, even though it was not currently known to what extent those actions were effective.

Many of the uncertainties about causes of the decline of the kit fox population at NPR-1 mentioned above were also mentioned in the Fish and Wildlife Service's December 16, 1987, biological opinion on the kit fox (and blunt-nosed leopard lizard and giant kangaroo rat). That opinion also mentioned that DOE had agreed to prepare an SEIS and a new biological assessment to cover (1) impacts of NPR-1 development that exceeded in some respects those covered in the 1979 environmental impact statement (EIS)⁴ and the Service's 1980 biological opinion and (2) future activities. The NPR-1 research program began as a result of consultations between DOE and the Service that occurred after the Service reviewed a draft of the 1979 EIS. The initial research and protective measures were carried out under a February 1, 1980, biological opinion by the Service. The 1980 opinion cited rapid loss of native habitat in the San Joaquin Valley due to agricultural development and a resulting smaller fox population as a reason for the kit fox having been listed as an endangered species. This opinion also noted that the Department of the Interior's goal was to remove the kit fox from the endangered species list by 1990 by securing well-distributed habitat with viable populations. The opinion noted that NPR-1 was the largest contiguous piece of native habitat in the southern San Joaquin Valley and had thus "become very important for the survival" of the kit fox.

⁴For example, the 1979 EIS estimated that 351 new wells that would disturb an additional 702 acres—2 acres per well—of NPR-1 would be drilled between September 30, 1978, and September 30, 1985. DOE statistics in the June 1990 SEIS draft indicated that 432 wells were drilled in that period.

Additional Information on Impacts of NPR-1 Operations on Ground Water

According to a 1989 California Division of Oil and Gas report,¹ historically little concern existed for ground water degradation on the west side of the southern San Joaquin Valley, because of the poor quality of the ground water in the area. Only since 1983 had percolation of oil field brine from unlined sumps and otherwise dry stream channels into ground water-bearing sediments come under scrutiny. Because of concerns about possible pollution of the new Kern Water Bank section, which is near NPR-1 and other oil field operations, Kern County Water Agency representatives told us that the California Department of Water Resources had drilled a few monitoring wells near the reserve.

Insufficient Data Contributed to the Disagreement

The disagreement between DOE-NPRC and Argonne staffs on potential ground water impacts is attributable, at least in part, to the fact that (1) data on the amount of NPR-1 wastewater disposed of in sumps are partially derived from estimates and (2) others have expressed concerns that have not been resolved about how the geology at and around NPR-1 affects wastewater migration.

Amount Sumped Unclear

Direct, precise measurements of wastewater volumes placed in unlined sumps during the 1980s were not made at NPR-1 (nor were such measurements required by state regulatory authorities). In general, the amount sumped is derived by subtracting the amount disposed of daily in production and disposal wells from the estimated amount of wastewater produced. Thus, neither the total quantity of wastewater sumped nor that portion sumped on or near soils that may provide a route via percolation to ground water is exactly known.

While preparing the SEIS drafts, Argonne and DOE-NPRC staffs disputed the amount of water that had been sumped. Argonne's November 1989 SEIS draft indicated that about 9,000 barrels per day were then being disposed of in unlined sumps and the rest reinjected into underground formations. That SEIS draft also mentions that the wastewater was high in total dissolved solids, including salts—levels were between 20,000

¹David C. Mitchell, The Effects of Oilfield Operations on Underground Sources of Drinking Water in Kern County, 1989, Publication No. TR36, California Department of Conservation, Division of Oil and Gas.

and 40,000 parts per million² as compared to 3,000 to 6,000 parts per million in underground source water.

After DOE-NPRC staff learned of Argonne's estimate of sumped wastewater volume, the staff objected that it was too high and asked that the number be reduced to 1,000 barrels per day or less, which represented the estimated average amount that would be sumped in 1990. For the period from 1979 to 1989, DOE-NPRC officials also provided to Argonne average daily sumping numbers that ranged from 21,000 barrels per day in the earlier years down to 2,000 barrels per day in the later years.

Argonne staff believed that DOE-NPRC's requested use of sumping numbers of 1,000 barrels per day was too low and was inconsistent with data DOE and Bechtel provided previously. Consequently, in the June 1990 SEIS draft, Argonne primarily used the range of values provided by DOE, which reflected the variation in sumping values for the 11-year period. A DOE-NPRC official expressed the opinion that the sumping data were sufficient for an environmental assessment.

Concerns About Wastewater Disposal Are Not New

Argonne was aware that some, including a DOE review team, had expressed concern about the potential effect on ground water of NPR-1 wastewater disposal.

A 1984 review of the hydrology of the area near NPR-1 mentioned a high-salt-level problem in wells to the north of the reserve.³ Although the review could not explain the salt's presence, the authors suggested a possible migration route from surface sumps at Elk Hills. A 1983 report by the same authors indicated that other oil field sumps south/southeast of NPR-1 could have contributed to poor water quality there.⁴

Using data from the Kern County Water Agency, we noted that other wells northeast of NPR-1 had generally better quality water. However, one California Department of Water Resources monitoring well near the

²Irrigation water containing total dissolved solids of more than 2,000 parts per million is described as harmful to most crops and unsatisfactory for all but the most tolerant in the U.S. Public Health Service standards for water. In addition, the state has limited the total dissolved solids in regularly sumped wastewater to 1,000 parts per million.

³R. T. Bean and J. Logan, Lower Westside Water Quality Investigation Kern County Supplementary Report, January 1984, prepared for the California State Water Resources Control Board.

⁴Bean and Logan, Lower Westside Water Quality Investigation-Kern County, November 1983, prepared for the California State Water Resources Control Board.

town of Tupman and immediately adjacent to the northeast side of NPR-1 generally showed total dissolved solids of 2,000 to 4,000 parts per million in 1989 tests at three levels 90 to 385 feet below the surface, according to a department representative. Whether the well may have been affected by older sumps not now operating is uncertain. Aquifer⁶ water quality was shown as increasingly poorer on both the north and south flanks of NPR-1 moving in a westerly direction. However, except for the one well, no recent nearby well data were available that would continue to support the reports' conclusions.

A November 1985 Bechtel staff memorandum sent to the Director of NPRC pointed out that potential environmental problems could occur due to the injection and sumping of wastewater in a section on NPR-1's south side. The supporting analysis raised the possibility that injected wastewater was polluting the same aquifer being used to produce water for use in NPR-1 oil production. The memorandum also speculated that wastewater could migrate from NPR-1. Records of a December 1985 meeting of the NPR-1 Waste Water Disposal Committee—made up of DOE, Chevron, and Bechtel staffs—indicate that committee members did not concur with the memorandum's conclusions. The committee did recommend that wastewater injection be decreased over time in one area of NPR-1. According to DOE-NPRC officials, this led to the lining of the one sump in that area, completed in 1990, and other wastewater disposal projects designed to reduce future injection of wastewater there.

A February 1989 DOE preliminary environmental health survey report, prepared under the supervision of DOE's Office of Environment, Safety and Health, contained conclusions similar to Argonne's on NPR-1's potential for causing ground water degradation. One of the report's findings stated that "Disposal of excess produced water in sumps and Tulare Zone disposal wells degrades groundwater quality in both the Upper and Lower Tulare on-site." (Tulare is one of the geological formations at NPR-1.) The report also stated that disposal of NPR-1 wastewater potentially could degrade ground water near the reserve. The DOE-NPRC/Bechtel June 1989 response indicated that DOE was taking action to improve its wastewater disposal practices (by eliminating some sumps, for example) and stated that the SEIS for NPR-1 would address ground water issues.

The lack of definitive data on NPR-1 wastewater migration is one reason Argonne took into consideration the reports cited, and concluded in its

⁶An aquifer is a body of rock containing sufficient saturated permeable material to yield significant quantities of ground water to wells and springs.

**Appendix III
Additional Information on Impacts of NPR-1
Operations on Ground Water**

June 1990 draft SEIS that some wastewater disposed of in wastewater disposal wells at NPR-1 during the 1980s potentially could degrade nearby San Joaquin and Buena Vista Valleys ground water. Argonne staff attempted to determine wastewater migration patterns by analyzing existing maps, well logs,⁶ and other data that were subject to differing interpretations. For example, water quality maps were based on projections of data from only a few collection points made by different researchers at different times.

DOE-NPRC officials advised us in June 1991 that preliminary recommendations in a subcontractor's draft report are that no direct ground water monitoring is needed in five of seven areas considered most sensitive at NPR-1; in the other two areas ground water monitoring could be beneficial, pending further analysis.

⁶A well log is a record of the results of probes sent down a well to measure rock and sediment properties encountered in the well. One item measured is the resistivity of the sediments and contained water, which can be used to determine salt concentrations.

Additional Information on NPR-1 Compliance With Certain Environmental Requirements

NPR-1 operations may have violated the Endangered Species Act in 1990, according to Fish and Wildlife Service representatives. NPR-1 operations did not comply with the National Historic Preservation Act regulations over a period of several years and may have violated California wastewater disposal requirements during the 1980s.

Endangered Species Not Covered by Authorization Died in NPR-1 Operations

The death of a kit fox pup at NPR-1 in July 1990 may have violated provisions of the Endangered Species Act, according to Fish and Wildlife Service officials. The fox pup's death was not covered by an "incidental take authorization" because NPR-1's authorization had expired on September 30, 1989, and the pup's later death was determined to be a result of NPR-1 operations.¹ The fox pup was found dead on July 12, 1990, in an NPR-1 operations oil spill, and a veterinarian subsequently determined that the pup was asphyxiated by the oil. DOE is now taking action to obtain a new authorization to protect it from violating the act if another endangered animal dies as a result of oil field operations.

In cases where federal agency operations may affect endangered species, the agency may receive an incidental take authorization from the Fish and Wildlife Service. Essentially, these authorizations protect an agency from violating the Endangered Species Act should an endangered species be killed, wounded, or captured in connection with the agency's operations² (if an agency does not exceed the take allowance set by the Service).

Agencies obtain the incidental take authorizations as a result of a formal consultation with the Service—a process that can take several months. The act provides for a formal consultation procedure that focuses on the agency's preparation of a biological assessment. The assessment contains the agency's determination of how a proposed action will affect any endangered species and its plans for mitigating adverse effects. The Service reviews the assessment to determine whether all agency conclusions are adequately supported and whether proposed mitigation is sufficient. The Service may issue to the agency an incidental take

¹ A similar endangered species authorization compliance problem exists at NPR-2, which is managed by the same DOE and contractor staffs. The primary difference is that DOE-NPRC officials had never previously obtained the protective authorization for NPR-2.

² More specifically, "take" of an endangered species is defined in the Endangered Species Act as including harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, or collecting, or attempting to engage in any such conduct without an authorization or permit issued by the Service.

authorization under section 7 of the act in return for the agency's taking mitigating actions.

If an endangered species is killed or injured when the agency does not have an authorization, the Service can prosecute the agency and its officers and employees for violating the Endangered Species Act. In addition to civil penalties, the act provides for criminal fines and/or imprisonment for knowing violations.

Actions Under Way to Address the Problem

For situations in which Service officials believe operations are jeopardizing endangered species, even if no take violations occurred, they may seek a court action to stop the operations. Service officials did not believe that such action was needed during the waiting period for a new biological assessment on NPR-1. Service representatives told us that NPR-1 officials had continued to abide by the terms and conditions of their expired incidental take authorization, and they were satisfied that NPR-1 officials were making a good faith effort to continue mitigating adverse effects on endangered species. Furthermore, while the Service requested in May 1990 that DOE enter into consultation on NPR-1, Service representatives said that they realized consultation could not take place until a biological assessment is completed. On July 20, 1990, DOE officials informed the Service that NPR-1's biological assessment would be submitted in February/March 1991 concurrent with the release of the NPR-1 draft SEIS.

On the other hand, in September 1990 Service officials did refer information on the fox's death to their Division of Law Enforcement—the routine initial step in the enforcement process for take violations. Speaking generically of the enforcement process, a Service enforcement agent told us that after the division investigates an incident, it prepares a report and recommendations for continuing or terminating the enforcement process. If the division decides it has gathered enough information to support a finding that an agency improperly took the endangered species, it refers the case to either the U.S. Attorney's Office or the Department of the Interior's Solicitor. DOE-NPRC officials told us that they were not aware of the referral to the Service's enforcement division until we informed them in October 1990. They also told us that they had not known until receiving the Service's letter in May 1990 that the expired authorization could not be extended.

DOE-NPRC Compliance With the National Historic Preservation Act

Activities at NPR-1 have not complied with the National Historic Preservation Act regulations because DOE has not consulted, as required, with the State Historic Preservation Officer (SHPO) and the federal Advisory Council on Historic Preservation (Council) concerning every agency action that could adversely affect a historic property on NPR-1, according to an official in the California Office of Historic Preservation. However, it is unlikely that DOE's actions have adversely affected any historic properties.³

At NPR-1, EG&G biologists, trained by an archaeologist, look for signs of historic properties at NPR-1 sites before any NPR-1 action is taken that will disturb the area. If the biologists find any indication of a historic property, an archaeologist reviews the site prior to the proposed action. EG&G forwards the archaeologist's surveys to the SHPO if the archaeologist finds anything regarded as significant. However, DOE has not consulted with the SHPO or the Council concerning every agency action that could adversely affect a historic property. For example, DOE has not consulted with the SHPO or the Council every time it has undertaken a routine oil operation action at NPR-1. Routine actions include drilling wells, grading roads, and cleaning up oil spills. The preparation of an agreement would cover a series of such actions, thus alleviating the need for individual consultations.

What Is Required

Regulations implementing section 106 of the National Historic Preservation Act require federal agencies to consult with the SHPO and the Council at various stages of an action that could change the character or use of a historic property. To comply, before beginning an action an agency must identify any historic properties that could be affected by that action. The agency is required to document that no historic properties were identified, or determine the effect of its action on any property that was discovered and seek ways to mitigate any possible adverse effects to the historic property that could result from the proposed action.

³The Native American groups that inhabited the southern San Joaquin Valley were known as the Yokuts. When California was annexed by the United States, Indian lands passed into Euroamerican hands. In the mid 1800s the remaining Indians were moved to the Tule River reservation. Little unique information has been found on NPR-1 concerning the history either of the Yokuts or of oil production that began in the early 1900s. The arid conditions and historic lack of potable water made the area unsuitable for long-term settlement. Consequently, sites on NPR-1 tend to consist of items discarded during passage through the area or from temporary camps. Furthermore, most of the old oil operations no longer exist because it is common in producing fields to disassemble and remove structures and facilities from abandoned wells.

Under regulations implementing section 106 of the act, agencies can satisfy their responsibilities for a large or complex project, or a class of actions that would otherwise require numerous individual requests for consultation (such as NPR-1 operations), by negotiating a programmatic agreement with the SHPO and/or the Council. As part of the consultation, the SHPO or the Council may recommend a cultural resources survey of the affected area to identify historic properties. Given the known historic properties, the agency, the Council, and the SHPO may reach an agreement on a management plan to mitigate potential adverse impacts on historic properties. They may also agree on procedures to handle discoveries of historic properties during implementation of the agency actions.

If an agency adversely affects a historic site without allowing the Council an opportunity to comment, the Council can determine that its opportunity to comment has been foreclosed. Such a decision is an official recognition that an agency did not allow the Council the opportunity to suggest mitigation of adverse impacts on a historic property. Foreclosing the Council's opportunity to comment leaves an agency vulnerable to litigation for failure to carry out its responsibilities under section 106.⁴

A former DOE official, responsible for compliance with the act between January 1985 and December 1987, said that on the basis of discussions with a SHPO official, he believed that DOE would be in compliance with the act by conducting cultural resource surveys as part of its contractor's pre-activity surveys and consulting with the SHPO in the event a historic property was discovered on NPR-1. In 1988 DOE-NPRC became aware that this was not sufficient to comply with the act and its regulations. As a result, DOE-NPRC directed EG&G to begin the process of completing a programmatic agreement with the SHPO. However, the programmatic agreement is still not completed. According to a DOE-NPRC official, DOE-NPRC had not assigned a high priority to completing the agreement because no known significant historic properties exist on NPR-1; thus, other environmental concerns were given a higher priority. Thus, DOE-NPRC officials believed it was unlikely that any such historic properties would be adversely affected by NPR-1 operations. The state Office of Historic Preservation archaeologist responsible for NPR-1

⁴The foreclosure of the Council's opportunity to comment has not occurred because historic properties have not been designated at NPR-1. However, in June 1991 DOE-NPRC officials advised us that the recent site survey required by the SHPO identified 56 sites—mostly old oil field facilities—that might potentially be eligible for listing in the National Register.

agreed that available information concerning NPR-1 indicates that few historic properties are expected to be found in the area.

**NPR-1's Compliance
With State
Wastewater Disposal
Requirements**

Possible violations of the sumping requirements had been brought to DOE's attention by both Bechtel and Argonne staffs. As discussed in appendix III, in 1985 a Bechtel staff member raised the possibility that the quality and amount of wastewater sumped at NPR-1 might violate state regulations. The staff also speculated that the wastewater would migrate off NPR-1 to alluvium and an aquifer. Similar concerns were raised by Argonne staff in a 1988 meeting with DOE-NPRC, Chevron, and Bechtel staffs.

Objectives, Scope, and Methodology

We reviewed (1) the dispute between DOE-NPRC and Argonne on what impacts NPR-1 operations have had on endangered species and ground water, and how the associated uncertainties would be discussed in the SEIS, and (2) specific questions about NPR-1's compliance with environmental laws and regulations governing endangered species, wastewater disposal, and historic preservation activities. In carrying out these objectives, we obtained information on whether (1) NPR-1 could operate legally without an incidental take authorization from the Fish and Wildlife Service (FWS), (2) DOE-NPRC's not consulting with the state Historic Preservation Office complied with the National Historic Preservation Act regulations, and (3) wastewater disposal practices violated state regulations and a permit.

Our work focused on only three of the topics covered in Argonne's June 1990 SEIS draft and earlier drafts in March and November 1989: endangered species, wastewater disposal, and historic preservation (cultural resources).

In reviewing the dispute between DOE-NPRC and Argonne on what impacts NPR-1 operations have had on endangered species and ground water, and how the associated uncertainties would be discussed in the SEIS, we obtained and reviewed the first three SEIS drafts and reviewers' comments and selected supplementary data from the following: DOE (headquarters, NPR-1, and the Argonne Area Office); Argonne; Bechtel; EG&G; SMS; FWS' Sacramento Field Office; the California Department of Fish and Game (CDF&G); the California Division of Oil and Gas; the California Regional Water Quality Control Board, Central Valley Region; and the Kern County Water Agency. We also interviewed officials or other representatives from those agencies and companies, plus Chevron, the California Department of Water Resources, and the California Department of Health Services to determine the extent to which their data or other information would support definitive conclusions on the impacts NPR-1 operations have had on endangered species or ground water. We observed selected endangered species and wastewater disposal activities at NPR-1. In addition, our senior geologist reviewed and analyzed geological, hydrological, and water quality data for the NPR-1 vicinity.

To determine how NPR-1 operations affect endangered species and ground water and how the associated uncertainties were discussed in the SEIS drafts, we reviewed and discussed, as needed, the comments on the March and November 1989 and June 1990 Argonne drafts, as well as the revised drafts and related correspondence, with DOE-NPRC, Argonne, Bechtel, EG&G, SMS, and Chevron representatives.

To determine whether NPR-1 was considered to be in compliance with selected environmental laws and regulations governing endangered species, wastewater disposal, and historic preservation activities, we obtained and reviewed copies of pertinent federal and state laws and regulations. To determine requirements, such as permits and reporting requirements, and the penalties for noncompliance, we discussed these compliance issues with representatives from DOE-NPRC, Argonne, Bechtel, EG&G, FWS' Sacramento Field Office, the Kern County Water Agency, the California Division of Oil and Gas, the California Regional Water Quality Control Board, the California Department of Health Services, CDF&G, and the California Office of Historic Preservation. We did this because of legal compliance issues identified by Argonne and FWS.

We conducted our audit work primarily at NPR-1 and Argonne National Laboratory. We also conducted interviews and gathered data at officials' offices in Fresno, Bakersfield, Sacramento, and San Francisco, CA; DOE headquarters, Washington, D.C.; and DOE's Argonne Area Office, Argonne, Illinois.

We sought the views of DOE, Argonne, Bechtel, EG&G, SMS, Chevron, FWS' Sacramento Field Office, and CDF&G representatives on the facts discussed in this report and incorporated their comments where appropriate. However, as agreed with the requester's office, we did not obtain official agency comments on a draft of this report from DOE or from others included in our review. We conducted our review in accordance with generally accepted government auditing standards between January 1990 and May 1991.

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