

GAO

Report to the Chairman, Committee on  
Governmental Affairs, U.S. Senate

August 1994

# ENVIRONMENTAL CLEANUP

## Better Data Needed for Radioactively Contaminated Defense Sites



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United States  
General Accounting Office  
Washington, D.C. 20548

National Security and  
International Affairs Division

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August 24, 1994

The Honorable John Glenn  
Chairman, Committee on  
Governmental Affairs  
United States Senate

Dear Mr. Chairman:

Your December 22, 1992, letter expressed concern about whether the Department of Defense (DOD) has systematically addressed issues involving radiologically contaminated sites. In this report, we evaluate the accuracy and adequacy of data that DOD provided in July 1992 and April 1993 on identification and cleanup of military sites contaminated with low-level radioactive waste. As requested, we also provide information on (1) data sharing among DOD and other agencies (see app. I) and (2) our recent reports addressing radiation risks to DOD personnel (see app. II).

## Results in Brief

DOD's identification of radiologically contaminated sites and their cleanup relies on data that often are outdated, inaccurate, and incomplete. In data provided to your Committee in July 1992 and April 1993, DOD identified 420 low-level radioactive waste sites. The estimates were incorrect because the services had double-counted some sites and not identified others. In addition, Defense Logistics Agency (DLA) sites and former defense sites, managed by the Army Corps of Engineers, were not included in the data provided to the Committee.

The Office of the Secretary of Defense's (OSD) monitoring of status at known sites was impeded because neither it nor the services recorded such basic data as the amount of radioactivity, and the data they did record were often inaccurate and outdated. DOD's database included only general categories of contaminants at sites, such as low-level radiation, but could not identify specific contaminants or quantities. For example, significant data on plutonium contamination at Johnston Island were omitted in both Air Force and DOD data. More specific information would better help identify the types of contamination that exist, the types of required cleanup, and potential risks associated with continued contamination and with cleanup efforts.

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## Background

DOD low-level radioactive waste includes a wide range of radioactive materials from medical facilities, industrial facilities, research and analytical laboratories, weapons testing, and nuclear propulsion reactors. Some common DOD radioactive materials are dials, navigation instruments, markers, monitors, thickness gauges, radium paint, and depleted uranium. According to the Navy, no radioactive waste from servicing of nuclear-powered warships was ever buried at a DOD installation. In addition, nuclear weapons accidents over the years have also resulted in low-level radiation contaminated sites.

In March 1990, we recommended that the Secretary of Defense develop an inventory of the amounts and types of low-level radioactive waste that are stored or buried at all DOD installations. (See app. II.)

About 97 percent of low-level radioactive waste decays to safe levels within 100 years, while some of the rest may remain harmful for many thousands of years. DOD estimates that it generates about 1 percent of the low-level waste in the United States.

The Deputy Under Secretary of Defense (Environmental Security) provides direction and oversight for the Defense Environmental Restoration Program. The program was established in 1984 to manage the evaluation and cleanup of contamination at DOD installations. The military services and defense agencies implement the program at their installations.

The Defense Appropriations Act annually provides the primary funding for the restoration program through the Defense Environmental Restoration Account. In addition, restoration work at bases scheduled for closure is funded under the Defense Authorization Amendments and Base Closure and Realignment Act (1988) and the Defense Base Closure and Realignment Act of 1990.

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## Radioactively Contaminated Sites Not Adequately Identified and Monitored

Execution of DOD's restoration program requires a DOD-wide management information system containing site-specific data that are complete and accurate. The data are to be updated at least quarterly. However, DOD's identification and monitoring of sites contaminated with low-level radiation is based on inconsistent and outdated data. According to DOD officials, this is partly due to varying interpretations of what constitutes a low-level radioactive site. As a result, DOD does not know the precise number of contaminated sites. For example, in an April 1992 hearing

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before your Committee, DOD identified 271 sites; in July 1992 and April 1993, DOD listed 420 such sites. In addition, we believe that additional data that are not required by DOD would be useful for oversight and management purposes.

Both of the above-mentioned estimates were based on lists from the individual services, and not DOD records, as DOD did not believe its own database could provide accurate information. In July 1993, DOD's database contained only 156 sites, in part because there were no data from the Air Force. In addition, the services' data often were flawed. In some cases, the military services overstated the number of sites; for example, by listing individual contaminants as separate sites. In other cases, the services understated the number by inadvertently omitting sites.

When DOD did correctly identify sites, data flaws impeded monitoring of cleanup efforts. Neither the DOD database nor the services are required to record such basic data as the amount of radioactivity, and the data they did record were inaccurate and outdated. DOD's database included only general categories of contaminants at sites, such as low-level radiation, but could not identify specific contaminants or quantities.

More specific data would be useful for such management information purposes as identifying type and severity of contamination. The information could aid in current DOD initiatives to identify candidates for common cleanup methodologies and to provide some indication of the types of hazards presented by given sites. Testimony before the Congress on its budget request for fiscal year 1995 indicated that the use of generic remedies for cleanup was a key element in its efforts to achieve faster cleanups and reduce environmental risk. DOD's program guidance states that its restoration management information system is an important tool for use in program management and oversight.

Specific information for each military service, DLA, and former defense sites is discussed below.

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## Army

The Army's list of low-level radiation waste sites comprised 260 of the 420 locations DOD reported in April 1993. The list was drawn from several sources. Site identification was based on information in the Army's database as of 1992, as well as an Army installation radiation monitoring report last prepared in 1987. Data on site monitoring came from a contractor effort completed in 1991. Army officials stated that the Army is

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continuing to clarify and identify site counts consistent with DOD guidance and definitions of low-level radioactive waste.

According to OSD Environmental Security officials, about 80 Army sites were duplicates. At Aberdeen Proving Grounds, Maryland, for example, the list identified 30 sites. According to an Aberdeen official, there are actually only 12 sites. The other 18 sites were repeats of the 12. In addition, the Army list omitted a site that should have been included at Fort Wainwright, Alaska.

Although there is no requirement that the information system distinguish between burial sites and contamination from ongoing activities, we believe it may be useful to reflect such data in DOD and service reports. For example, the Army list did not show that 11 of the 12 sites at Aberdeen Proving Ground involved contamination at sites with ongoing, licensed activities, such as test firing ranges and medical buildings. Also, at Fort Sam Houston, Texas, the list identified two contaminated sites. One of the sites did serve as a temporary storage area, but the other was the medical center hospital.

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## Air Force

The Air Force list of contaminated and potentially contaminated sites comprised 147 of the 420 total reported in April 1993. Our visits to four Air Force bases confirmed the 10 sites reported at the bases. However, data monitoring the status of cleanup efforts were often inaccurate, and the Air Force was not routinely providing information to DOD about location, number, and types of sites.

The data provided during our site visits to George Air Force Base, Lackland Air Force Base, and Norton Air Force Base confirmed the number of the Air Force's listed sites. However, we found that a Randolph Air Force Base site on the list had been cleaned up and was no longer considered contaminated.

Data on the Johnston Island site reflected inaccurate cleanup status. According to Defense Nuclear Agency (DNA) officials, DNA is responsible for cleaning up plutonium contamination that occurred at Johnston Island when a rocket exploded on a test pad in the mid-1960s. The Air Force list indicated only the following about two contaminated sites: (1) residual contamination with plutonium in a lagoon area with a completed site investigation and (2) a contaminated launcher facility. However, DNA data indicate that ongoing cleanup efforts have been underway since 1990, with

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a possible total cost of up to \$15 million. The Air Force data made no reference to DNA's efforts to develop cleanup techniques, begun in the middle 1980s, and the ongoing cleanup of the large, 24-acre site. According to a DNA official, the soil enclosing the contamination is about 100,000 cubic meters in volume, although more than 200,000 cubic meters are restricted from use because some of it may be plutonium-contaminated. Operations at the site had processed about 17,000 tons of soil as of May 1993.

The Air Force has provided incomplete site information to the DOD environmental office. In particular, the data provided do not include site or contaminant type. According to an Air Force official, such specific information can be obtained from the service directly. However, without that information, DOD's databases cannot provide information on even the number of low-level sites for the Air Force.

Additionally, the Air Force's information system itself poses problems in communicating data to DOD. The Air Force's system is incompatible with those maintained by the Army, Navy, and OSD. Hard copy information, which is provided annually to OSD, must be manually entered into its system, slowing efforts to update OSD's data.

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## Navy

The Navy reported 13 of the 420 sites, and we confirmed data regarding 4 of the 13 during our visits to Barstow Marine Corps Logistics Base, El Toro Marine Corps Air Station, and Miramar Naval Air Station. However, the list omitted many other sites. In December 1993, the Navy provided a list of at least 49 potentially contaminated sites and another 17 sites that had been remediated or where contamination was investigated but not found.

Navy officials stated that radioactive waste from servicing of nuclear powered warships was not buried at DOD installations.

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## DLA and Army Corps of Engineers

We also found that both DLA and the Army Corps of Engineers have identified some additional sites not reported to the Committee. According to DLA officials, DLA is responsible for low-level cleanup at several waste sites, and cleanup efforts are underway. The Corps of Engineers is still identifying formerly used defense sites and has not yet begun cleaning up those that have been identified as having low-level radioactive contamination.

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## Recommendations

We recommend that the Secretary of Defense take action to improve DOD's databases to ensure that they have sufficient low-level radioactive waste data for managing the contaminated sites' restoration. Specifically, the Secretary should require that DLA and the military services correct current data errors and ensure that data are reported to OSD at least four times a year.

Because data on specific contaminants are readily available and potentially useful for management decisions, we also recommend that the Secretary of Defense modify DOD's reporting requirements to include such information, as well as data available on estimated quantities of contaminants.

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Our work was conducted between November 1992 and July 1994 in accordance with generally accepted government auditing standards. As requested, we did not obtain written agency comments on this report. However, we discussed our findings with agency officials and have included their comments where appropriate. The scope and methodology for our review are discussed in appendix III.

Unless you publicly announce its contents earlier, we plan no further distribution of the report until 30 days after its issue date. At that time, we will send copies to appropriate congressional committees, the Secretary of Defense, and the Director of the Office of Management and Budget. We will also make copies available to others upon request.

If you or your staff have any questions concerning this report, please contact me on (202) 512-8412. Major contributors to this report are listed in appendix IV.

Sincerely yours,



Donna M. Heivilin  
Director, Defense Management and NASA Issues



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## Abbreviations

DLA	Defense Logistics Agency
DNA	Defense Nuclear Agency
DOD	Department of Defense
GAO	General Accounting Office
OSD	Office of the Secretary of Defense



# Efforts to Share Radiological Data Among DOD and Other Agencies

DOD officials said they recognize the need to share data as part of efforts to identify and cleanup radiological contamination. Two programs appear especially likely to potentially improve sharing technology and systems for use in environmental science: the congressionally mandated Strategic Environmental Research and Development Program and the Central Intelligence Agency's Environmental Task Force.

The Strategic Environmental Research and Development Program is conducted with participation from DOD, the Department of Energy, and the Environmental Protection Agency. It was established in 1991 to address environmental matters through support for basic and applied research and development of technologies. The program is intended to interact with other environmental programs to identify and solve defense-specific needs, extend applications of defense information to other agencies, and build on existing science and technology to derive more usable and cost-effective approaches for reducing environmental risks.

The Central Intelligence Agency's task force comprises a team of scientists who work to determine ways of applying classified systems and data to environmental science. The task force is in response to congressional requests, and expects to recommend classified information of value for release to the environmental community.

We also obtained information from other agencies specified in your request, but they did not indicate immediate potential for coordination. Other agencies' efforts to share data include the following:

- Defense Intelligence Agency officials stated that they do not get involved in identifying and cleaning up low-level waste sites because they are only involved with foreign-owned, foreign-operated bases overseas.
- A Defense Nuclear Agency official said technology is generally known to the low-level radiation research community and attributed this knowledge to the specialized nature of the community. According to this official, no formal mechanism has existed in DOD to ensure the coordination of low-level waste technology.
- The Advanced Research Projects Agency is the central research and development organization of DOD with the responsibility to maintain U.S. technological superiority over potential adversaries. According to an agency official, it is not doing the type of work that would benefit DOD's low-level waste program. He stated that he was not aware of any coordination with DOD regarding low-level wastes.

# Our Recent Reports Addressing Radiation Risks to DOD Personnel

In Nuclear Regulation: The Military Would Benefit From a Comprehensive Waste Disposal Program (GAO/RCED-90-96, Mar. 23, 1990), we reported that no comprehensive DOD radioactive waste disposal program exists. We were asked to compare DOD and military service waste disposal practices because of an accidental release of low-level radioactive waste at Wright-Patterson Air Force Base, Ohio, in 1986. Several individuals had inhaled small quantities of a radioactive substance.

We reported that none of the three services had complete information on the amounts or types of low-level radioactive waste generated or disposed. In 1988, the Navy had conducted two surveys to develop this information, but the results were not complete. The Army expected to survey its installations in fiscal year 1990. The Air Force had surveyed 23 bases in 1987, but at that time did not plan to conduct additional surveys.

Among other recommendations to ensure that all DOD facilities appropriately dispose of low-level radioactive waste, we recommended that the Secretary of Defense develop an inventory of the amounts and types of low-level radioactive waste that are stored or buried at all DOD installations.

In Nuclear Health and Safety: Mortality Study of Atmospheric Nuclear Test Participants Is Flawed (GAO/RCED-92-182, Aug. 10, 1992), we reported inaccuracies in participant databases and the exposure data reported by the National Academy of Sciences in 1985 dealing with five selected atmospheric nuclear test series. These inaccuracies were the result of, among other things, the inexperience of the service team members who gathered data, the lack of complete and accurate records, and the inaccurate transcribing of data. We recommended that the Secretary of Defense require the Director, Defense Nuclear Agency, to notify veteran groups, researchers, and the general public that the conclusions reached in the 1985 National Academy of Sciences' mortality study might not be valid because (1) inaccuracies were found in the participant data used in performing the study and (2) the study is being redone. DOD agreed that the Defense Nuclear Agency would notify the appropriate institutions and veterans' organizations of the limitations of the 1985 mortality study and its plans to update the study.

In Operation Desert Storm: Army Not Adequately Prepared to Deal With Depleted Uranium Contamination (GAO/NSIAD-93-90, Jan. 29, 1993), we reported that at least several dozen U.S. soldiers, some unknowingly, were exposed to depleted uranium during the Persian Gulf War. The exposure

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**Appendix II  
Our Recent Reports Addressing Radiation  
Risks to DOD Personnel**

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was through inhalation, ingestion, or shrapnel. Although Army and Nuclear Regulatory Commission officials believe exposures did not exceed allowable limits, Army regulations require that exposure to radiation be minimized. We reported that the Army has not effectively educated its personnel in the hazards of depleted uranium contamination and in proper safety measures. We noted that although our work was limited to the Army, these issues may be applicable to the other services.

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# Scope and Methodology

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To accomplish our objectives, we interviewed headquarters officials from DOD, the Defense Logistics Agency, the Department of Energy, the Defense Nuclear Agency, the Defense Intelligence Agency, and the Environmental Protection Agency. We also interviewed officials from the U.S. Army Corps of Engineers and the U.S. Army Environmental Center, Aberdeen Proving Ground, the Advanced Research Projects Agency, and a representative of the National Governors Association.

To evaluate the status and progress of contaminated sites and cleanup efforts, we analyzed DOD's database, service reports, and supporting documentation about selected sites.

We visited the following locations: Lackland Air Force Base, Randolph Air Force Base, Camp Bullis, and Fort Sam Houston, Texas; Aberdeen Proving Ground, Maryland; Fort Greely and Fort Wainwright, Alaska; Miramar Naval Air Station, California; Marine Corps Air Station, El Toro, California; Marine Corps Logistics Base, Barstow, California; Norton Air Force Base, California; and George Air Force Base, California.

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