REPORT BY THE

Comptroller General

OF THE UNITED STATES

Efforts To Clean Up DOD-Owned Inactive Hazardous Waste Disposal Sites

Since 1975, DOD has been assessing its inactive hazardous waste disposal sites to determine if any pollutants have been escaping and causing harm to humans or the environment. These efforts have been carried out under DOD's Installation Restoration Program, which is designed to identify and clean up inactive hazardous waste sites on military bases.

GAO reviewed the program at the request of two congressional subcommittees and found that (1) DOD estimated the program will cost between $5 billion and $10 billion, (2) groundwater pollution standards were informal and varied considerably among states, and (3) DOD has not adequately involved regulatory agencies in its program to clean up inactive DOD-owned hazardous waste sites. Also, GAO noted that the Air Force monitoring of contractor performance under the program could be improved.

GAO/NSIAD-85-41
APRIL 12, 1985

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The Honorable Vic Fazio
Chairman, Subcommittee on Legislative
Committee on Appropriations
House of Representatives

The Honorable James J. Florio
Chairman, Subcommittee on Commerce,
Transportation and Tourism
Committee on Energy and Commerce
House of Representatives

In response to your request, this report provides our evaluation of the status of the Department of Defense's Installation Restoration Program.

As arranged with your offices, unless you publicly announce its contents earlier, we plan no further distribution of this report until 10 days from the date of the report. At that time, we will send copies to the Chairmen, House Committee on Government Operations, Senate Committee on Governmental Affairs, and House and Senate Committees on Appropriations; the Director, Office of Management and Budget; the Secretary of Defense; the Secretaries of the Army, Navy, and Air Force; and other interested parties.

Charles A. Bowsher
Comptroller General
of the United States

From January through December 1984, GAO reviewed implementation of the IRP at 18 bases. Information on program cost was updated through February 1985. (See p. 4.)

STATUS AND COST OF THE IRP

The IRP is a four-phase program. Phase I is the installation assessment or records search to identify bases with inactive, potentially hazardous waste sites; Phase II is for confirming that contaminants are affecting the environment; Phase III is used for developing or advancing the technology needed to solve some of the problems; and Phase IV is the operations or corrective action effort. (See pp. 5 and 6.)

Out of 911 bases, DOD has identified 473 bases that require Phase I studies to identify inactive hazardous waste disposal sites. Although the status of certain bases is being reassessed, DOD's most recent IRP status report (data as of September 30, 1984) on bases requiring IRP work (see pp. 6 and 7) is as follows:

	Required	Completed	In process	To be done
Phase I	473	356	58	59
Phase II	204	51	123	30
Phase III/IV[a]	72	0	38	34

[a]Data provided by DOD do not make a distinction between those bases that have only reached Phase III versus those which are in Phase IV.

From inception through fiscal year 1983 the actual IRP expenditures were about $202 million. The rate of expenditure for IRP work has increased substantially as $74 million was spent in fiscal year 1984 and DOD has allocated $199 million for fiscal year 1985. GAO was unable to develop an independent cost estimate for the program because sufficient data were not available on key cost elements, such as the extent of contamination. Instead GAO requested DOD to provide an estimate of the cost. In February 1985 DOD estimated that costs for the

REPORT BY THE
COMPTROLLER GENERAL
OF THE UNITED STATES

EFFORTS TO CLEAN UP DOD-OWNED INACTIVE HAZARDOUS WASTE DISPOSAL SITES

D I G E S T

In 1975 the Department of Defense (DOD) initiated the Installation Restoration Program (IRP) to identify inactive hazardous waste disposal sites, assess their potential for contaminating the environment, and take appropriate corrective action. (See p. 2.)

In 1980 the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 (42 U.S.C. 9601 et seq.) was enacted. This act, commonly known as Superfund, provides for cleanup of the nation's uncontrolled hazardous waste sites, including those on federal facilities. Under the act, the Environmental Protection Agency (EPA) is responsible for managing the CERCLA program. Federal agencies must comply with CERCLA's requirements to the same extent as private entities. The IRP is DOD's progam to comply with these requirements. (See p. 1.)

In a letter dated February 7, 1984, the Chairmen of the Subcommittee on Legislative, House Committee on Appropriations, and the Subcommittee on Commerce, Transportation and Tourism, House Committee on Energy and Commerce, requested GAO to (1) provide a cost estimate for cleanup of hazardous waste problems at DOD-owned sites identified to date under the IRP, (2) assess problems the armed services are encountering with the criteria used to measure contaminants in drinking water at DOD bases, and (3) assess whether information on the potential pollution caused by inactive hazardous waste disposal sites is properly communicated to the appropriate regulatory agencies. In addition, the Chairmen requested that GAO evaluate the adequacy of DOD's administration and monitoring of IRP contracts. (See p. 3.)

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Cost implications of meeting nonregulatory standards are not known. The largest IRP costs will be incurred in Phase IV, the cleanup phase, which involves the design, construction, and operation of pollution abatement facilities. Phase II studies, which identify the scope of the needed cleanup effort, have not been completed at three quarters of the bases, and cleanup efforts have begun at only 38 bases. (See p. 18.)

Compliance with nonregulatory standards may pose problems for DOD. Nonregulatory standards have not been subject to the full regulatory review, which usually includes consideration of the cost and benefits associated with implementing the standard. In the absence of a regulatory review, the involved parties may need to more fully evaluate the cost of meeting the informal standards and balance that cost against the benefits to be derived. This will become increasingly important as more information becomes available on the scope of needed cleanup efforts to meet the informal standards. (See pp. 17 to 19.)

COORDINATION WITH REGULATORY AGENCIES

The lack of formal regulatory federal and state groundwater standards for allowable contaminants and the variance of the currently used informal standards from state to state increase the need for close coordination of base IRP activities with regulatory agencies. DOD policy calls for coordination with EPA and state authorities. However, the level of coordination prescribed is not sufficient to preclude problems that may arise with EPA and state regulatory agencies or to facilitate efficient implementation of the IRP. (See pp. 20 to 27.)

DOD's Policy Memorandum 81-5 (December 11, 1981) requires DOD components to advise EPA regional offices and state and local governments of IRP activities. The notification is to include announcement of scheduled record searches, projects, and finished reports. Also, these agencies are to be notified promptly when contamination problems pose an immediate threat to health, welfare, or the environment. Problem notification is not to be

program will be between $5 billion and $10 billion. However, the estimate is tentative since the number of sites and the full scope of the required cleanup effort is not yet known. (See pp. 9 and 10.)

REGULATORY STANDARDS FOR GROUNDWATER POLLUTANTS HAVE NOT BEEN ESTABLISHED

EPA is not responsible under CERCLA for setting national standards for pollutants in groundwater, which is a key determinant of the effort required of DOD in cleaning up its hazardous waste sites. In the absence of national standards, many states have begun the process of establishing regulatory standards and other administrative requirements for some of the hazardous waste contaminants in groundwater in their states. (See p. 16.)

At the time of GAO's review, however, the standards being established by the states were informal, nonregulatory in nature, and subject to change. Moreover, informal standards that have been established for the same contaminant vary considerably among states. For example, for the common pollutant trichloroethylene, informal contamination standards have been set at 70 parts per billion (ppb) by Connecticut, 50 ppb by New Jersey, 5 ppb by Arizona, and 4.5 ppb by California. (See p. 16.)

DOD EFFORTS TO MEET STANDARDS

The military services' guidance provides that DOD bases comply with regulatory standards. However, DOD guidance does not explicitly address the extent to which DOD bases are required to meet states' informal nonregulatory standards. (See p. 17.)

Although there is no stated policy, DOD bases, in practice, are generally attempting to comply with states' informal standards and associated administrative requirements. IRP activities at the 18 bases GAO reviewed were designed to comply with informal standards. Officials in DOD's Office of Environmental Quality, which is responsible for setting IRP policy, stated that this practice was being followed at other DOD bases. (See p. 18.)

surveys. GAO did not find any apparent problems caused by inadequate contract administration at the four Navy bases visited, however, problems were noted at some of the Air Force bases visited. The Army was not included in GAO's review of contract administration because contractors did not do all of the IRP work at the bases visited. (See p. 11.)

GAO found that contractor performance monitoring was not sufficient for the Air Force time and material contracts used for Phase II work at four of the bases it visited. This type of contract does not encourage effective cost control and requires almost constant government surveillance. According to Defense Acquisition Regulations, time and materials contracts should be used only where provisions for adequate controls (including appropriate surveillance by government personnel during performance) are in place to give reasonable assurance that contractors are not using inefficient or wasteful methods. (See pp. 11 and 12.)

Contractor monitoring for the four IRP Phase II time and materials contracts did not satisfy the Defense Acquisition Regulations requirements at the four Air Force bases. Because Air Force officials were not actually checking on the work performed by the contractor, they could not state with assurance that the labor or materials charged on the contractors' invoices were reasonable in nature or amount. Nor could they assure themselves that the contractor was performing the work required by the contract. (See p. 12.)

DOD, in commenting on a draft of this report, stated that the Air Force had taken steps to improve the monitoring of its time and materials contracts. (See pp. 13 and 14.)

AGENCY COMMENTS AND GAO'S EVALUATION

In a draft of this report, GAO proposed that the Secretary of Defense revise the IRP policy on coordination with state regulatory agencies to provide for increased and earlier involvement of those agencies. The California Regional Water Quality Control Board, Central Valley Region, and Florida's Department of Environmental Regulation agreed with GAO's proposal. (See p. 26.)

delayed until publication of final technical reports. (See pp. 20 and 21.)

While bases have generally followed the policy and applicable service guidance on coordination, the level of coordination efforts and involvement of regulatory agencies could be increased to help facilitate the efficient implementation of the IRP. The regulatory agencies have identified deficiencies in Phase I and Phase II surveys, leading to the need to redo or expand IRP work. Earlier involvement and/or more thorough coordination may have avoided these situations or at a minimum surfaced areas of disagreement earlier in the process. (See p. 26.)

Six of the 18 bases GAO reviewed encountered problems which could have been minimized with earlier regulatory agency involvement. For example, California officials questioned the adequacy of the McClellan Air Force Base Phase II survey. State officials found that the Phase II work did not include sampling of contamination sites to identify what contaminants were present, an essential step in determining the appropriate control and cleanup approach. As a result, Phase II was reopened and expanded. Earlier coordination would have most likely avoided this inefficiency. (See pp. 23 and 24.)

At three other bases GAO found the process benefited from regulatory agency involvement in developing IRP plans. For example, Mather Air Force Base shared Phase II work plans with the California regulatory agencies. California officials expressed concerns with these plans. Phase II plans were modified to address these concerns, and California officials have expressed satisfaction with the way their concerns were being handled. In contrast to the prior example, Mather's action should help avoid questions on the result of the Phase II study or the need to redo portions of the study. (See pp. 23 to 26.)

CONTRACT ADMINISTRATION

The military services have used several types of contracts to accomplish IRP studies and

GAO developed suggests that the Congress should consider the merits of changing the act's structure. (See p. 19.)

GAO recognized in the report that the lack of precise data on health and environmental effects of hazardous waste sites make standard setting difficult. Nevertheless, if we are to provide consistent cleanup on a national basis, GAO believes it is important that, where feasible, reasonably uniform criteria be established to govern both federal and state cleanup decisions. (See p. 19.)

RECOMMENDATION

GAO recommends that the Secretary of Defense revise the IRP policy on coordination with regulatory agencies. The revised policy should provide for increased and earlier involvement of EPA and state regulatory agencies in all IRP phases and should be uniform for all services. (See p. 27.)

DOD also agreed with the proposal and stated it would issue a revised policy by May 1985 to provide for increased and earlier involvement of state regulatory agencies. DOD also stated that it would be appropriate to update its 1981 policy in light of the refinements in EPA and state regulations which have occurred since 1981. (See p. 26.)

EPA commented, however, that GAO's proposal should be broadened to include EPA. GAO agrees that because of EPA's expertise in the hazardous waste field, it would contribute significantly in developing studies and alternatives for cleanup efforts. (See p. 26.)

EPA also stated that the revised DOD policy should provide for uniform implementation of the coordination effort with regulatory agencies at each step of the IRP process. GAO agreed and has clarified its proposal. The modified recommendation was discussed with DOD officials who concurred with the changes. (See p. 27.)

DOD also commented that the lack of formal standards is the most serious obstacle to the DOD hazardous waste site cleanup program, placing its cleanup efforts in a no-win situation. DOD explained that if it is responsive and cleans up to informal standard levels only to have the levels raised later, more money will have been spent than was necessary. Conversely, if DOD delays its cleanup efforts until formal standards are available, it will be criticized for not cleaning up fast enough. (See p. 18.)

GAO agreed that the lack of formal federal and state standards is a serious problem which increases the need for close coordination between DOD, EPA, and the respective state regulatory agencies. In a separate report[1] on the Superfund program, GAO presents information and alternatives to the Congress for its consideration during deliberations on reauthorization of the Superfund Act. The information

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[1]Cleaning Up Hazardous Wastes: An Overview of Superfund Reauthorization Issues (GAO/RCED-85-69, March 29, 1985.)

Contents

CHAPTER 1

INTRODUCTION

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 (42 U.S.C. 9601 et seq.), commonly known as Superfund, was enacted on December 11, 1980 to provide for cleanup of the nation's uncontrolled hazardous waste[1] sites. The Environmental Protection Agency (EPA) is responsible for managing the CERCLA program including the promulgation of regulations, compilation of a list of hazardous waste sites, responding to emergencies, and controlling the use of federal funds to clean up waste sites. Federal agencies must comply with CERCLA's requirements to the same extent as private entities. The IRP is DOD's progam to comply with these requirements.

The act provides for a $1.6 billion fund, called Superfund, for cleaning up these sites, to be accumulated over a 5-year period from taxes on petroleum and certain chemicals and from federal appropriations. CERCLA provides for two types of responses to hazardous substance release or threatened releases: removal and remedial. Removal actions are prompt but not necessarily final measures taken to reduce hazards; remedial actions are final but not necessarily prompt measures taken to provide permanent remedy. The law allows the EPA to use CERCLA funds for removal and remedial actions. However, CERCLA-funded remedial actions at federally owned facilities are specifically prohibited by the act. Federal agencies, while responsible for cleaning up certain sites under the Act, are expected to fund these actions through their normal budget process.

Various provisions in CERCLA provide for the discovery or identification of such sites. CERCLA Section 103(a) requires that persons, which includes federal agencies, notify EPA's National Response Center--the national communications center for activities related to response actions--when hazardous substances (in certain established reportable quantities) are released into the environment. One example of how hazardous waste affects the environment is the contamination of groundwater[2]. About 50 percent of the nation's drinking water comes

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[1] Hazardous waste is defined as waste which, because of its quantity; concentration; or physical, chemical, or infectious characteristics, may cause or contribute to an increase in mortality or pose a substantial hazard to human health or the environment when improperly treated, stored, transported, or disposed of.

[2] Groundwater is subsurface water that completely saturates spaces between soil particles and rocks. Wells for drinking water are drilled into these saturated areas.

from groundwater which is susceptible to contamination from inactive hazardous waste sites.

In 1975 the Department of Defense (DOD) initiated the Installation Restoration Program (IRP) to accomplish the objectives, including identification and cleanup of hazardous waste disposal sites, that were later stipulated in CERCLA. In February 1985 DOD estimated that the IRP would cost between $5 billion and $10 billion.

The IRP is a four-phase program. Phase I is the installation assessment or records search to identify bases with closed potentially hazardous waste sites, Phase II is for confirming that contaminants are affecting the environment, Phase III is used for developing or advancing the technology needed to solve some of the problems, and Phase IV is the operations or corrective action effort.

ADMINISTRATION OF THE IRP

Overall policy direction for the IRP is provided by the Directorate of Environmental Policy within the Office of the Secretary of Defense. Each of the military services has a corresponding organization within the Office of the Secretary.

Major commands are responsible for overall program management. Commands prioritize and initiate funding requests for base IRP efforts. Bases are responsible for coordination and logistical support of IRP activities.

The services have also assigned implementation responsibilities, including the contracting, monitoring, oversight, and evaluation of IRP studies, surveys and remedial actions, to specific organizations, identified below.

Army	Responsibility
U.S. Toxic and Hazardous Materials Agency	Implements Phases I, II, III, and IV
Army Environmental Hygiene Agency	Provides technical expertise
Corps of Engineers	Provides engineering expertise and overall program design
Navy	
Navy Energy and Environmental Support Agency	Implements Phase I and provides technical expertise to support other phases

Engineer Field Divisions	Implement Phases II, III and IV
Air Force	
Air Force Engineering Service Center	Implements Phases I, III, and IV
Occupational and Environmental Health Laboratory	Implements Phase II and provides technical support for other phases

OBJECTIVES, SCOPE, AND METHODOLOGY

In a letter dated February 7, 1984, Chairmen of the Subcommittee on Legislative, House Appropriations Committee and the Subcommittee on Commerce, Transportation and Tourism, House Committee on Energy and Commerce, requested that we (1) assess problems the armed services are encountering with the criteria used to measure contaminants in drinking water at DOD bases, (2) assess whether information on the potential pollution caused by inactive hazardous waste disposal sites is properly communicated to the appropriate regulatory agencies, (3) evaluate the adequacy of DOD's administration and monitoring of the IRP contracts, and (4) provide a cost estimate for cleanup of hazardous waste problems at DOD owned sites identified to date under the IRP.

To address the first two objectives, we selected 18 bases for detailed review. Five bases were chosen at the request of the two chairmen. Thirteen of the 18 bases were selected based on DOD data identifying those bases where Phase II was complete or underway. After we began our review at these bases, we found that six of them had not yet started Phase II. Three of these bases subsequently started Phase II during our review. The bases were selected to provide a mixture of the various types of DOD bases, such as depots, maintenance, shipyards, and air rework stations, using hazardous materials that could become hazardous waste. Because DOD's IRP work at previously owned sites had not advanced as far as the IRP work at presently owned sites, we did not include them in our review. Therefore the information and data presented in this report relates only to installations currently owned by DOD with the exception of DOD's estimate of program costs which includes owned and previously owned sites. The bases included in our review are identified in appendix I.

At each base, we met with representatives responsible for managing the program to obtain data on implementation of the IRP. We also reviewed files and other documents pertaining to coordination with regulatory agencies and compliance with regulatory agency requirements.

We also met with, and reviewed documents from, DOD officials responsible for overall direction and implementation of the program, to obtain information on DOD and military services' policies and procedures.

We also held discussions with officials of states where sampled bases were located (identified in appendix I) and with EPA officials. We obtained and reviewed evaluations of sampled bases' IRP programs made by EPA, state, and local regulatory agencies.

Our review of contract administration was limited to Air Force and Navy bases because the IRP surveys made at the Army bases in our sample were not contracted out. We determined what were the Air Force and Navy procedures and reviewed contract files to ascertain whether these procedures were followed.

We were unable to develop an independent cost estimate for the IRP because of limited information on key variables; e.g., the scope of contamination has not yet been established for a majority of the bases included in the IRP. This report presents data on IRP implementation at the 18 bases through June 1984, data on the overall status of the program through September 1984, and DOD's estimate of the latest IRP costs presented in February 1985.

Our review was made in accordance with generally accepted government audit standards.

We provided a draft of this report to DOD, EPA, and the eight states' regulatory agencies whose activities are discussed in the report. Comments were received from DOD, EPA, California, and Florida. Their comments are discussed in subsequent chapters and reprinted in appendixes VI, VII, VIII, and IX. The states of Maryland, New Jersey, New Mexico, North Carolina, Texas, and Virginia were also asked to comment but they chose not to.

CHAPTER 2

STATUS OF THE

INSTALLATION RESTORATION PROGRAM

DOD has undertaken the IRP to identify and clean up inactive hazardous waste sites that are or have the potential for contaminating the environment. IRP work is underway at most of the 473 bases included in the program. In February 1985 DOD estimated that the IRP costs would be between $5 billion and $10 billion.

The IRP was started by the Army in 1975 to (1) identify and evaluate suspected problems associated with past hazardous material disposal sites located on DOD installations and (2) control the migration of hazardous waste environmental contamination from these sites. In a July 23, 1976, memorandum, the Assistant Secretary of Defense for Installation and Logistics and the Director of Defense Research and Engineering provided initial guidance and direction to the military departments to implement the IRP. However, the Air Force and Navy did not formally implement the IRP until 1980. Also in 1980, CERCLA was enacted and the IRP became the DOD's program to implement the legislative requirements as they relate to DOD.

To minimize duplication of effort, the Department of the Army was designated as the lead service to compile and refine applicable technology and to develop new or improved technology and guidance for the restoration program as they relate to all contamination, including chemical, biological, and radiological. The other services were to support the Army in this endeavor.

To assure proper integration of the programs in the three services, the Army was assigned responsibility for preparing an overall concept plan. After the plan was completed in 1981, DOD issued a new policy memorandum that required the services to initiate, establish, and maintain the program outlined in the concept plan as it pertained to identification, evaluation, and restoration associated with DOD real property.

FOUR PHASES OF THE IRP

The IRP consists of four phases. Phase I is an installation assessment during which files are examined, current employees and key former employees are interviewed, and the terrain and facilities are examined. Additionally, all available information on past mission, current operations, waste generation,

disposal, and hydrogeology of the area is collected. Limited soil and water sampling may also be conducted to determine if contaminants are present. Phase I studies at every installation currently listed in the IRP are scheduled for completion by the end of fiscal year 1988.

Phase II is referred to as the confirmation phase. In this phase, a comprehensive survey is made to define the problem and to fill identified information gaps revealed during Phase I, and survey data from all technical areas are interpreted and interrelated.

Phase III is referred to as technology base development. In this phase, control technology is matched with specific contamination problems at a given site to determine the most economical solution. If control technologies do not exist, they are developed in this phase.

Phase IV is the operations phase. This phase includes design, construction, and operation of pollution abatement facilities and the completion of remedial actions. This phase could include constructing containment facilities or implementing decontamination processes, and associated long-term monitoring systems.

PROGRESS TO DATE

Out of a total of 911 bases, DOD's most current IRP status report shows that 473 bases have been identified as requiring Phase I studies to identify inactive hazardous waste disposal sites. A study at a given base may include multiple sites. EPA has thus far proposed inclusion of 33 of these 473 bases in its Superfund National Priorities List.[1] The National Priorities List identifies those sites deemed to pose the greatest potential for long-term threat to human health and the environment. Even if the DOD sites are added to the list, they still would not be eligible for Superfund remedial money. The reason for including them on the list is to provide higher visibility. Appendix II lists the 33 bases and depicts the status of the IRP at each base. DOD has begun corrective actions at eight of these bases.

The status of DOD's IRP effort as of September 30, 1984, by Phase is shown on page 7. (Bases proposed for EPA's National Priorities List are shown in parentheses.)

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[1] Five of the 33 bases were included in the 18 bases we reviewed.

Status of DOD's IRP Effort

	Required	Completed	In process	To be done
Phase I	473 (33)	356 (30)	58 (3)	59 (-)
Phase II	204 (28)	51 (12)	123 (16)	30 (-)
Phase III/IV[a]	72 (8)	0 (-)	38 (8)	34 (-)

[a]Some of the Phase II studies still in process at the bases have already identified sites that will need cleanup (Phase IV) efforts. Thus, a base could be listed in both categories, Phase II in process and Phase IV required. Data provided by DOD does not make a distinction between those bases that have only reached Phase III verses those which are in Phase IV.

Additional Phase I studies may be needed

A "worst first" priority system was used to schedule Phase I studies. However, DOD's initial assessment excluded certain sites, such as training installations, which now appear to contain hazardous waste and thus will require Phase I studies. Moreover, some of the Phase I studies made by the Army between 1975 and 1980 were not as extensive as those being made now, and will need to be redone.

When the Army initially assessed its bases in the mid-1970's, it determined that certain types of facilities would not be included in the IRP. Excluded were reserve and National Guard installations, office buildings, personnel training sites, and other bases that they believed did not use hazardous materials.

In a draft of this report we stated that the United States Army Toxic and Hazardous Materials Agency had revised its program to include National Guard sites. DOD in commenting on the draft, stated that only inactive owned or formerly owned sites would be reviewed for inclusion on the Army's list of sites requiring Phase I studies. Installations, such as the National Guard facility at Richmond, Virginia, which are operated by the state are the responsibility of the individual states for environmental compliance. Conversely, sites which are federally owned, such as the National Guard site in Phoenix, Maryland will be included in the IRP.

We further discussed the Richmond National Guard site with DOD officials and pointed out that the Army owned the site and was leasing it to the state. They stated that it was their policy in such cases to have the using activity, Virginia National Guard, assess and study the site to determine if there is any

contamination and who caused the contamination. If it was found that DOD's former use of the property was the cause of contamination, DOD would accept the responsibility and cost of clean up including the preliminary assessment study. This was the case at the Phoenix, Maryland site. Army officials told us that if it is found that DOD activities were the cause of the groundwater contamination at the Richmond site, then the site would be incorporated into the IRP.

The Army plans to further review the list of bases it excluded from the original assessment to determine whether additional bases should be included in the IRP.

Early Phase I studies performed by the Army before 1980[2] will also need to be reassessed. Earlier studies were not as extensive as those currently being done, and several chemicals now considered hazardous were not identified as hazardous at the time these studies were performed. For example, the Phase I study done at Fort Dix, New Jersey, in 1977 did not identify any sites as potential hazardous waste disposal sites. In 1983, evidence of a high level of organic chemicals trichloroethylene (TCE) was found at the Fort Dix landfill. At the time of the Phase I study, TCE was not considered hazardous. Subsequently, TCE was determined to be a hazardous substance. Furthermore, the Phase I record search had not disclosed that the landfill had been used for dumping chemical waste. The Army now plans to reassess Fort Dix. EPA, in October 1984, also proposed that Fort Dix be added to the National Priorities List.

In commenting on a draft of this report, DOD stated that, given the advancement of technology and establishment of new standards, it plans to reassess some of the early Phase I studies.

Phase II does not cover all base hazardous waste sites

At some bases, only a portion of the potentially hazardous waste disposal sites identified in Phase I studies are being included in Phase II surveys. DOD has decided to concentrate Phase II resources on those sites identified in Phase I as potentially the most serious. DOD officials stated that most sites were deferred because of funding restrictions although at one base, the absence of records on materials placed in a disposal site was cited as the reason for deferral.

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[2] Navy and Air Force did not formally implement the IRP until 1980.

At 6 of the 15 bases we visited which required Phase II work, some of the disposal sites were not included in the Phase II survey, as shown below.

Disposal Sites Not Included in Phase II

	Sites identified in Phase I	Sites included in Phase II
Kelly Air Force Base (AFB), Texas	14	9
Kirtland AFB, New Mexico	20	6
Mather AFB, California	20	3
Norfolk Naval Shipyard, Virginia	9	7
Defense General Supply Center, Virginia	14	5
Aberdeen Proving Grounds, Maryland	6	4

DOD officials at these bases stated that excluded sites will be reviewed at a later time. Phase II studies at the Defense General Supply Center, Kelly Air Force Base, and the Aberdeen Proving Grounds were listed as complete even though some sites were excluded from the Phase II survey.

IRP COSTS

In response to our request, DOD in June 1984 provided a projection of IRP costs through 1993 of $1.6 billion based on IRP work completed through December 1983. In February 1985 DOD's Director of Environmental Policy testified before the Military Construction Subcommittee of the House Appropriations Committee and presented the status of DOD's IRP effort as of September 30, 1984 by Phase and the latest cost estimate. Citing a dramatic increase in DOD's understanding of what costs are involved and how much it will cost to clean up each type of pollution, the Director presented a revised cost estimate of $5 billion to $10 billion. The testimony indicated that this latest estimate drew on new "EPA cost data and our own information on the number of sites we have, plus projects that will result from studies in progress..."

In his testimony the Director also stated that the uncertainty in this figure is because DOD still has over 200 Phase II studies in progress or to be started. "Costs can only rise and likewise the number of sites." he said.

After these hearing we met with DOD officials, who told us that the significant range in the current cost estimate was caused by a number of factors. The basis for the estimates, as provided to us by DOD, is presented on page 10.

Because of the uncertainty of what will have to be done at a number of the bases, DOD officials told us that they could not project when all of the cleanup work will be completed. However, they hope to have all of the required work either completed or under contract by fiscal year 1996.

DOD's IRP Cost Estimate

$5 billion estimate

Cost element	Cost (in millions)
1983 - 1985 costs	$360
Phase I studies remaining	4
Phase II studies remaining	78
Phase III work to be done	60
Phase IV	
Rocky Mountain Arsenal	350
Total sites - 400	
2 percent will average $100 million	800
8 percent will average $20 million	640
90 percent will average $6 million	2,160
Total	$4,452
Allowing for unknowns round to	$ 5 billion

$10 billion estimate

Base figure from above	$4,452
Double number of sites (Because of new standards, better locating techniques, postponed sites added) however at only $3 million per additional site	1,200
5 percent inflation through 1996	1,600
50 percent cost increase (different cleanup procedures, new standards)	2,300
Total	$9,552
Allowing for unknowns round to	$10 billion

We obtained documents supporting DOD's cost estimates and while we did not make a complete analysis of their data, we agree with the Director that the cost figures should be viewed as tentative because many specifics about the actual cost are not known. For example, at McClellan Air Force Base, one of the bases used in making the original $1.6 billion projection, before Phase II was complete the Air Force expected that the IRP would cost about $29 million. Since the projection was made and

after Phase II work was complete at some of McClellan's sites, the estimated cleanup costs for McClellan have increased to about $81 million. Estimates for selected other bases are shown in appendix III.

DOD has completed about 25 percent of its scheduled Phase II surveys. In addition to the already scheduled Phase II work, additional Phase II surveys may be required at those bases where the Phase I studies have not been completed or were inadequate or where the Phase II survey did not include all potential sites.

Through 1983 the actual costs for the IRP was only about $202 million. However, the rate of expenditure for IRP work has increased substantially as $74 million was spent in fiscal year 1984 and DOD has allocated $199 million for fiscal year 1985.

CONTRACT ADMINISTRATION

The military services have used several types of contracts to accomplish IRP studies and surveys. The Navy used firm fixed price contracts[3] for its Phase II surveys at the bases we visited; the Air Force used time and material contracts at the bases we visited.[4] At the four Navy bases we visited that used contractors, we did not find any apparent problems caused by inadequate contract administration. At the six Air Force bases, we found that contractor performance monitoring was not sufficient, given the type of contract used. The Army was not included in our review of contract administration because contractors did not do all of the IRP work at the bases we visited.

Air Force contract monitoring

According to Defense Acquisition Regulations, time and materials contracts should be "...used only where it is not possible at the time of placing the contract to estimate the extent or duration of the work or to anticipate costs with any reasonable degree of confidence." The regulations further provide that this type of contract "...does not encourage effective management control." Thus, it should be used only where provisions for adequate controls are in place, including appropriate surveillance by government personnel during performance, to give reasonable assurance that inefficient or wasteful methods are not being used. Because this type of contract does not encour-

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[3] At one of the five bases visited, the Navy had performed the work in-house.

[4] A type of cost reimbursement contract in which the overhead and profit are recovered through the labor/hour rate. Material costs are reimbursed directly.

age effective cost control and requires almost constant government surveillance, its use is permitted by Defense regulations only after determination that no other type of contract is suitable.

Defense Acquisition Regulations require, with some exceptions, that responsibility for contract administration be assigned to Defense Contract Administrative Service. Within this organization, responsibility for individual contracts is assigned to an administrative contracting officer. Among other duties, the contracting officer's functions and responsibilities include:

--Coordination of contract administration. The administrative contracting officer serves as primary coordinator of a contract administration team of functional experts which, in the case of Air Force IRP contracts, would include base, Occupational and Environmental Health Laboratory (OEHL), and Air Force Engineering Service Center officials.

--Monitoring of contractor costs. This includes establishing and maintaining cost monitoring programs with contractors meeting certain qualifications. The contracting officer is responsible for assuring that contracts are fulfilled in the most efficient and effective manner and is expected to call upon DOD specialists to review and report on contract functions.

Monitoring of the four IRP Phase II contracts did not satisfy these requirements at four of the Air Force bases we visited. For example, OEHL assumed responsibility for some contract administration and monitoring functions. However, neither OEHL or the Defense Contract Administrative Service have established cost monitoring programs or verified reported contractor progress and results. OEHL officials review and approve certificates of service which are signed listings of hours worked by contractor personnel. These certificates of service are used to support invoices provided to contracting officers who in turn approve them for payment. Contractors' costs for material are similarly submitted to contracting officers for reimbursement. Administrative contracting officer's roles were limited to processing contractors' invoices.

Because they were not actually checking on the work performed by the contractor, neither OEHL nor the contracting officer could state with assurance that the labor or materials charged on the contractors' invoices were reasonable in nature or amount. Nor could they assure themselves that the contractor was performing the work required by the contract.

CONCLUSIONS

DOD is in the early phases of implementing its IRP, which is designed to identify and clean up hazardous waste sites on DOD-owned bases. As a result, the full scope and cost of DOD's clean-up effort will not be known for some time. In February 1985, DOD testified that the program could ultimately cost between $5 billion and $10 billion.

As of September 30, 1984, DOD had identified 473 bases that will require at least Phase I hazardous waste management assessments and DOD had completed 356 or 75 percent of them. DOD's initial hazardous waste assessment effort done by the Army in the late 1970's, however, excluded certain installations from analysis which now appear to have contained hazardous waste. As a result, the Army plans to further review the list of bases it excluded from the original assessment to determine whether additional bases should be included in the IRP.

We also observed that some of the early Phase I studies done by the Army between 1975 and 1980 were not as extensive as those being done now and will need to be redone. In addition, several chemicals now considered hazardous were not identified as hazardous at the time the studies were made. Moreover, we found that at some bases, only a portion of the potentially hazardous waste disposal sites identified in the completed Phase I studies were included in Phase II surveys. During our review DOD officials told us they had decided to concentrate Phase II resources on those sites identified in Phase I as potentially the most serious because of funding limitations, although the absence of records was cited as a reason at one base.

We did not find any apparent problems caused by inadequate contract administration at the four Navy bases visited and did not include the Army in our review of contract administration because contractors did not do all of the IRP work at the Army bases visited. However, we noted problems with Air Force contractor performance monitoring of time and material contracts for preparing Phase II studies at the six bases we visited. Because of the limited scope of our review, we are not recommending corrective action be taken. However, we believe that this issue warrants the attention of DOD officials.

AGENCY COMMENTS AND OUR EVALUATION

DOD agreed that it will be necessary to reassess some of the early Phase I studies. They commented that these studies were state-of-the-art when completed but may be obsolete due to advances in techniques and technology or the establishment of new standards.

In its comments, DOD pointed out that no Phase I sites had been eliminated from Phase II surveys, but agreed that there had been situations where Phase II surveys were deferred due to funding restrictions. However, DOD said that, with increased funding in fiscal years 1984 and 1985, future deferments of Phase II surveys should be minimal. DOD further stated in this regard, that only inactive, owned or formerly owned sites would be reviewed for inclusion on the Army's list of sites requiring Phase I studies.

EPA commented that the use of criteria such as funding restrictions and inadequate records for deferring or eliminating sites appears to be "environmentally unacceptable." EPA further stated that the use of such criteria calls into question the adequacy of existing Phase I and II reports. EPA commented that GAO should consider recommending that DOD conduct a systematic reevaluation of all existing Phase I and II reports, in cooperation with regulatory agencies using CERCLA criteria.

While we did express concern about the adequacy of certain Phase I and II studies; a number of the studies we reviewed were done properly. However, since we examined only a small number of bases--eighteen--we do not have a sufficient basis to support a re-evaluation of all Phase I and II studies.

DOD commented that the Air Force's use of time and material contracts was appropriate since it is not always possible to estimate the extent or duration of Phase II work required or the expected costs at a given site. DOD also stated that the Air Force has taken steps to improve contract monitoring. For example, new contracts call for four specified monthly contractor reports. Also, a procedural guide to field level contract monitors is in development. We are encouraged by the actions DOD cited and if properly implemented, they should help improve contractor performance monitoring.

CHAPTER 3

EFFECT OF EPA AND STATE STANDARDS ON THE IRP

The amount of pollutants permitted in groundwater is a key determinant of the effort required of DOD to clean up hazardous waste sites. EPA, although responsible for managing CERCLA, has no legislative responsibility for establishing national standards for pollutants in groundwater. In the absence of CERCLA pollution standards, EPA has proposed a policy of applying environmental standards required by other laws at hazardous waste sites. However, these other standards do not address all of the substances and conditions found at hazardous waste sites. At the time of our review, in the absence of national standards, most states had only established informal non-regulatory standards for pollutants in groundwater. DOD's practice is to attempt to meet informal standards if regulatory standards have not been established. However, DOD policy only requires that regulatory standards be met and does not address the extent to which informal standards should be met.

EPA AND STATE STANDARDS

One of the primary problems caused by improper disposal of hazardous waste is that the contaminants from these disposal sites leak into groundwater below them. Groundwater is the source of drinking water for about 50 percent of the population. Although there is no legislation that is directed toward comprehensive groundwater protection, the Congress has enacted six laws[1] that address specific sources of groundwater contamination. One of them, CERCLA, was passed to deal with the problems associated with contamination resulting from inactive hazardous waste disposal sites.

EPA is responsible for administering the various laws concerning groundwater protection including CERCLA. The U.S. Code of Federal Regulations lists over 600 chemicals that if improperly disposed of could become harmful contaminants in groundwater. There is one major group of chemicals, organic chemicals, that is particularly troublesome to DOD. Organic chemicals include those used in solvents which is one of the primary sources of contamination from inactive hazardous waste disposal sites on DOD bases.

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[1] Other than CERCLA, the laws are (1) the Clean Water Act, (2) the Safe Drinking Water Act, (3) the Resource Conservation and Recovery Act, (4) the Surface Mining Control and Reclamation Act, and (5) the Uranium Mill Tailings Radiation Control Act.

Regulatory standards have not been established

EPA is not responsible for setting national standards for pollutants in groundwater. However, EPA is in the process of setting standards for nine synthetic organic chemicals in drinking water. These standards can be applied to groundwater when it is a source of drinking water supply. Because of the demands of the regulatory process, EPA estimates that enforceable standards and testing and reporting requirements for the nine chemicals will not be finalized until January 1986.

In the absence of national standards most state regulatory agencies have begun the process of establishing formal standards and other requirements (including administrative, testing, control, and cleanup requirements) for some of the hazardous waste contaminants in groundwater in their state. Groundwater standards for all chemicals have not been set by any state. Usually, setting regulatory standards involves research and testing to determine the level at which a contaminant becomes harmful to human health as well as evaluating the costs and benefits of alternative standards.

However, at the time of our review, the groundwater standards being established by the states were informal and non-regulatory in nature, and subject to change. Specifically, these informal non-regulatory standards are those where the state regulatory agencies have not taken all of the actions, such as giving the public a chance to comment on the proposed standards, to get them approved for inclusion in the regulations.

Moreover those informal standards that have been established for the same contaminant vary considerably among the states. The variance from state to state is demonstrated by the informal non-regulatory standards set for Trichloroethylene (TCE), one organic chemical which is one of the primary contaminants at DOD bases. We found that the level set varied widely: 70 parts per billion (ppb) by Connecticut, 50 ppb by New Jersey, 5 ppb by Arizona, and 4.5 ppb by California.

To further illustrate the variance in informal standards, EPA's regional offices provided us data that revealed how 24 states were dealing with organic compounds. Eight states had no organic compound standard while the remaining 16 states had developed informal standards. Differences in the informal standards for these states are illustrated on page 17.

States	Standards for organic compounds
8	No criteria.
4	Use SNARLS[a]--no risk level indicated.[b]
6	Use SNARLS--1:100,000 risk level.
1	100 ppb for total compounds.
1	20 ppb for total compounds if no SNARLS.
1	50 ppb for one; 100 ppb for total compounds.
3	Action levels for some contaminants ranging from 0.1 ppb to 300 ppb.

[a] EPA's Office of Drinking Water provides advice on health effects concerning unregulated contaminants found in drinking water supplies. The advisories are called Suggested No Adverse Response Levels (SNARLS). SNARLS are not legally enforceable standards, they are not issued as an official regulation, and they may or may not lead ultimately to the issuance of national standards.

[b] SNARLS suggest ranges of allowable pollutants. Levels within ranges have different risk levels. For example, a risk level of one additional death per 100,000 population (1:100,000) would be associated with a particular level of allowable pollutants.

In addition to the variation among state informal standards, many states are in the process of revising the informal standards i.e., creating new informal standards. We noted that proposed revisions to these informal standards are usually more stringent than the ones they would replace.

While the states have not set regulatory standards for groundwater, EPA and the states have set standards for contaminants allowed in drinking water. These standards can be applied to groundwater when it is a source of drinking water supply. In some cases because there are only informal non-regulatory groundwater standards, some states have used these drinking water standards as a means to require DOD to clean up inactive hazardous waste sites when the states can demonstrate that contamination from the site is the cause of drinking water contamination.

DOD EFFORTS TO MEET STANDARDS

The military services' guidance provides that DOD bases comply with federal and state regulatory standards. However, DOD guidance does not explicitly address the extent to which DOD bases are required to meet states' informal, nonregulatory standards.

Although there is no stated policy, DOD bases are generally attempting to comply with states' informal standards and associated administrative requirements. IRP activities at the 18 bases we reviewed were designed to comply with informal standards. Officials in DOD's Office of Environmental Quality, responsible for setting IRP policy, stated that this practice was being followed at other DOD bases.

The cost implications of this approach are not known. The largest IRP costs will be incurred in Phase IV, the cleanup phase, which involves the design, construction, and operation of pollution abatement facilities. Phase II studies, which identify the scope of the needed cleanup effort, have not been completed at over three-quarters of the bases, and cleanup efforts have begun at only 38 bases.

Informal standards and associated administrative procedures have not been subject to the full regulatory process which generally would provide for consideration of clean up cost in determining the appropriate level of stringency. The process would generally provide for an assessment of the costs and benefits of alternative levels of stringency. In setting regulatory standards, the public--including private industries which, like DOD, would have to comply with the proposed standard--would be given the opportunity to comment on the proposed regulation.

CONCLUSION

Informal standards and administrative requirements for groundwater contaminants vary from state to state. This variance does not, by itself, pose serious implementation problems; it simply requires that base IRP efforts be designed to deal with the applicable state informal standards. However, complying with these informal standards may pose problems for DOD. Informal standards have not been subject to the full regulatory review which generally provides for consideration of the costs and benefits associated with implementing the standard. In the absence of a regulatory review, the involved parties may need to more fully evaluate the cost of meeting the informal standards and balance that cost against the benefits to be derived. This will become increasingly important as more information becomes available on the scope of needed cleanup efforts to meet the informal standards.

AGENCY COMMENTS AND OUR EVALUATION

DOD stated that the lack of formal standards is the most serious obstacle to DOD's hazardous waste program. DOD explained that if it is responsive and cleans up to informal standards levels only to have the levels raised later, more money will have been spent than necessary. (Although not mentioned by DOD, the reverse could also be true.) DOD pointed out

that if it delays clean up until formal standards are available, DOD will be criticized for not cleaning up fast enough. In a discussion subsequent to our receipt of DOD's comments, a DOD official also advised us that it has initiated a series of meetings with EPA and some state regulatory agency officials to obtain further clarification of DOD's responsibilities.

We agree that the lack of formal federal and state standards is a serious problem and believe that it increases the need for close coordination between DOD, EPA, and the respective state regulatory agencies. In a separate report[2] on the Superfund program, we present information and alternatives to the Congress for its consideration during deliberations on reauthorization of the Superfund Act. The information we developed suggests that the Congress should consider the merits of changing the Act's structure. We recognize in the report that the lack of precise data on the health and environmental effects of hazardous waste sites makes standard setting difficult. Nevertheless, if we are to provide consistant cleanup on a national basis, we believe it is important that, where feasible, reasonably uniform criteria be established to govern both federal and state cleanup decisions.

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[2]Cleaning Up Hazardous Wastes: An Overview of Superfund Reauthorization Issues (GAO/RCED-85-69, March 29, 1985.)

CHAPTER 4

DOD POLICY ON COORDINATION WITH REGULATORY AGENCIES SHOULD BE REVISED

The lack of formal regulatory federal and state groundwater standards for allowable contaminants and the variance of the currently used informal standards from state to state increases the need for close coordination of base IRP activities with regulatory agencies. DOD policy calls for coordination with EPA and state authorities, however, the level of coordination prescribed is not sufficient to preclude problems that may arise with EPA and state regulatory agencies or to facilitate efficient implementation of the IRP.

DOD POLICY CALLS FOR COORDINATION WITH EPA AND STATE REGULATORY AGENCIES

In various policy statements since 1976, DOD has stated that the military services will advise regulatory agencies, such as EPA, and state and local government environmental agencies, of IRP activities and progress. CERCLA and the Resource Conservation and Recovery Act provide for EPA to insure that federal agencies, including DOD, assess, identify, control, and if necessary clean up hazardous waste disposal sites. The Safe Drinking Water Act also gives EPA authority to have DOD clean up its hazardous waste disposal sites when their sites are the source of drinking water contamination.

State regulatory agencies have set up programs to monitor, inspect, and oversee the hazardous waste programs in the states.

On December 11, 1981, the Assistant Secretary of Defense (Manpower, Reserve Affairs, and Logistics) signed Policy Memorandum 81-5 updating DOD's IRP policy. The policy requires DOD components to advise EPA[1] regional offices and state and local governments of IRP activities. The notification is to include

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[1] In August 1983, EPA and DOD signed a memorandum of understanding to clarify each organization's responsibilities and commitments for conducting and financing response actions authorized by CERCLA. Under this agreement, DOD and EPA are to exchange information on a regular basis. They are to inform each other at the earliest possible stage of any evidence of contamination, types, and potential actions. Each agency, after technical and peer review, will, on request, submit drafts of specific technical reports to each other for review.

announcement of scheduled record searches, projects, and finished reports. Also, these agencies are to be notified promptly when contamination problems pose an immediate threat to public health, welfare, or the environment. Problem notification was not to be delayed until publication of final technical reports. In an August 20, 1982 letter, the Deputy Assistant Secretary of Defense (Facilities, Environment, and Economic Adjustment) reminded the services of DOD's policy.

Military services' implementation of DOD policy

The services interpreted and implemented DOD's 1981 guidance differently. The Navy's policy basically restates DOD's 1981 policy. Until the Air Force revised its policy in 1984, the Air Force policy basically restated the 1981 DOD policy. In 1984 the Air Force revised its policy to provide for considerable involvement and collaboration with regulatory agencies. The Army's policy basically restates DOD's policy, but its implementation of DOD's policy is the most restrictive of the three services. All services' implementing guidance requires prompt notification of regulatory agencies when contamination problems pose an immediate threat to health, welfare, or the environment.

Coordination efforts at the Army, Navy, and Air Force bases we visited are discussed below and summarized in appendix IV.

Army policy

Army's policy is to keep the public fully informed of IRP activities including scheduled record searches, surveys, projects, and finished reports. However, in implementing Army's policy, the U.S. Army Toxic and Hazardous Materials Agency has limited coordination requirements to those bases having a potential for hazardous waste to migrate off base. As a result, the Army activities do not routinely furnish copies of IRP reports to EPA and state regulatory agencies or notify them of IRP efforts. Phase I and II reports are furnished only in final form and only if the regulatory agencies request them, except when off-base migration of contaminants is identified.

The Toxic and Hazardous Materials Agency followed its restricted implementation of Army policy at the six Army bases we reviewed. None of the bases initially notified regulatory agencies of IRP activities. Also, the bases did not initially provide regulatory agencies the Phase I report because they did not believe there was any off-base contamination. However, at the three bases which have completed Phase II, IRP work revealed that there was potential off-base contamination.

Coordination efforts at two of these three bases, Aberdeen and Sacramento, eventually exceeded the Toxic and Hazardous

Materials Agency's guidelines on coordination during latter phases of the IRP. For example, although not required by the guidelines, EPA and state officials were given the opportunity to review Aberdeen Phase IV plans and monitor their implementation and a draft of Sacramento's Phase II report was provided to regulatory agencies.

Navy policy

Under Navy policy, base commanders are responsible for notifying EPA and applicable state agencies of each base's IRP phase and providing them with final Phase I and Phase II studies. In addition, when requested, bases are to provide data to EPA and state and local agencies through the Naval Facilities Engineering Command's field divisions.

Two of the five Navy bases we visited exceeded these basic requirements. Both Alameda and McGregor provided Phase II draft reports to regulatory agencies for their evaluation. The other three Navy bases were following Navy policy concerning coordination.

Air Force policy

Air Force policy, until revised in the latter part of 1984, was similar to Navy policy. It called for bases to notify regulatory agencies of IRP activities, provide these agencies with Phase I and Phase II reports, and respond to requests for additional data.

In 1984, the Air Force issued revised guidance which significantly expanded coordination requirements.[2] A management guide for Phase IV was issued in January 1984. The guide provided that Phase IV coordination include distributing draft action plans to regulatory agencies, inviting their comments, and providing these agencies with finalized action plans.

In February 1984, the Phase II portion of the guide was issued. Phase II was broken down into several stages. For each stage, a task description is to be prepared and regulatory agencies are to be given an opportunity to comment on them. After completion of each stage, a report is to be prepared and the draft submitted to the regulatory agencies for comment. Finalized reports are to be distributed to the regulatory agencies and interested congressional offices. The revised guide also stated that Phase I is not to be considered complete until regulatory agencies have reviewed and commented on the Phase I report.

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[2] The guidance was provided in draft form in September 1983.

In March 1984, the Air Force issued additional guidance that provided for release of draft Phase I reports to regulatory agencies after they had received internal technical review.

Air Force officials stated the changes were made to insure that base IRP activities meet regulatory agency requirements. In past instances, regulatory agency dissatisfaction with base programs had resulted in considerable tension and adverse publicity; it is anticipated that expanded cooperation will minimize such problems.

At the six Air Force bases we visited, we found that coordination efforts before 1984 complied with the policy in effect at that time, except that two bases, Langley and McGuire, did not initially notify regulatory agencies of IRP activities. Another base, Kelly, provided the Phase I report only after repeated requests from regulatory agencies. All of the bases were in the process of implementing the revised 1984 guidance.

INCREASED COORDINATION NEEDED

Although the bases we reviewed generally complied with applicable DOD and service guidance, the level of coordination effort was not adequate. Regulatory agencies raised concerns with Phase I and II reports. As a result of the regulatory agencies' concern, some of the IRP work had to be redone. IRP implementation would be facilitated by expanded collaboration with regulatory agencies, as provided for by Air Force's recently revised guidance.

Six of the 18 bases we reviewed experienced or faced implementation difficulties which would likely have been minimized by earlier involvement of regulatory agencies.[3] Three other bases benefited from regulatory agency involvement in developing IRP plans; i.e., state concerns were made known before the work was implemented.[4] Six of the remaining bases,[5] all currently implementing Phase II, have had minimal contact with regulatory agencies, but we did not observe any adverse effects from the limited regulatory agency involvement. At two bases, Langley AFB, Virginia, and the McGregor Naval Weapons Industrial Reserve

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[3] Bases are Alameda, Sacramento, and McClellan in California; Fort Dix, New Jersey; Fort Eustis, Virginia; and Aberdeen, Maryland.

[4] Bases are Defense General Supply Center, Virginia, Kelly in Texas, and Mather in California.

[5] Bases are Camp Lejeune and Cherry Point in North Carolina, Kirtland in New Mexico, Longhorn in Texas, Norfolk Shipyard in Virginia, and McGuire in New Jersey.

Plant, Texas, state officials reviewed and concurred in IRP plans. At the remaining base (Fort Lee), IRP work was terminated since Phase I revealed that there were no hazardous waste sites on the base.

State officials in four of the seven states we visited (California, Maryland, New Jersey, and Texas) indicated that close coordination is necessary to assure that IRP programs comply with state requirements. State officials indicated that they had participated in the IRP to the extent permitted by the bases. Officials of North Carolina and Virginia indicated they did not have adequate resources to adequately monitor IRP activities, while New Mexico officials viewed the IRP as a federal program not subject to state control.

Five of the nine bases where we found that increased coordination had or could have been beneficial are discussed below. These examples illustrate the potential benefits of sharing information and involving the regulatory agencies early in the IRP process. The remaining four bases are discussed in appendix V.

McClellan Air Force Base

McClellan, consistent with Air Force policy existing in 1980 when the Phase II began, initially refused California's requests for information on Phase II plans and preliminary Phase II data. (Limited information on the design of monitoring wells was subsequently provided.) California officials also requested, and were refused, the draft Phase II report. When the final Phase II report was presented, California officials questioned the adequacy of the Phase II survey and identified areas where state requirements were not met, forcing McClellan to reopen and expand Phase II work. For example, California officials found that Phase II work did not include sampling of contamination sites to identify what contaminants were present, an essential and required step to determine the appropriate control and cleanup approach. Other deficiencies were identified which required additional IRP work. Had state officials been involved in designing the Phase II study these issues may have been resolved, thus avoiding the inefficiencies associated with closing and then reopening the study.

Aberdeen Proving Grounds

In 1983 EPA and Maryland officials identified deficiencies with Aberdeen's Phase II implementation and the final Phase II report. Specifically, they found that Phase II testing and other data were not adequate to identify specific contaminants, how toxic the compounds were, or how far the contaminants had spread. Furthermore, the Phase IV plan of action for control-

ling the contamination was found lacking and a revised plan was requested. Aberdeen undertook further work to address these concerns. Again the inefficiency of starting and stopping work might have been avoided by earlier coordination.

Fort Eustis

Fort Eustis's Phase I report identified a high potential that contaminants from the base's disposal sites were migrating to the James River. However, because the contamination involved surface water rather than groundwater, the Toxic and Hazardous Materials Agency terminated the IRP after Phase I; the Agency views the IRP as limited to problems with groundwater contamination. (The Navy and Air Force include all contamination stemming from base hazardous waste sites in their IRP.) Virginia officials indicated that there are requirements for surface water that the base is expected to meet. Virginia officials also stated that, as of November 1984, Army officials have not requested information on these requirements. Early coordination and agreement in this case may have avoided what is now an unresolved disagreement.

Kelly Air Force Base

Kelly Air Force Base provided Texas officials with the final Phase I report and a draft work plan for Phase II. State officials identified a highly contaminated site that had not been included in the Phase I survey. As a result, the Air Force modified its Phase II work plan and has included the site in the Phase II work. Here early involvement almost certainly avoided the need to reopen the Phase II study.

Although Texas Department of Water Resources officials said they were satisfied with the role they have been allowed to play in the IRP, they are dissatisfied with the pace of IRP implementation. Texas officials stated that because of the slowness of IRP progress, the Department of Water Resources (as of January 1985) had a request on file with the Texas Attorney General's Office to prepare a suit against DOD and Kelly Air Force Base, calling for cleanup of four hazardous waste sites at the base.

Mather Air Force Base

Officials at Mather Air Force Base shared Phase II work plans with the California regulatory agencies. California officials expressed concerns with these plans. For example, California officials questioned the proposed method for analyzing samples of groundwater and the number of samples planned. Phase II plans were modified to address these concerns and California officials have expressed satisfaction with the way their concerns were being handled. Again this early involvement should

avoid latter questions and/or the need to reopen the Phase II study.

CONCLUSIONS

While bases have generally followed the 1981 DOD and applicable service guidance on coordination, the level of coordination efforts and involvement of regulatory agencies in the IRP could be increased to help facilitate the efficient implementation of the IRP. The regulatory agencies have identified deficiencies in Phase I and Phase II surveys, leading to the need to redo or expand IRP work. Earlier involvement and/or more thorough coordination may have avoided these situations or at a minimum surfaced areas of disagreement earlier in the process. We believe DOD's coordination policy should be revised to call for increased EPA and state and local regulatory agency involvement in IRP planning and finalizing of IRP work.

AGENCY COMMENTS AND OUR EVALUATIONS

In a draft of this report, we proposed that the Secretary of Defense revise IRP policy on coordination with state regulatory agencies and that the revised policy should provide for increased and earlier involvement of these agencies.

The California Regional Water Quality Control Board, Central Valley Region, stated that it strongly supported this proposal and that "...this action should improve the quality of environmental survey results and allow for more timely cleanup of contaminants that threaten water quality in the region".

Florida's Department of Environmental Regulation also indicated its strong support for the proposal. It commented that state involvement must be improved and state concerns incorporated in the early phases. Otherwise, the clean up of sites runs the risk of being inadequate and unacceptable to the state. It also expressed concern with other aspects of the Installation Restoration Program, not specifically addressed in this report. (app. IX.)

DOD also agreed with our proposal stating it would issue a revised policy by May 1985 to provide for increased and earlier involvement of state regulatory agencies. It also stated that it would be appropriate to update its 1981 policy in light of the refinements in EPA and state regulations applying to hazardous waste clean up which occurred since 1981.

EPA commented that the proposal should be broadened to include EPA. After reconsidering our proposal, we agree that EPA should be included because of their expertise in the

hazardous waste field and as a result they would contribute significantly in developing studies and alternatives for hazardous waste cleanup efforts. EPA also stated that in revising its policy, DOD should provide for uniform implementation of the coordination effort with regulatory agencies at each step of the IRP process. It was our intent that this action be covered in the initial proposal, therefore we have clarified the language accordingly. The modified recommendation was discussed with DOD officials who concurred with the changes.

DOD also commented that Army policy is consistent with DOD's policy requiring notification of regulatory agencies of IRP activities and finished reports. We modified our report to reflect that Army's policy is the same as DOD's.

RECOMMENDATION

We recommend that the Secretary of Defense revise the IRP policy on coordination with regulatory agencies. The revised policy should provide for increased and earlier involvement of EPA and state regulatory agencies in all IRP Phases and should be uniform for all services.

DOD STATUS OF IRP AT BASES GAO VISITED

IRP Phase	Bases	Location
Phase I (3)		
Limited Phase I complete (1)	Fort Dix	Wrightstown, NJ
Complete (2)		
No further work to be done	Fort Eustis	Newport News, VA
	Fort Lee	Petersburg, VA
Phase II (13)		
In process (7)	Norfolk Shipyard	Norfolk, VA
	Alameda Naval Air Station	San Francisco, CA
	Camp Lejeune	Jacksonville, NC
	Cherry Point Marine Corps Air Station	Havelock, NC
	Kirtland Air Force Base	Albuquerque, NM
	Mather Air Force Base	Sacramento, CA
	McGuire Air Force Base	Wrightstown, NJ
Complete (6)		
No further work (1)	Sacramento Army Depot	Sacramento, CA
Further work to be done (5)	Aberdeen Proving Grounds[1]	Edgewood, MD
	Longhorn Ammunition Plant	Marshall, TX
	Kelly Air Force Base[1]	San Antonio, TX
	McGregor Naval Weapons Industrial Reserve Plant	Konarch, TX
	Defense General Supply Center[1]	Petersburg, VA
Subsequent work underway (2)	Langley Air Force Base	Newport News, VA
	McClellan Air Force Base	Sacramento, CA

[1]As discussed on page 9, these three bases were listed as complete even though some sites were excluded from the Phase II survey.

STATUS OF IRP AT DOD BASES PROPOSED FOR INCLUSION ON EPA'S NATIONAL PRIORITIES LIST

	State	IRP Phase I	II	III	IV
Alabama Army Ammunition Plant	AL	C	C	IP	PC[1]
Anniston Army Ammunition Plant	AL	C	C	C	IP
Castle Air Force Base	CA	C	IP	-	-
Mather Air Force Base	CA	C	IP	-	-
McClellan Air Force Base	CA	C	C	IP	IP
Norton Air Force Base	CA	C	IP	-	-
Sacramento Army Depot	CA	C	C[2]	-	-
Sharpe Army Depot	CA	C	C	-	-
Rocky Mountain Arsenal	CO	C	IP	IP	IP
Dover Air Force Base	DE	C	IP	-	-
Robins Air Force Base	GA	C	IP	-	-
Joliet Army Ammunition Plant	IL	C	C	-	-
Savanna Army Depot	IL	C	C	IP	-
Louisiana Army Ammunition Plant	LA	C	IP	-	-
Brunswick Naval Air Station	ME	C	IP	-	-
Lake City Army Ammunition Plant	MO	C	IP	-	-
Weldon Spring Facility	MO	C	C	-	-
Cornhusker Army Ammunition Plant	NE	C	IP	-	-
Fort Dix	NJ	PC[3]	-	-	-
Naval Weapons Station, Earle	NJ	C	IP	-	-
Griffiss Air Force Base	NY	C	IP	-	-
Umatilla Army Depot	OR	C	C	-	-
Letterkenny Army Depot	PA	C	C	-	-
Milan Army Ammunition Plant	TN	C	C	-	IP
Air Force Plant #4	TX	C	IP	-	-
Lone Star Army Ammunition Plant	TX	C	IP	-	-
Hill Air Force Base	UT	C	IP	-	IP
Ogden Air Force Base	UT	C	PC	-	-
Tooele Army Depot	UT	C	C	-	-
Defense General Supply Center	VA	C	IP	-	IP
Bangor Ordnance Disposal Site	WA	C	-	-	-
Fort Lewis	WA	IP	-	-	-
McChord Air Force Base	WA	IP	IP	-	-

[1] One of seven sites completed
[2] Phase II to be reopened
[3] Phase I is to be redone

C - Complete
PC - Partially complete - IRP work at some of the sites is completed, while it is in process at other sites.
IP - In process - Work at all sites is in process.

APPENDIX III

EXAMPLES OF COST ESTIMATE REFINEMENT AT SELECTED AIR FORCE BASES

	September 1983	January 1984	October 1984
	- - - -	-(millions)-	- - -
McClellan AFB, California	$12.3	$29.9	$81.1
Hill AFB, Utah	6.1	10.4	9.4
Robins AFB, Georgia	4.3	14.2	13.7
Edwards AFB, California	5.0[a]	5.0[a]	9.4
Eglin, Florida	5.0[a]	5.0[a]	7.2
McChord, Florida	5.0[a]	5.0[a]	3.7

[a] Based on the average costs for all Air Force bases.

Summary of Regulatory Agency Involvement in IRP

Installation	Announce IRP activities	Provided Phase I report	Provided Phase II draft report	Regulatory agencies comment on draft	Provided Phase II report	Regulatory agencies comment on report	Regulatory agencies participate in IRP implementation[1]	Participation in future IRP work[1]
AIR FORCE								
Kelly AFB	Yes	No/Yes[2]	No	No	NA	NA	Yes	Yes
Kirtland AFB	Yes	Yes	NA	NA	NA	NA	No/Yes[2]	Yes
Langley AFB	No/Yes[2]	Yes	No	No	Yes	Yes	Yes	Yes
Mather AFB	Yes	Yes	No	No	NA	NA	Yes	Yes
McClellan	Yes	Yes	No	No	Yes	Yes	No/Yes[2]	Yes
McGuire AFB	No	Yes	NA	NA	NA	NA	No	Yes
ARMY AND DEFENSE LOGISTICS AGENCY								
Aberdeen Proving Grounds	No	No/Yes[2]	No	No	Yes	Yes	Yes	Yes
Fort Dix[3]	NA	NA	NA	NA	NA	NA	NA	Yes
Fort Eustis	No	No	NA	NA	NA	NA	No	NA
Fort Lee	No	No	NA	NA	NA	NA	No	NA
Longhorn AAP	No	No/Yes[2]	No	No	No/Yes[2]	No	No	No
Sacramento Depot	No/Yes	No/Yes[2]	Yes	Yes	No/Yes[2]	Yes	No	Yes
DGSC[4]	Yes	No	NA	NA	NA	NA	Yes	Yes
NAVY								
Alameda NAS	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Camp Lejeune	Yes	Yes	NA	NA	NA	NA	No[5]	No
Cherry Point MCAS	Yes	Yes	NA	NA	NA	NA	No[5]	No
McGregor NWIRP	Yes	Yes	Yes	Yes	Yes	Yes	No/Yes[2]	Yes
Norfolk Shipyard	Yes	Yes	No	NA	NA	NA	No	No

[1] Participation involves reviewing and commenting on work plans and/or monitoring IRP implementation.
[2] Provided data only after the regulatory agencies requested it.
[3] Only a limited Phase I done for one site.
[4] The Army Toxic and Hazardous Materials Agency made the IRP studies for the Defense Logistics Agency.
[5] Regulatory agencies do not plan to participate.
NA - Not applicable indicating that the base IRP work has not reached this point yet.
No/Yes - Indicates that the base did not initially perform the action, but later did so.

APPENDIX IV

COORDINATION WITH REGULATORY AGENCIES

We identified nine bases which experienced implementation difficulties that could have been minimized by earlier involvement of regulatory agencies, or which benefited from regulatory agency involvement in developing IRP plans. Five cases are discussed in chapter 4. The remaining four are discussed below.

Alameda Naval Air Station

Alameda provided the California Regional Water Quality Control Board and the Department of Health Services a copy of its Phase I report in which 12 sites were identified as potential hazardous waste sites to be surveyed under Phase II. Alameda decided to limit Phase II to the seven worst sites. Thus far, Phase II work has only been performed at one site, the West Beach landfill. A preliminary copy of the West Beach landfill study was sent to the Board, and subsequently, a plan for closing the landfill was submitted for Board approval. The Board approved the closure plan. The plan was not submitted to Health Services because Alameda officials did not believe that Health Services' approval was required for "Class II" landfills i.e., ones without significant amounts of hazardous waste. Health Services officials told us they are supposed to be consulted on closure plans for all hazardous waste sites.

When the Phase II report was subsequently furnished to the Department of Health Services, they expressed concerns about the IRP work at Alameda. Specifically, they questioned the;

--Navy's basis for recommending that only seven of the 12 sites be included in Phase II,

--adequacy of the methodologies recommended in the Phase I report for determining whether hazardous wastes were present in the seven sites, and

--adequacy of the Phase II work, including the placement of wells and methodology used in sampling the landfill site.

The Health Services engineer responsible for reviewing Alameda's plan told us that Health Services may require Alameda to do additional sampling to determine the type and extent of the contamination from the landfill.

Sacramento Army Depot

When provided with Sacramento's Phase II report, California officials questioned the adequacy of the work and expressed

disagreement with the report's conclusions. The report concluded that contaminants were not migrating off base in concentrations that exceeded state standards and that no further IRP work was needed. The state requested that additional tests be done to define the extent of water and soil contamination. Phase II was reopened. Additional testing revealed that organic compounds in the depot's water greatly exceeded state standards. Furthermore, preliminary results of an evaluation of the Phase I and Phase II surveys indicated that on-base contamination and the potential for off-base migration was greater than reported in the Phase II survey.

Fort Dix

The 1977 Phase I study at Fort Dix dealt primarily with radiological contamination at a base missile site (BOMARC). It concluded that, except for the missile site, Fort Dix was not contaminated with chemical, biological, or radiological materials.

In 1983, a high concentration of organic chemicals was discovered in the Fort Dix landfill, calling into question the depth of the Phase I records search. The discovery was made as a result of tests undertaken to meet New Jersey requirements for operating a landfill. New Jersey officials requested, and Fort Dix agreed, that additional sampling and testing be done at the landfill. New Jersey officials have also suggested approaches for controlling the spread of contaminants. In 1984, Army officials also decided to conduct a new Phase I study to identify other potential hazardous waste sites.

Defense General Supply Center

As a result of publicity on potential groundwater contamination, Virginia officials have taken an active interest in on-going phase II efforts at Defense General Supply Center. Virginia officials have independently sampled water and soil in the area and have worked with base officials to develop a sampling and monitoring plan to determine the type, extent, and direction of contamination. State officials have also participated in decisions on siting of monitoring wells. Tests conducted thus far have shown that contaminants were migrating off base and contaminating nearby drinking-water supplies. As a result, the base has begun supplying bottled water to affected residents.

APPENDIX VI

THE ASSISTANT SECRETARY OF DEFENSE

WASHINGTON, D.C. 20301

MANPOWER,
INSTALLATIONS
AND LOGISTICS

27 DEC 1984

Mr. Frank C. Conahan
Director, National Security and
International Affairs Division
General Accounting Office
Washington, DC 20548

Dear Mr. Conahan:

This is in response to the General Accounting Office (GAO) Draft Report dated October 30, 1984, entitled, "DoD Efforts to Clean Up Inactive Hazardous Waste Sites" (GAO Code No. 9456619, OSD Case No. 6639).

The Department of Defense concurs in the majority of findings and recommendations. Detailed comments are set forth in the enclosure hereto.

The opportunity to comment on the report in draft form is appreciated.

Sincerely,

Jerry L. Calhoun
Principal Deputy Assistant Secretary of Defense
(Manpower, Installations & Logistics)

Enclosure

APPENDIX VI

DoD Comments to
GAO Draft Report Dated October 31, 1984
(GAO Code 945619 - OSD Case No. 6639)
"Subject: DoD Efforts To Clean Up
Hazardous Waste Sites"

FINDING A: The Status of the Installation Restoration Program Indicates That Additional Phase I Studies May Be Needed. GAO found that DoD has indentified 463 bases that will require at least Phase I inactive hazardous waste disposal studies, 32 of which have been included in the EPA List of Superfund National Priorities. There are four installation restoration program (IRP) phases. GAO found, however, that a "worst first" priority system was used to identify the sites and as a result excluded certain sites such as National Guard installations, office buildings, personnel training sites, and other bases which now appear to contain hazardous waste and will require Phase I studies. For example, the United States Army Toxic and Hazardous Materials Agency (USATHAMA) discovered that the Virginia National Guard site next to the Defense General Supply Center in Richmond, Virginia, was contaminating the ground water due to past usage and disposal of hazardous materaials (trichloroethylene). The Army now plans to further review the list of bases it excluded from the original assessment to determine whether additional bases should be included in the IRP. Further, GAO found that earlier Phase I studies were not as extensive as those currently being done and several chemicals now considered hazardous were not identified as hazardous at the time these studies were performed. GAO concluded that the majority of targeted bases are still in the early identification and confirmation phases of the program, and the full scope of the cleanup effort will not be known until bases' cleanup and other remedial actions are initiated. (pp. 7,8, and 13; GAO Draft Report).

DoD Response: Concur. DoD did use a "worst first" priority system to schedule Phase I studies. This approach was, and remains, the only rational way to ensure that those sites with a high potential for contamination are addressed first. Sites with low potential were never excluded from the list but rather scheduled after those sites with a higher probability of contamination. There is no constraint on the number of sites listed and additions have been made as problems are identified. The fact that the list has increased by only 19% since its inception indicates that the initial evaluations were of exceptionally good quality.

It will be necessary to reassess some of the early Phase I studies. These studies were state-of-the-art when completed but may be obsolete due to advanced techniques and technology or the establishment of new standards. It is not unlikely that current Phase I study results will be questioned in the future as more modern analytical techniques, coupled with new standards redefine what is acceptable.

APPENDIX VI

Only active, inactive, or formerly-used Army properties will be reviewed for inclusion on the Army list of sites requiring Phase I studies. Installations, such as the National Guard facility at Richmond, VA, which are operated by the state[1] are the responsibility of the individual states for environmental compliance. Conversely, sites which are federally owned such as the National Guard facility in Phoenix, MD, will be included in the DoD Installation Restoration Program.

[1] See pages 7 and 8 for a more detailed discussion of how DOD views its responsibilities for those bases which are operated by a state.

APPENDIX VI

FINDING B: All Base Hazardous Waste Sites Are Not Covered by Phase II. GAO found that at some bases, only a portion of the potential hazardous waste disposal sites identified in Phase I studies are being included in Phase II surveys because of funding restrictions and the absence of records on materials in individual disposal sites. GAO stated that DoD has decided to concentrate Phase II resources on those identified in Phase I as potentially the most serious and that the excluded sites will be reviewed at a later time. GAO concluded that there are difficulties with this approach, especially as it applies to sites for which DoD lacks records on materials placed in the site. A Phase II study would confirm whether such sites were a source of contamination. (pp. 8-9, GAO Draft Report).

DoD Response: Partially concur. Although a Phase II study would confirm whether such sites were a source of contamination, it would constitute an imprudent use of funds. No Phase I sites have been eliminated from Phase II surveys because of funding restrictions or the inadequacy of records. The fact that some Phase I sites have been eliminated from further study is predicated on a decision that the potential for contamination is small in relation to the other known sources. There have been situations when Phase II surveys were deferred due to funding shortfalls; however, with the increased funding provided in Fiscal Year 1984 and Fiscal Year 1985, future deferrments of Phase II surveys due to funding shortfalls should be minimal.

FINDING C: Air Force Contract Monitoring To Accomplish IRP Studies and Surveys Is Not Adequate. GAO found that the Air Force's use of time and material contracts to accomplish IRP studies and surveys was not sufficient for its Phase II surveys according to Defense Acquisition Regulations. GAO stated that its review of Phase II contracts did not satisfy Defense Acquisition Regulation requirements at four of the Air Force bases it visited. For example, the Occupational and Environmental Health Laboratory (OEHL) assumed responsibility for some contract administration and monitoring functions but did not establish a cost monitoring program (nor did the DCAS) or verify reported contractor progress and results. GAO concluded that because they were not actually checking on the work performed by the contractor, neither OEHL nor the ACOs could state with assurance that the labor or materials charged on the contractors invoices were reasonable in nature or amount, or that the contractor was performing the work required by the contract. (pp. 11-12, GAO Draft Report)

DoD Response: Partially concur. Given the nature of the program it is not always possible to estimate the extent or duration of work actually required or the expected costs at a given site until field data are produced to guide further decisions within a Phase II. Therefore, in accordance with Defense Acquisition Regulations, time and material contracts are appropriate since "it is not possible at the time of placing the contract to estimate the extent or duration of the work or to anticipate costs with any reasonable degree of confidence."

The Air Force has taken steps to improve contract monitoring. New contracts call for 4 specified monthly contractor reports that will provide near real-time contractor performance and cost status. Beginning in March 1984, Air Force contractors were required to split all samples with the OEHL laboratory. Quality assurance verification is performed on a representative number of these samples. A procedural guide to field level monitors is in development and will be issued in the near future.

FINDING D: Effects of EPA and State Standards on the IRP and DoD's Efforts to Meet Them. GAO found that allowable standards for pollutants in ground water are set by EPA and individual states. EPA has set standards for contaminants in drinking water, and these standards can be, and are applied to ground water when ground water is the source of water supply; however, ground water protection has been viewed primarily as a state responsibility. Further, standards set by the states may be regulatory or informal. GAO found that it is DoD's practice to attempt to meet both regulatory and informal standards, although DoD policy does not address the extent to which informal standards should be met. GAO found that while DoD bases are generally attempting to comply with states' informal standards and associated administrative requirements, the cost implications of this approach are not known since informal standards and associated administrative procedures have not been subject to the full regulatory process, which generally would provide for costs in determining the appropriate level of stringency. For example, at McClellan Air Force Base where Phase IV began, the estimated cost of the cleanup effort is considerably higher than the $29 million originally projected; after Phase IV began, the estimated cost of the cleanup effort increased to over $81 million. GAO concluded that while standards and administrative requirements for contaminants vary from state to state, this variance does not, by itself, pose serious implementation problems. However, standards for organic chemical contaminants which usually take the form of informal, non-regulatory standards may potentially pose problems for DoD since informal standards have not been subject to the full regulatory review which generally provides for consideration of costs. The cost of meeting the more stringent of these standards may need to be balanced against the benefits to be derived. (pp. 17-18, GAO Draft Report)

DoD Response: Concur. This is the most serious obstacle to the DoD hazardous waste site cleanup program. The lack of formal standards only places the DoD cleanup efforts in a no-win situation. If the Department is responsive and cleans up to informal standard levels only to have the levels raised later, more money will have been spent than was necessary. Conversely, if the Department delays cleanup efforts until formal standards are available, there will be criticism for not cleaning up fast enough.

APPENDIX VI

FINDING E: DoD Policy on Coordination with Regulatory Agencies Shound be Revised. GAO found that while the DoD policy calls for coordination with EPA and state authorities, the level of coordination is not sufficient to avoid problems with regulatory agencies or facilitate efficient implementation of the IRP. GAO also found that while all Services' implementing guidance on IRP activities and progress requires prompt notification of regulatory agencies when contamination problems pose an immediate threat to health welfare or the environment, each Service has interpreted and implemented the DoD guidance differently. For example, the Army has limited coordination requirements to those bases having a potential for hazardous waste to migrate off-base and as part of its policy, does not routinely furnish copies of IRP reports to regulatory agencies nor notify them of IRP activities. The Navy policy requires base commanders to notify EPA and state agencies of each IRP phase and provide them with final Phase I and Phase II studies and to provide data upon request to these agencies. The Air Force policy was similar to Navy policy until 1984 when it issued revised guidance significantly expanding coordination requirements for Phase I, Phase II, and Phase IV. GAO concluded that while bases have generally followed applicable DoD and Service guidance, coordination efforts have not proved sufficient to assure efficient implementation of the IRP. (GAO's summarization of its review at nine bases at which it found increased coordination had or could have been beneficial is on pages 21-23 of the Draft Report and in Appensix III). GAO further concluded that DoD's coordination policy should be revised to call for increased regulatory agency involvement in IRP planning and finalizing of IRP reports recognizing, however, that some states may choose not to become more involved in IRP activities. (pp. 20-26, and Appendix III, GAO Draft Report)

DoD Response: Partially concur. Contrary to the statements on page 18 of the report, Army policy issued on March 18, 1982 and again on September 7, 1982 is consistent with DoD guidance. This policy requires notification of EPA regional offices, and state and local governments of IR Program activities including scheduled record searches, projects and finished reports. For three of the four installations cited as examples of failure to coordinate (Ft. Dix, Ft. Eustis, and Sacramento Army Depot), the IR reports were completed before Army guidance regarding coordination was issued.

The DoD policy was issued only three years ago; however, since EPA and the states have refined their regulations relative to eazardous waste site cleanup, it appears appropriate for DoD to update the policy issued in 1981.

APPENDIX VI

RECOMMENDATION. GAO recommended that the Secretary of Defense revise IRP policy on coordination with state regulatory agencies. The revised policy should provide for increased and earlier involvement of the agencies. (p. 27, GAO Draft Report)

DoD Response: Concur. DoD will issue a revised policy by May, 1985 to provide for increased and earlier involvement of state regulatory agencies.

(GAO Note: Page references in this appendix which referred to our draft report were changed to reflect their location in this final report.)

APPENDIX VII

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

DEC 18 1984

OFFICE OF
POLICY, PLANNING AND EVALUATION

Mr. J. Dexter Peach
Director
Resources, Community and Economic
Development Division
U.S. General Accounting Office
Washington, D.C. 20548

Dear Mr. Peach:

On November 1, 1984, the Environmental Protection Agency (EPA) received the General Accounting Office (GAO) draft report entitled "DOD Efforts to Clean Up Inactive Hazardous Waste Sites." As required by Public Law 96-226, EPA has prepared this formal response on the report for GAO's use when preparing the final report. Below are brief general comments and enclosed is a detailed statement, referenced to page numbers, concerning the report.

The title of the GAO report is somewhat misleading because the text does not fully cover the broad subject of Department of Defense (DOD) efforts to clean up Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) type sites, nor was it intended to do so. Instead the report only addresses three specific areas: status and cost of the Installation Restoration Program (IRP); contaminant criteria for ground water; and DOD policy on coordination with appropriate regulatory agencies. I recommend that the report be retitled more accurately.

We appreciate the opportunity to comment on the draft report, and hope the enclosed comments are useful.

Sincerely yours,

Milton Russell
Assistant Administrator for
Policy, Planning and Evaluation

Enclosure

Specific Comments on the Draft GAO Report,
"DOD Efforts to Clean Up Inactive Hazardous Waste Sites"

Page 2

The report apparently overlooks the role of the U.S. Army Corps of Engineers (COE) in the preparation of installation assessments for previously owned DOD properties, and in planning for remediation of these sites. For example, the COE in Huntsville, Alabama, is currently working with EPA, the COE North Atlantic Division in New York, and the General Services Administration (GSA) on cleaning up a number of sites scheduled for sale by GSA which had previously been owned by DOD.

Page 6

The statement that DOD has identified 463 bases that will require Phase 1 studies and that "EPA has included 32 of these 463 bases in its Superfund National Priorities List" is potentially misleading. Since these 32 bases were only a "first cut" by EPA, the report should more accurately state that "EPA has thus far included 32 of these 463 bases...."

Page 8

The report cites a number of cases, including Fort Dix, New Jersey, in which conclusions presented in Phase 1 and Phase 2 IRP studies were subsequently found to be outdated, inadequate, or inaccurate. The report goes on to note that "only a portion of the potential hazardous waste disposal sites identified in Phase 1 studies are being included in Phase 2 surveys. ... Reasons given by DOD for excluding some sites included funding restrictions and the absence of records or materials in individual disposal sites...."

These appear to be environmentally unacceptable criteria. The fact that these criteria have been used by DOD in preparing IRP documents calls into question the adequacy of the conclusions in existing Phase 1 and 2 reports, particularly decisions not to proceed beyond Phase 1. With this in mind, GAO should consider recommending that DOD conduct a systematic reevaluation of all existing Phase 1/2 reports, in cooperation with regulatory agencies, to ensure that all hazardous sites are adequately screened using CERCLA criteria and cleaned up, as appropriate.

Page 20

The report notes that while "DOD policy calls for coordination with EPA and state authorities, (the) level of coordination prescribed is not sufficient to avoid problems with regulatory agencies or facilitate effective implementation of the IRP." However, the only recommendation made by GAO is that DOD policy be revised to provide for increased involvement with State agencies. The report does not address the need for increased coordination with EPA; the final report should correct this apparent oversight. EPA and DOD Headquarters officials are meeting regularly to discuss cleanup policies and procedures, and EPA is developing guidance for use by agencies on how to satisfy the requirements of the National Contingency Plan.

In addition, the report notes that the military services have interpreted and implemented existing DOD policy differently regarding coordination with Federal, State, and local agencies. As a result, in 9 of the 18 bases GAO studied, DOD would have benefitted from better coordination with regulatory agencies. The GAO should consider a recommendation that DOD revise its policy to ensure uniform implementation of coordination with regulatory agencies at each step in the IRP process.

(GAO Note: Page references in this appendix which referred to our draft report were changed to reflect their location in this final report.)

APPENDIX VIII

STATE OF CALIFORNIA GEORGE DEUKMEJIAN, *Governor*

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
CENTRAL VALLEY REGION**

3201 S STREET
SACRAMENTO, CALIFORNIA 95816-7090
PHONE: (916) 445-0270

12 December 1984

Mr. Frank C. Conahan, Director
U.S. General Accounting Office
Washington, D.C. 20548

DRAFT REPORT, D.O.D.'S EFFORTS TO CLEAN UP INACTIVE HAZARDOUS WASTE SITES

Thank you for sending us a copy of the subject draft report for our review.

We strongly support the report's recommendation for increased and earlier involvement of state agencies in the Installation Restoration Program process. This action should improve the quality of environmental survey results and allow for more timely cleanup of contaminants that threaten water quality in our Region. We look forward to working with the Department of Defense in this endeavor.

WILLIAM H. CROOKS
Executive Officer

TRP:cab

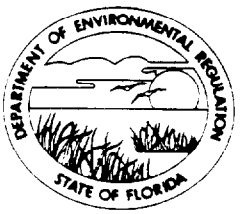
cc: Mr. Mike Campos, Executive Director, SWRCB, Sacramento

APPENDIX IX

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241



BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

December 10, 1984

Mr. Frank C. Conahan
Director
United States General Accounting
Office
Room 4804
Washington, D.C. 20548

Dear Mr. Conahan:

Thank you for the chance to review your draft report entitled "DOD's Efforts to Clean Up Inactive Hazardous Waste Sites." I wholeheartedly agree with your recommendations for increased coordination between the Department of Defense (DOD) and state regulatory agencies in completing the Installation Restoration Program (IRP) at military bases.

We have had many of the problems with the program noted in the report. Specific problems include the state not being involved early enough and not being given the opportunity to review plans before they are carried out. Other problems include continued misdirection of reports and correspondence with the wrong section of our agency and, in some cases, very short time frames for the return of our comments when they are requested. We are attempting to remedy some of these problems on a case-by-case basis, but the broad program changes recommended in the report will certainly help.

Most of the plans which we have received for comment are in Phase I or II of the program and have come from the Air Force. It appears that the responsibility for each base's plan rests with an individual environmental officer at that base. This lack of a central unit with which we can coordinate our input may be the root of some of the problems. It certainly makes our job more difficult when we have to deal individually with each base. There is no efficient way for us to try and resolve problems that are inherent in the general approach the Air Force is taking. I believe that the Navy's approach of a centralized command would be a better model to implement.

From our experience so far, we feel that the methodology used by the DOD in the formation of the IRP has some deficiencies which seriously affect the quality of the completed plans. The Phase I mechanism which identifies potential areas of contamination is not as thorough as it should be. It appears that after scoring the sites using the HARM system, sites which do not receive a sufficiently high score are deleted from further study. This is inappropriate. Some of these sites do not score high primarily because of a lack of data. This should indicate a need for further evaluation, not a conclusion that there is no problem.

There are also technical deficiencies with the way the Phase II confirmation phase is being handled. The major problem is that DOD has chosen, presumably for economic reasons, to use indicator parameters to confirm contamination. Typically, these parameters include only oil and grease, total organic carbon (TOC) and total organic halogens (TOX). The DOD has chosen this generic approach rather than tailoring the studies to specific site conditions and selecting methods that will detect all pollutants reasonably expected to be present at a given site.

I do not approve of the broad application of indicator parameter test methods in our own approach to site assessment, nor do I approve of them in the department's dealings with responsible parties in the regulatory process. The methods are generally not sensitive enough to show the differences between true contamination and natural background interferences. This makes it impossible to draw valid conclusions based on the data.

The indicators selected by the military are not even intended to respond to many potentially serious pollutants such as heavy metals. As an example, the state has a regulatory standard of 1 ug/l for benzene, a volatile aromatic hydrocarbon associated with fuels. The minimum detection limit of the TOC indicator parameter test used by the Air Force is 1000 ug/l. The TOC test will not measure levels of benzene that are clearly in violation of state standards (those between 1 ug/l and 1000 ug/l). Since benzene is not halogenated, the TOX test with a detection limit of 5 ug/l will not detect benzene at all.

It is ironic that in at least one of the Phase II studies completed by the Air Force before we were asked to comment, the consultant concluded that further detailed analyses would be necessary for all of the sites tested. It is apparent that performing detailed analyses initially would have been the most cost effective and conclusive approach to assess the sites.

APPENDIX IX

Mr. Frank C. Conahan
December 10, 1984
Page Three

We are in the initial and least complicated phases of the IRP, and already a number of serious problems have developed. State regulatory agency involvement must be improved, and our comments must be incorporated in the early phases. If this does not occur, then Phase III and Phase IV results, the actual cleanup of sites, run the risk of being inadequate and unacceptable to the state.

We have a great deal of experience in dealing with hazardous waste assessment and remediation. I suggest that our input could be of benefit to the IRP Program and would help us all better manage Florida's resources.

I have enclosed a copy of a letter which I have recently sent to the base commanders in Florida in an attempt to straighten some of these problems out.

Sincerely,

Victoria J Tschinkel
Secretary

VJT/mh

Enclosure

(945619)