

May 2012

DEFENSE INFRASTRUCTURE

DOD Can Improve Its Response to Environmental Exposures on Military Installations





Highlights of GAO-12-412, a report to congressional committees

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Why GAO Did This Study

There have been various reported incidents of individuals being potentially exposed to environmental hazards while on military installations. Indeed, some incidents, such as contaminated air due to burn pits in Afghanistan and Iraq and contaminated water at Camp Lejeune, North Carolina, have received considerable attention, and in the case of Camp Lejeune have resulted in claims seeking billions of dollars from the government.

Public Law 111-383, §314(2011) directed GAO to assess Department of Defense (DOD) policies regarding environmental exposures. GAO's objectives were to determine (1) the extent to which DOD has policies that identify and respond to environmental exposures, (2) what programs exist to provide health care or compensation to individuals for environmental exposures, and (3) which features of other federal programs may provide options in designing future compensation programs. GAO briefed the Armed Services Committees in December 2011, to satisfy the mandate. To address these objectives, GAO reviewed relevant documentation, visited installations, and interviewed relevant officials.

What GAO Recommends

GAO is making recommendations to DOD to identify and respond to limitations in its policies for responding to environmental exposures. DOD generally disagreed with GAO's recommendations, commenting that current policies are adequate. GAO believes the recommendations remain valid, as discussed in the report.

View [GAO-12-412](#). For more information, contact Brian Lepore at (202) 512-4523 or LeporeB@gao.gov and David Trimble at (202) 512-9338 or TrimbleD@gao.gov.

What GAO Found

DOD relies on four types of policies to identify and respond to many but not all aspects of environmental exposures: (1) environmental restoration policies address hazardous releases at military installations; (2) occupational and environmental health policies address workplace exposures; (3) deployment health policies address the collection of occupational and environmental health data for deployed individuals; and (4) public health emergency management policies. Nonetheless, there are some limitations in the policies' coverage. For example, DOD's environmental restoration policies do not specify when to conduct public health assessments at its sites beyond the initial assessment of certain priority sites required by the Superfund law. In addition, DOD has not fully documented its responses to recommendations that result from the assessments. DOD officials responsible for oversight reported that they did not know what actions, if any, installations had taken on about 80 percent of the recommendations. Without a comprehensive tracking system, DOD has no assurance that it is addressing recommendations appropriately and could be missing opportunities to identify and resolve concerns about some health threats. Further, DOD has no policy guiding services and their installations on appropriate actions to address health risks from past exposures, which DOD attributes to the Superfund law not specifically requiring responsible parties to address such risks.

Although several programs potentially provide either health care or compensation to various types of individuals suffering from environmental exposures, the ability of some individuals to actually obtain benefits—particularly compensation—is often complicated by documentary, scientific, and legal factors. First, it is often difficult to document an environmental exposure because they are often not always identified at the time they occurred. Second, it is often difficult to establish causation between an environmental exposure and a health condition, because scientific research has not always established a clear link. Third, although under certain circumstances some individuals have legal standing under the Federal Tort Claims Act to file a lawsuit against the U.S. government for damages due to an environmental exposure, damages under the Federal Tort Claims Act are not available to other types of individuals, and for certain types of claims due to legal precedent or statutes.

In several cases, Congress has established alternative programs to provide compensation to specific populations exposed to specific environmental hazards, such as for individuals involved in the production of nuclear weapons and those who worked in coal mines. Agency officials in charge of managing these alternative programs told us that certain features of these programs have proven to be beneficial to both claimants and administrators and should be considered for inclusion if any future programs are established to compensate individuals for environmental exposures on military installations. For example, Department of Labor and Department of Justice officials told GAO a compensation program that resolves claims in a nonadversarial manner and provides outreach to potential claimants is more beneficial to both claimants and administrators. In contrast, a more adversarial with limited claimant assistance usually leads to delays and increased cost for both claimants and the agency adjudicating claims.

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Abbreviation

DOD	Department of Defense
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United States Government Accountability Office
Washington, DC 20548

May 1, 2012

The Honorable Carl Levin
Chairman
The Honorable John McCain
Ranking Member
Committee on Armed Services
United States Senate

The Honorable Howard P. "Buck" McKeon
Chairman
The Honorable Adam Smith
Ranking Member
Committee on Armed Services
House of Representatives

Over the years, there have been various reported incidents of active and former members of the Armed Forces, their dependents, federal contractors, and civilian employees being exposed to environmental hazards,¹ such as contaminated air and water, while living and working on military installations² or while deployed on contingency operations.³

¹ For the purpose of this report, an environmental hazard includes, among other things, the release or occurrence of a contaminant in the environment including the air, water, and land. Exposures to contaminants occur when humans have skin contact, inhale, or ingest (such as in drinking water) such contaminants at a threshold of toxicity that can potentially cause an adverse health condition. These hazards also include environmental conditions, such as those in occupational settings that may be harmful to humans. Whether or not an exposure is harmful may depend, in part, on the dose delivered to individuals and their susceptibility to it.

² Section 2687 of Title 10 of the United States Code defines military installation, for the purpose of certain base realignments and closures as a base, camp, post, station, yard, center, homeport facility for any ship, or other activity under the jurisdiction of the Department of Defense, including any leased facility. Such term does not include any facility used primarily for civil works, rivers and harbors projects, flood control, or other projects not under the primary jurisdiction or control of the Department of Defense.

³ Under 10 U.S.C. §101(13), the term "contingency operation" means a military operation that is designated by the Secretary of Defense as an operation in which members of the armed forces are or may become involved in military actions, operations, or hostilities against an enemy of the United States or against an opposing military force or results in the call or order to, or retention of, active duty of members of the uniformed services under certain sections of Title 10 or any other provision of law during a war or during a national emergency declared by the President or Congress.

Several incidents in particular—contaminated air at Naval Air Facility Atsugi, Japan; contaminated air due to open burn pits in Afghanistan and Iraq; and contaminated water at Camp Lejeune, North Carolina—have recently garnered considerable congressional, public, and media attention. At Naval Air Facility Atsugi, an off-base incinerator released toxic fumes that drifted over the installation. The Department of Veterans Affairs estimates that, from 1985 through 2001, over 25,000 individuals on the installation could have been exposed to air contaminants.

Similarly, since the start of military operations in Afghanistan and Iraq, the U.S. military and its contractors have burned solid waste, including plastics, electronics, and appliances, in open burn pits on or near military bases. These burn pits have produced smoke and harmful emissions that military and other health professionals believe may cause acute and chronic health effects. Moreover, at Camp Lejeune in the early 1980s, volatile organic compounds were discovered in some water systems serving installation housing areas. Exposure to certain volatile organic compounds increases the risk of adverse health effects, including cancer. The Congressional Budget Office estimates that 650,000 individuals were stationed at Camp Lejeune at some point during the contamination period, which lasted about 30 years, and officials at the Agency for Toxic Substances and Disease Registry estimate that up to one million individuals could have been exposed. According to the Navy, some former residents and individuals who worked on Camp Lejeune have recently filed administrative claims against the U.S. government totaling billions of dollars in potential damages for health conditions alleged to have resulted from exposure to the contaminated water. However, the Department of Defense's (DOD) response in identifying, studying, addressing, and communicating these three environmental hazards has raised congressional concerns in general about how DOD responds to possible individual exposures to environmental hazards on its installations. Congress has also expressed interest regarding how the U.S. government provides compensation and medical benefits for those who may have suffered adverse health effects from their exposure to such hazards.

Section 314 of the Ike Skelton National Defense Authorization Act for Fiscal Year 2011 set out a number of congressional findings related to military environmental exposures and directed GAO to conduct an assessment of possible exposures of individuals to environmental

hazards while living and working on military installations.⁴ In response to that mandate, our objectives were to determine (1) the extent to which DOD has policies for identifying and responding to possible human exposures to environmental hazards on its installations, (2) what programs currently exist to provide health care and compensation to individuals for health conditions resulting from environmental exposures on military installations and any factors that may affect how these individuals obtain access to health care or compensation, and (3) what features of alternative federal programs that provide medical benefits or compensation to large groups of individuals affected by a specific environmental exposure may be considered as possible options in the design of any future programs for individuals harmed by environmental hazards. To satisfy the mandate, we provided a briefing to the House and Senate Armed Services Committees in December 2011. This report provides additional information on the topics addressed in response to that mandate.

To determine the processes DOD has in place for identifying and responding to possible exposures to environmental hazards we reviewed and analyzed relevant laws as well as guidance from DOD, the Environmental Protection Agency, and the Agency for Toxic Substance and Disease Registry. In conducting this analysis we conducted content searches of DOD guidance documents to determine the extent to which they addressed environmental exposures on military installations and conducted a literature search to determine if there were any best practices in responding to environmental exposures. We also examined the database used to track the Agency for Toxic Substance and Disease Registry public health assessment recommendations and DOD's

⁴ Specifically, GAO was directed to report on (1) An identification of the policies and processes by which the Department of Defense and the military departments respond to environmental hazards on military installations and possible exposures and determine if there is a standard framework. (2) An identification of the existing processes available to current and former members of the Armed Forces, their dependents, and civilian employees to seek compensation and health benefits for exposures to environmental hazards on military installations. (3) A comparison of the processes identified under paragraph (2) with other potential options or methods for providing health benefits or compensation to individuals for injuries that may have resulted from environmental hazards on military installations. (4) An examination of what is known about the advantages and disadvantages of other potential options or methods as well as any shortfalls in the current processes. (5) Recommendations for any administrative or legislative action that the Comptroller General deems appropriate in the context of the assessment.

implementation of those recommendations. In addition, we interviewed DOD officials at the Office of the Secretary of Defense and the various components, the Environmental Protection Agency, the National Research Council, Agency for Toxic Substance and Disease Registry, and some members of the Agency for Toxic Substance and Disease Registry's Community Assistance Panel for Camp Lejeune. We also conducted site visits to Camp Lejeune, North Carolina and Aberdeen Proving Ground, Maryland where the Army Public Health Command, as DOD's Executive Agent for interaction with the Agency of Toxic Substances and Disease Registry, has its offices. To determine the programs that currently exist within the federal government to provide health benefits and compensation to individuals, we obtained, reviewed, and analyzed relevant laws and regulations, agency guidance, and other documentation to identify the eligibility requirements and determination procedures and extent of compensation and medical benefits provided through various processes currently available to different types of individuals possibly exposed to environmental hazards while working or living on military installations. We also interviewed officials from DOD, Department of Veterans Affairs, Department of Labor, Department of Justice, and officials from each of the Army, Navy, and Air Force Judge Advocate Offices. To determine the features of alternative federal programs that provide medical benefits and monetary compensation we reviewed and analyzed relevant laws and regulations, agency guidance, external studies, previous GAO reports, and other documentation to identify other comparable federal programs that provide medical benefits and monetary compensation to large groups of individuals that have been exposed to a specific environmental hazard. Through discussions with Departments of Veterans Affairs, Labor, Justice, and other federal agency officials who administer these programs, we identified the key features associated with each program and any challenges and lessons learned among the different features of these programs.

We conducted this performance audit between May 2011 and May 2012, in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. (See app. I for more information on our scope and methodology.)

Background

Some Federal Laws Requiring Cleanup of DOD's Hazardous Waste Include Mechanisms to Consider Exposures

Various environmental laws govern the identification, study, and cleanup of environmental contamination at military installations.⁵ Under a key law, a public health agency has responsibilities for assessing the presence and nature of health hazards at certain DOD sites, among other items. In addition, statutes also specify DOD responsibilities for cleanup of its contaminated sites. These are described below:

- Comprehensive Environmental Response, Compensation, and Liability Act: Better known as “Superfund,” the 1980 act established, among other things, government authorities to respond to actual and threatened releases of hazardous substances, pollutants, and contaminants that may endanger public health and the environment.⁶ DOD uses its own environmental restoration appropriations to finance its cleanups.⁷ The Environmental Protection Agency places some of the most seriously contaminated sites on the National Priorities List; 141 DOD installations are currently on this list. The Comprehensive Environmental Response, Compensation, and Liability Act also authorized the establishment of the Agency for Toxic Substances and Disease Registry in the Department of Health and Human Services to assess the presence and nature of health hazards to communities affected by Superfund sites, to inform actions to prevent or reduce harmful exposures, and to expand the knowledge base about the health effects that result from exposure to hazardous substances.
- The Agency for Toxic Substances and Disease Registry: The Agency for Toxic Substances and Disease Registry is to conduct a health assessment of each site listed on the National Priorities List. These health assessments may result in recommendations

⁵ Generally, the federal environmental laws described here apply to DOD facilities within the United States and its territories.

⁶ Pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act, the National Priorities List is a list of priority hazardous waste sites for attention under the federal Superfund program. Environmental Protection Agency places sites on the National Priorities List using criteria and a process established in regulations. Hazardous waste sites that are not placed on the National Priorities List may be referred to as non-National Priorities List sites.

⁷ While Congress established a trust fund to pay for, among other things, remedial actions at nonfederal National Priorities List sites, the fund is not available for federal sites.

from the Agency for Toxic Substances and Disease Registry to the agency responsible for the site and may include actions for reducing the public health risk or requests for additional data or analysis. The Agency for Toxic Substances and Disease Registry relies on records and data gathered by DOD and the Environmental Protection Agency for the assessments.⁸ With respect to toxic substance exposures, the agency is to maintain current research and literature on the health effects of toxic substances and prepare toxicological profiles, and, in cooperation with states, establish and maintain a national registry of serious diseases and illnesses and a national registry of persons exposed to toxic substances, among other things.⁹

- Superfund Amendments and Reauthorization Act: In 1986, the Superfund Amendments and Reauthorization Act added provisions to the Comprehensive Environmental Response, Compensation, and Liability Act, specifically governing the cleanup of federal facilities.¹⁰ These provisions also require the Secretary of Defense and the Secretary of Health and Human Services to enter into a memorandum of understanding regarding the manner in which DOD will support certain activities to be conducted by the Agency for Toxic Substances and Disease Registry, including the manner for transferring funds and personnel and for coordination of activities.¹¹ Under these provisions, a preliminary site assessment is to be completed by the responsible agency for each property where the agency has reported generation, storage, treatment, or disposal of hazardous waste. This preliminary assessment is reviewed by the Environmental Protection Agency, together with additional information, to determine whether the site poses a threat to human health and the environment or requires further investigation or assessment for potential inclusion on the National Priorities List.

⁸ The working relationship between DOD and the Agency for Toxic Substances and Disease Registry is established in a memorandum of understanding between the two agencies and they jointly develop annual work plans which require that DOD fund the Agency for Toxic Substances and Disease Registry's efforts on DOD's behalf. The Department of the Navy has also established a separate memorandum of understanding with the Agency for Toxic Substances and Disease registry for Camp Lejeune.

⁹ 42 U.S.C. § 9604(i) (2012).

¹⁰ Pub. L. No. 99-499 §120(a) (1986), codified at 42 U.S.C. § 9620 (2012).

¹¹ 10 U.S.C. § 2704(c) (2012).

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- Defense Environmental Restoration Program: Section 211 of the Superfund Amendments and Reauthorization Act established DOD's Defense Environmental Restoration Program, providing legal authority and responsibility to DOD for cleanup activities at DOD installations and properties, including former defense sites¹² in the United States and territories. DOD conducts cleanup activities under the Defense Environmental Restoration Program at its sites listed on the National Priorities List, as well as sites that are not. Among other things, the Defense Environmental Restoration Program provisions require the Secretary of Defense to take necessary actions to ensure that the Environmental Protection Agency and state authorities receive prompt notice of the discovery of a release or threatened release, the associated extent of the threat to public health and the environment, proposals to respond to such release, and initiation of any response.¹³ Specifically, when DOD identifies releases or threatened releases of hazardous substances, it is to notify the Environmental Protection Agency. These provisions also require the Secretary of Defense and the Secretary of Health and Human Services to enter into a memorandum of understanding regarding the manner in which DOD will support certain activities to be conducted by the Agency for Toxic Substances and Disease Registry, including the manner for transferring funds and personnel and for coordination of activities.¹⁴

Contaminants on Military Installations and Pathways to Human Exposure

Military installations are the site of various mission activities such as specialized operations and maintenance of equipment, as well as resembling "small cities" featuring offices, housing, water and wastewater systems, and solid and hazardous waste facilities. In some cases, these installations and surrounding areas became contaminated due to past storage and disposal practices for substances such as solvents, machining oils, metalworking fluids, and metals. Many of these contaminants, such as trichloroethylene, perchloroethylene, and vinyl chloride, are known or suspected carcinogens. On some installations, these contaminants have spread beyond their points of origin because

¹² Formerly used defense sites are located on properties that were under the jurisdiction of DOD and owned by, leased to, or otherwise possessed by the United States prior to October 17, 1986, but have since been transferred to states, local governments, other federal entities, or private parties. See 10 U.S.C. § 2701(c)(1)(B) (2010).

¹³ 10 U.S.C. § 2705(a) (2010) ("Expedited notice").

¹⁴ 10 U.S.C. § 2704(c) (2012).

they have been transported by wind currents or have entered ground water, resulting in potential environmental exposures.

An environmental exposure is quantified by estimating the amount (how much), duration (how long), and frequency (how often) of an individual's exposure to a dose of a contaminant. The dose is a primary factor in whether the exposure may result in harm to the individual. Doses below health standards generally do not result in harm to the exposed individuals. For environmental exposures the routes of exposure are: (1) ingestion—for solids and liquids; (2) inhalation—for gases and particulates; and (3) skin contact—for all types of agents. Some contaminants can cause harm at the site of exposure—for example, the lungs or skin—and some cause effects only after they have been absorbed into the blood stream and carried throughout the body. In their travel through the body, they have the potential to affect various organs in the body—such as lungs, liver, kidneys, heart, and brain. Appendix II contains a description of some of the contaminants found on military installations and their effects on humans.

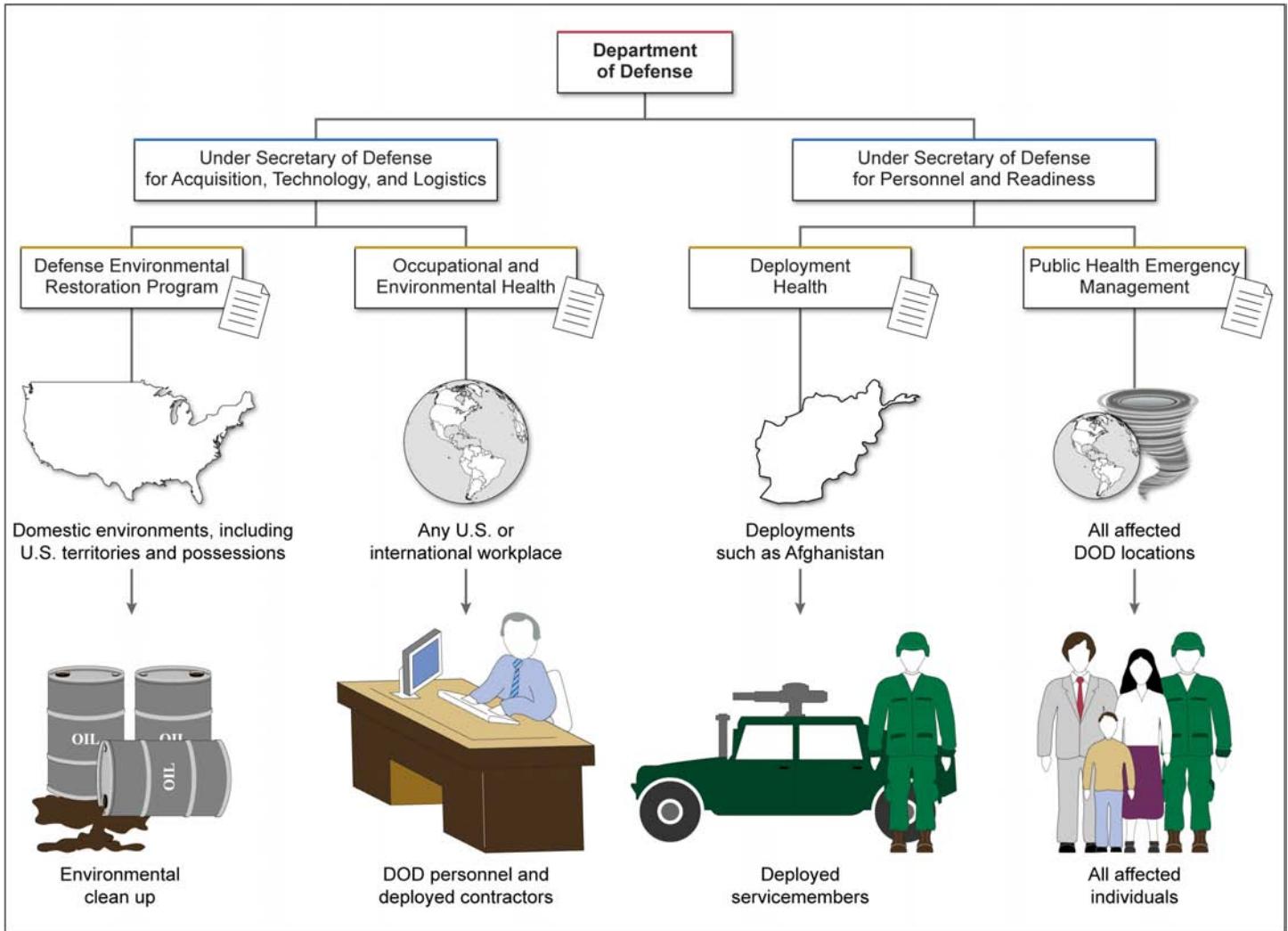
DOD Has Policies for Identifying and Responding to Environmental Exposures but They Have Limitations

DOD has four types of policies to address aspects of environmental exposure: (1) environmental restoration policies that require the services to identify and respond to hazardous releases at military installations, (2) occupational and environmental health policies that require the services to identify and respond to unsafe or unhealthy activities in DOD workplaces, (3) deployment health policies that require the services to collect and analyze occupational and environmental health data for individuals deployed in military operations in order to help identify environmental exposures, and (4) public health emergency management policies that establish general guidance for responding to specific situations (see fig. 1). Limitations in DOD's environmental restoration policies may hinder DOD's ability to identify and respond to all environmental exposures.¹⁵ DOD recently updated a directive that complements these policies by including servicemembers' dependents in its system for collecting, analyzing and interpreting health-related data—called the health surveillance data system—when associated with a public health event such as a disease outbreak or widespread exposure incident.¹⁶

¹⁵ DOD has other policies that identify responsibilities and procedures for remediation of environmental contamination on overseas installations or facilities or caused by DOD operations. The policies are focused on remedies for "known imminent and substantial endangerments to human health and safety" and any applicable country-specific policy or international agreement, and are silent as to assessments of health risk from exposures. See DOD Instruction 4715.8 (1998), Deputy Secretary of Defense Memorandum, "Environmental Remediation Policy for DOD Activities Overseas," October 18, 1995.

¹⁶ DOD Directive 6490.02E, *Comprehensive Health Surveillance*, Feb. 8, 2012. The revised directive defines health surveillance as the regular or repeated collection, analysis, and interpretation of health-related data to monitor the health of a population and to identify potential health risks. The purpose is to enable timely intervention to prevent, treat, or control disease and injury. The health surveillance system is not exclusively focused on health issues related to environmental exposure. It also includes data on occupational (work-related) health and medical surveillance of health-related data in the military health system's electronic medical records.

Figure 1: Four Types of Policies That Address Environmental Exposures



Source: GAO analysis of DOD policies.

DOD's Environmental Restoration Policies Require the Services to Identify and Respond to Hazardous Releases at Domestic Military Installations

Policies under the Defense Environmental Restoration Program, established by Section 211 of the 1986 Superfund amendments, require the services to identify and respond to hazardous releases at military installations and offer a structure for cleanup. Under the Defense Environmental Restoration Program, the services are required to identify relative risks to human health and the environment from contaminated

DOD Cleanup and the Agency for Toxic Substances and Disease Registry Health Studies on Contamination at Camp Lejeune Continue

In the early 1980s, the Navy's water testing at Marine Corps Base Camp Lejeune identified contamination in water systems that served housing areas on the base. Further water testing revealed that some of the wells serving two of the water systems were contaminated with volatile organic compounds, such as trichloroethylene, a metal degreaser and an ingredient in adhesives and paint removers; tetrachloroethylene, a solvent used in the textile and dry cleaning industries; and benzene, a natural part of crude oil and gasoline. By early 1985, 10 wells that were determined to be contaminated with volatile organic compounds had been removed from service. Pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act, the Agency for Toxic Substances and Disease Registry published a public health assessment at Camp Lejeune in 1997, after the site was proposed for the National Priorities List in 1989. The Agency for Toxic Substances and Disease Registry estimated that the contamination may have begun as early as the 1950s. The Congressional Budget Office estimated that 650,000 people were stationed at Camp Lejeune during the period of contamination and officials at the Agency for Toxic Substances and Disease Registry estimated that up to 1 million people could have been exposed to the contaminated water.

In the 1997 assessment the Agency for Toxic Substances and Disease Registry stated that exposure was not likely to cause health problems in adults but recommended that studies be conducted to evaluate the risks of childhood cancer related to volatile organic compound exposure at Camp Lejeune and noted that adverse pregnancy outcomes were also of concern. The Agency for Toxic Substances and Disease Registry said it withdrew the 1997 assessment in 2009 because the information upon which it was based was incomplete. For example, the public health agency said there was a longer exposure period than known when developing the assessment and there was an incorrect assumption that a well containing benzene was not used to supply drinking water. The Agency for Toxic Substances and Disease Registry plans to revise the public health assessment once a water modeling study is complete. In the meantime, the public health agency said it stands behind the information related to the other nine exposure pathways. Several Agency for Toxic Substances and Disease Registry studies, a National Research Council study, and Marine Corps efforts followed after the 1997 assessment, of which some are ongoing, as described in appendix III.

Source: GAO.

sites—those areas with releases or threatened releases of hazardous substances. Because there have been thousands of contaminated sites on DOD properties, DOD prioritizes these sites for funding based on, among other things, whether a site presently poses a risk to human health. Within this program, DOD may conduct one or more response actions, such as investigation and cleanup of contamination from hazardous substances, pollutants, and contaminants, and demolition and removal of unsafe buildings and structures. The sidebar illustrates DOD's approach to a hazardous release at a military installation.

DOD's Occupational and Environmental Health Policies Require the Services to Identify and Respond to Unsafe or Unhealthy Working Conditions at Military Installations

DOD's Occupational and Environmental Health policies require the services to identify and respond to unsafe or unhealthy working conditions at military installations in the United States and abroad. The policies apply to DOD military and civilian personnel in any DOD workplace and certain contractors deployed with DOD.^{17, 18} Accordingly, the services are responsible for establishing and publicizing programs that encourage personnel to identify and promptly report to supervisors situations of imminent danger. In addition, according to these policies, the services must conduct surveys of workplaces to identify potential exposures and other worker safety and health risks, and establish workplace exposure profiles. They may also conduct periodic assessments to identify worksite environmental hazards.

DOD's Occupational and Environmental Health policies also require the monitoring of workers exposed to hazards to identify work-related health problems and the collection of workplace hazards data to identify trends that may require intervention. The monitoring may include baseline medical examinations, periodic physical examinations, and clinical and biological screening. DOD's manual on occupational medical examinations also suggests ancillary tests or biological monitoring to evaluate health issues such as blood, liver, renal, and pulmonary functions, and hearing loss.¹⁹ These tests seek to detect the biological effects of potentially serious exposures before the occurrence of clinical illness, at a point where intervention or treatment can decrease the severity of disease or limit disability and rehabilitation. Workers must be informed of the results of their occupational medical examinations as soon as possible following completion and are encouraged to alert a supervisor if they are concerned about a workplace hazard. When data

¹⁷ DOD Instruction 6055.05 Occupation and Environmental Health (Nov. 11, 2008). While the instruction primarily covers DOD personnel in work settings, another stated purpose is to provide additional guidance to DOD Directive 4715.1E, Environment, Safety and Occupational Health (Mar. 19, 2005), to protect DOD personnel from accidents and occupational illness and the public from risk of death, injury, illness, or property damage because of DOD activities, among other objectives. With respect to protection of the public, the instruction does not specifically address any risky conditions or activities occurring outside of the workplace.

¹⁸ The policy generally applies to contractor personnel deployed with the force. According to DOD, even in such situations, if contracts do not specify that DOD is responsible contractors are responsible for their personnel.

¹⁹ DOD Manual 6055.05-M, *Occupational Medical Examinations and Surveillance Manual* (May 2, 2007).

Occupational Noise Exposure Is Common among DOD Servicemembers

Noise is one of the most common occupational health hazards faced by military personnel. Servicemembers may be exposed to hazardous levels of noise from, among other things, gunfire at firing ranges or military aircraft on flight decks, all of which can lead to loss of or damage to hearing if protective equipment and measures to reduce exposure are not employed. In 2011, GAO reported that DOD has had hearing conservation programs for the services' work environment since 1948 and developed its first departmentwide directive on the subject to unify implementation and goals in 1978. Further, in response to GAO recommendations DOD agreed to improve training, develop performance indicators, and improve data collection, among other things.. See GAO-11-114, *Hearing Loss Prevention: Improvements to DOD Hearing Conservation Programs Could Lead to Better Outcomes* (Washington, D.C; Jan. 31, 2011).

Source: GAO.

suggest that an occupational environmental hazard exists, DOD's occupational and environmental health policies call for the development of appropriate targeted intervention programs to reduce the occurrence of occupational injury and illness. The sidebar illustrates the use of this type of policy in a workplace condition.

DOD's Deployment Health Policies Require the Services to Collect and Analyze Data on Individuals in Deployment Settings

DOD's deployment health policies require the services to regularly collect and report a variety of data for deployed individuals to identify and respond to health threats they may have encountered during deployments. These policies apply to servicemembers, DOD civilian employees, and, depending on the contract, deployed DOD contractor personnel.²⁰ These individuals may be subject to hazards that can include exposure to harmful levels of contaminants such as industrial toxic chemicals, chemical and biological warfare agents, and radiological and nuclear contaminants. Since harmful levels of exposure can result in immediate health effects or delayed or long-term health effects, the policies establish a system whereby DOD gathers and reports a variety of data on its servicemembers and civilian employees and examines the data over time to address specific exposure-related questions. DOD

²⁰ DOD contractor personnel are only included to the extent provided in the applicable contracts, DOD Instruction 3020.41 (2005), or service policy.

established specific guidance for the services in 2006 and again in 2007 that lay out data collection requirements.²¹

DOD collects three types of data: (1) occupational and environmental health surveillance data, including ambient air, water, and soil samples; (2) daily individual servicemember location data, such as the duty station; and (3) health outcome data, acquired from servicemember medical records. The Defense Occupational and Environmental Health Readiness System (DOEHRS) Environmental Health module was developed to capture data about existing environmental conditions in contingency operations—military operations in which members of the armed forces are involved in actions against an enemy of the United States or against an opposing military force. Table 1 provides examples of the types of data collected before, during, and after deployment.

Table 1: Examples of Selected Data Collection Efforts during Phases of Deployment

Deployment phase	Activity
Before deployment	<ul style="list-style-type: none">• Draw pre-deployment serum specimens for individual servicemembers.• Update medical records and deployment health records for individual servicemembers.• Conduct pre-deployment occupational and environmental health site assessments, including health risk assessments, of the deployment site.
During deployment	<ul style="list-style-type: none">• Conduct and validate health risk assessments of the deployment site.• Conduct occupational and environmental health site assessments of the deployment site.• Perform health surveillance activities to detect trends in the health of deployed personnel (includes biomonitoring, when required).• Document occupational and environmental health monitoring data summaries and file in servicemembers' deployment health records.• Record servicemember location once daily and report out on a weekly basis.
Post-deployment	<ul style="list-style-type: none">• Complete post-deployment health assessments and reassessments of individual servicemembers.• Draw post-deployment serum samples for individual servicemembers.• Ensure all occupational and environmental health surveillance monitoring data and reports and health surveillance data and reports have been submitted.

Source: DOD Instruction 6490.03.

Note: The steps listed in this table are required for all deployments outside the continental United States greater than 30 days with non-fixed U.S. medical treatment facilities; for other deployments, the relevant commander determines which steps are required.

²¹ DOD Instruction 6490.03, *Deployment Health* (Aug. 11, 2006); and Joint Staff Memorandum MCM-0028-07 (Nov. 2, 2007).

Implementing Deployment Health Policies at Burn Pits Illustrate Data Challenges

DOD implemented deployment health policies in Afghanistan and Iraq and addressed servicemembers' potential exposure to contamination resulting from the use of burn pits, where solid waste is burned in open pits on or near military bases. In October 2010, GAO reported that DOD had not established systems to monitor burn pit pollutants directly in these countries, but that DOD personnel had collected thousands of ambient air samples with which to conduct occupational and environmental health assessments, among other things. In addition, according to DOD officials, DOD collected daily individual servicemember location data. DOD is able to query its data system to address exposure questions. Information collected during deployments was used for a May 2010 report on health outcomes resulting from burn pit exposures; the report noted that future analyses should focus on improving the quality of individual level exposure data. A later study, issued by the Institute of Medicine in October 2011, concluded that the levels of most pollutants of concern at one military base studied were not higher than levels measured at other polluted sites. However, according to the study, the evidence was inconclusive about the long-term health effects of exposure to military burn pits because of a lack of data and the existence of high background levels of ambient pollution from other sources. Data concerns were also noted in the GAO report, which concluded that progress in implementing a comprehensive air sampling and monitoring plan to better understand the health risks from burn pits was hindered by unresolved concerns among Army public health officials about existing provisions for burn pit sampling and monitoring.

Source: GAO.

The Armed Forces Health Surveillance Center regularly monitors the health outcomes of both deployed and nondeployed servicemembers on a population-wide basis for abnormal trends that may indicate an adverse health outcome. In addition, it publishes a monthly report that reviews the incidence of a variety of deployment-related conditions, such as traumatic brain injury and motor vehicle accidents. The Millennium Cohort Study, an ongoing health evaluation led by the Naval Health Research Center, examines and issues reports on deployment-related health issues, for example the effects of deployment on servicemembers' respiratory systems.

While DOD has made progress in identifying potential occupational and environmental health hazards during deployments since the 1991 Gulf War, technological challenges remain. Currently, DOD estimates exposures using occupational and environmental health surveillance data coupled with individuals' once-daily location tracking information, but cannot precisely determine exposure concentrations and durations that provide individuals' unique exposure profiles. According to DOD officials, problems with collecting individual exposure data for all types of environmental exposures could be addressed in some cases by the use of certain dosimeters or exposure biomarkers,²² but such technologies have not been developed for all types of exposure hazards. DOD officials reported that DOD has partnered with the National Institute for Environmental Health Sciences and the National Research Council to learn more about the potential use of these technologies. They also told us that DOD is in the process of developing a personal dosimeter for naphthalene—a fuel component that may be carcinogenic—which they consider to be an important first step toward developing dosimeters for other chemicals and health threats. In addition to the technological limitations, DOD officials said there are logistical difficulties associated with the implementation of individual sampling devices on deployed personnel. The sidebar illustrates DOD's data collection efforts and challenges in Afghanistan and Iraq.

²² Dosimeters are sensor devices that individuals wear to monitor real-time exposure to hazardous materials. Biomarkers of exposure consist of antibodies, metabolites, or the parent compound itself (or its metabolic products), present in biological fluids or tissues. Biomarkers of exposure indicate that the hazardous agents in the environment actually entered into the body (pathway completion) resulting in an exposure to that individual.

DOD's Policy on Public Health Emergency Management Establishes General Guidance and References Additional Documents for More Specific Guidance

DOD Implemented Public Health Emergency Management Policies Following the 2011 Disaster in Japan

In the aftermath of the March 11, 2011 Tohoku, Japan earthquake, tsunami and subsequent radiation release from the Fukushima Daiichi nuclear power plant, DOD sent U.S. personnel to assist the Japanese government under Operation Tomodachi. According to an official from the Office of the Assistant Secretary of Defense for Health Affairs, in addition to assisting Japan, DOD implemented principles of its public health emergency management policy for the DOD-affiliated population on or near the mainland of Japan and developed a comprehensive registry for about 61,000 individuals that it considered to be the population of interest. The Office of the Assistant Secretary of Defense for Health Affairs, under the authority of the Under Secretary of Defense for Personnel and Readiness, issued a roadmap for the creation of the registry, outlining the minimum information to be collected for each affected individual. This information was to include the individuals': name, daily location, and estimated exposure to radiation. The purpose of the registry is to: (1) inform clinical treatment and diagnosis of medical conditions resulting from environmental exposures; (2) aid the Department of Veterans Affairs in examining and adjudicating claims based on causality; (3) support DOD, Veterans Affairs, and other organizations in conducting medical surveillance and epidemiological studies; and (4) be used to answer queries or requests for information by, among others, individuals in the registry. In addition, DOD conducted ambient radiation monitoring in the affected area. According to DOD officials, no toxic exposures of concern were identified after initial reviews.

Source: GAO.

DOD's Public Health Emergency Management policy establishes guidance for the services in responding to public health emergencies, such as natural disasters or nuclear attacks, to protect installations, facilities, and personnel—including military and civilian personnel, dependents of military and civilian personnel, contractors, and other individuals visiting installations that are located either in or outside of the United States.²³ While DOD officials told us the policy does not specify what steps should be taken immediately following an emergency, it does reference a number of other policies—including DOD's Installation Emergency Management Program policy and Installation Chemical, Biological, Radiological, Nuclear, and High-Yield Explosive Emergency Response Guidelines—and gives the Under Secretary of Defense for Personnel and Readiness the authority to issue additional implementing guidance.²⁴ DOD's Installation Emergency Management Program policy aligns DOD emergency management activities with national preparedness and response guidelines and covers a range of potential hazards, including natural hazards, such as earthquakes and tsunamis, and human-caused hazards, including air or water contamination and terrorist attacks. According to a DOD official, each public health emergency is different, and the types of data that should be collected will depend on the significance of the hazard. This official told us that standard risk assessment models are applied in such emergencies and public health and occupational and environmental health professionals make decisions on how to respond on a case-by-case basis, based on what they perceive the health threat to be. The sidebar illustrates DOD's response to the 2011 Fukushima Daiichi disaster in Japan.

²³ In areas outside of the United States, DOD Instruction 6200.03 applies to the extent that it is consistent with local conditions, and the requirements of applicable treaties, agreements, and other arrangements with foreign governments and allied forces.

²⁴ DOD Instruction 6055.17, *DOD Installation Emergency Management (IEM) Program* (Jan. 13, 2009 with changes incorporated Sept. 16, 2008); and DOD Instruction 2000.18, *Department of Defense Installation Chemical, Biological, Radiological, Nuclear, and High-Yield Explosive Emergency Response Guidelines* (Dec. 4, 2002).

Limitations in DOD's Environmental Restoration Policies May Hinder Its Ability to Identify and Respond to Exposures

DOD Has Not Fully Documented Responses to Public Health Recommendations

Because DOD's environmental restoration policies do not fully address the use of public health assessments or what actions should be taken to respond to health risks that may have resulted from past exposures, DOD's ability to identify and respond to environmental exposures on DOD installations may be limited. A goal of DOD's strategic plan for installations is to provide effective, safe, and environmentally sound living and working places in support of DOD missions.²⁵ Nonetheless, DOD policies under the Defense Environmental Restoration Program are silent regarding how to (1) document responses to public health recommendations and findings of significant risk, (2) specify when to conduct public health assessments beyond the initial assessment at National Priorities List sites,²⁶ and (3) respond to health risks associated with past environmental exposures.

For DOD sites proposed for or listed on the National Priorities List, the Agency for Toxic Substances and Disease Registry conducts a public health assessment of the site that may result in recommendations to DOD.²⁷ Some assessments may also identify serious public health concerns known as "findings of significant risk." The Defense Environmental Restoration Program's management guidance states that DOD is to track the Agency for Toxic Substances and Disease Registry's progress in completing public health assessments.²⁸ This guidance is, however, silent regarding what actions DOD should take in response to

²⁵ Deputy Under Secretary of Defense, Installations and Environment, *Defense Installations Strategic Plan*, 2007.

²⁶ While public health assessments are not required beyond the initial assessment, DOD officials stated that they can be useful. For example, restoration efforts that may take several years can include site characterization efforts that lead to additional information that could change the results of the initial health assessment. In addition, the initial assessments are required only at National Priorities List sites.

²⁷ In 2010 we found that because the Agency for Toxic Substances and Disease Registry did not have policies and procedures that describe how the agency is to comprehensively assess and categorize the risk of work it initiates to prepare public health products, management could not ensure that it consistently managed the risk related to all new work, or established product preparation procedures commensurate with the risk. GAO, *Agency for Toxic Substances and Disease Registry: Policies and Procedures for Public Health Product Preparation Should Be Strengthened*, [GAO-10-449](#) (Washington, D.C.: Apr. 30, 2010).

²⁸ Office of the Deputy Undersecretary of Defense, *Installations and Environment, Management Guidance for the Defense Environmental Restoration Program* (September 2001).

these recommendations and findings of significant risk or the timeliness of its response. According to a 1995 Guidelines document signed by the Deputy Under Secretary of Defense (Environmental Security) and the Assistant Surgeon General, DOD installations and the Agency for Toxic Substances and Disease Registry are supposed to report annually on actions taken in response to the recommendations resulting from health assessments, among other items.²⁹ A 2011 memorandum of understanding between DOD and the Department of Health and Human Services explicitly cites the Guidelines but gives no direction regarding its further implementation. The memorandum of understanding documents the working relationship between the two agencies but currently the process they follow does not ensure that status information on the recommendations is provided to or documented by the office of the DOD lead agent for the Agency for Toxic Substances and Disease Registry program. Status information may indicate that a recommendation has been fully implemented; a recommendation will be implemented in the future, as part of a planned study; DOD does not agree with a recommendation; or other relevant information. Under the Superfund law, department heads are to take steps to reduce the exposure and eliminate or substantially mitigate the risk if the Agency for Toxic Substances and Disease Registry finds that an exposure presents a significant risk to human health.³⁰ Furthermore, federal internal control standards encourage the prompt resolution of audits and reviews, which would include public health assessments.³¹

DOD developed a tracking system that identifies characteristics such as the date and nature of recommendations to particular installations; however, it does not always identify whether each installation responded to the recommendations or findings of significant risk. As a result, according to the DOD lead agent, the tracking system does not reflect

²⁹ Guidelines for the Coordination of the Comprehensive Response, Compensation and Liability Act (CERCLA) Activities Between the Agency for Toxic Substances and Disease Registry and the Department of Defense, February 1995.

³⁰ 42 U.S.C. § 9604(i)(11) (2012), 10 U.S.C. § 2704(e) (2012), Exec. Order 12580 § 2(k), 52 Fed. Reg. 2923 (Jan. 23, 1987).

³¹ GAO, *Standards for Internal Control in the Federal Government*, GAO/AIMD-00-21.3.1 (Washington, D.C.: November 1999). According to these standards, government agencies are to promptly record the results of transactions and events that impact operations and ensure that the findings of audits and reviews are promptly resolved and communicated to management.

Lead from Air Force Base Found at Elementary School

In June 2009 the Environmental Protection Agency asked the Agency for Toxic Substances and Disease Registry for assistance after the Air Force discovered lead shot (pellets) at the Tyndall Elementary School adjacent to Tyndall Air Force Base. After reviewing data and conducting site visits, the Agency for Toxic Substances and Disease Registry found that lead shot and debris at the Tyndall Elementary School grounds presented an urgent public health hazard to children who may have ingested the lead shot. Furthermore, the Agency for Toxic Substances and Disease Registry found although only 1 of 103 children had a blood level above the Centers for Disease Control action level, about 87 percent did not have their blood level tested. Agency for Toxic Substances and Disease Registry officials said removal actions taken by the Air Force in 2009 greatly reduced the potential risk to children, but lead shot and debris may still remain on the grounds so, among other things, regular inspection and maintenance of the grounds and annual blood lead testing for school children should be offered. In its draft public health assessment, Agency for Toxic Substances and Disease Registry officials developed several recommendations, including one requesting that DOD notify all services that they should take prudent action to prevent children's exposures to lead shot at all schools, day care centers, homes, or playgrounds located near former shooting ranges. According to the DOD Lead Agent for the Agency for Toxic Substances and Disease Registry program, DOD requested and received additional time to prepare comments responding to the draft health assessment before it will be released. An Army official, who is the lead agent, notified the Deputy Assistant Secretary of the Army, Environment, Safety, and Occupational Health, about the proposed recommendations in the health assessment and met with the Air Force and Navy liaisons to the Agency for Toxic Substances and Disease Registry in November 2011. The DOD officials agreed at that time to gather information from their respective components in an effort to respond to the proposed recommendation but had not finalized their response as of February 2012.

Source: GAO.

what actions, if any, DOD took on about 80 percent of the approximately 1,200 recommendations made since the inception of the environmental restoration program.³²

According to DOD officials, the installations are expected to elevate matters of concern with the public health agency's recommendations to the Office of the Secretary of Defense as needed, but otherwise, the lead agent's office does not systematically monitor recommendations or findings of significant risk. The Defense Environmental Restoration Program management guidance states that the Office of the Secretary of Defense provides oversight to the lead agent and components on Agency for Toxic Substances and Disease Registry involvement at installations. While DOD officials said they rely on individual installations to respond to recommendations from the Agency for Toxic Substances Disease Registry, without accurate data or a systematic means to track the status of responses to recommendations and findings of significant risk, the Office of the Secretary of Defense has no assurance that installations have responded to known public health risks. The sidebar illustrates DOD's approach to a draft public health assessment with DOD-wide implications.

³² The DOD lead agent for the Agency for Toxic Substances and Disease Registry Program indicated that DOD has received almost 1,200 recommendations from the Agency for Toxic Substances and Disease Registry since the inception of the Defense Environmental Restoration Program. During the course of this engagement, DOD officials told us they are trying to obtain the status of Agency for Toxic Substances and Disease Registry recommendations from the installations.

DOD's Environmental Restoration Program Does Not Specify When to Conduct Public Health Assessments beyond the Initial Assessment at National Priorities List Sites

DOD's Defense Environmental Restoration Program management guidance does not address if or when DOD components should voluntarily seek a public health assessment at National Priorities List sites beyond the initial assessment completed when a site is proposed for the list.³³ After the initial public health assessment, it may take many years for site characterization and restoration. During that period additional contaminants or exposure pathways may be discovered that could make the original public health assessment obsolete. In addition, the guidance does not require public health assessments for non-National Priorities List sites, which could have environmental hazards equivalent to sites on the National Priorities List, and despite the fact that officials from the Agency for Toxic Substances and Disease Registry said that the majority of their DOD-related work in recent years involves non-National Priorities List sites.³⁴ According to federal internal control guidelines, management should assess the risks faced from external (and internal) sources and decide what actions to take to mitigate them.³⁵ While DOD officials said that DOD relies on the judgment of environmental professionals at the installations, without a standard set of guidelines on when to request a public health assessment other than an initial assessment for a site on the National Priorities List, DOD lacks assurance that it is consistently identifying and addressing possible health risks from exposures at some National Priorities List sites and non-National Priorities List sites.

DOD Environmental Restoration Policies Do Not Address Health Risks from Past Exposures

DOD's Defense Environmental Restoration Program is focused on cleanup to avoid present and future exposures but does not provide guidance on whether or when DOD should assess public health risks from past exposures or identify potentially affected individuals. For example, at Camp Lejeune, while environmental compliance and Defense Environmental Restoration Program policies were relevant to the actions

³³ See DOD, Defense Environmental Restoration Program Management Guidance (2008), p. 30. While the memorandum of understanding between DOD and the Agency for Toxic Substances and Disease Registry indicates that requests from installations to the Agency for Toxic Substances and Disease Registry are to be coordinated through the service component and must be approved by DOD if deemed appropriate, program policies do not provide installations with information on whether and when they may request such assistance.

³⁴ DOD had almost 34,000 non-National Priorities List sites in fiscal year 2010. As we have previously reported, 141 DOD sites were listed on the National Priorities List as of February 2012; only 2 DOD sites have been newly listed since 2005.

³⁵ GAO/AIMD-00-21.3.1.

taken to provide safe drinking water and to begin investigating the groundwater contamination, there was no policy guiding installations on what actions it should consider to address past exposures. Instead, most actions to address past exposures have come about based on Agency for Toxic Substances and Disease Registry studies and congressional direction.³⁶

In determining priorities and requirements in the cleanup process, DOD officials told us DOD assesses relative risk to human health and the environment posed by contamination but does so in terms of present or future exposures; it generally does not identify or assess risks posed by past exposures.³⁷ DOD officials told us that none of the cleanup laws require retroactive public health assessments or identification of individuals potentially affected by past exposures. However, officials from the Agency for Toxic Substances and Disease Registry also told us that, from a public health point of view, they consider it important to contact

³⁶ See John Warner National Defense Authorization Act of 2007, Pub. L. No. 109-364 § 318 (Oct. 17, 2006) (requiring, among other things, the Navy to enter into an agreement with the National Academy of Sciences to conduct a comprehensive review and evaluation of the available scientific and medical evidence regarding associations between exposure to contaminated drinking water at Camp Lejeune and adverse health effects). Also, the National Defense Authorization Act for Fiscal Year 2008, Pub. L. No 110-181 § 315 (Jan. 28, 2008) required, among other things, that the Secretary of the Navy make reasonable efforts to identify and notify directly certain individuals—those served by the contaminated water systems or civilian employees in particular time frames—who may have been exposed to the contaminated drinking water at Camp Lejeune. In addition, the act required that the Agency for Toxic Substances and Disease Registry develop a health survey that would voluntarily request personal health information from these individuals. The act stated that the survey may lead to scientifically useful health information associated with certain contaminants, such as trichloroethylene, tetrachloroethylene and vinyl chloride, identified in the Agency for Toxic Substances and Disease Registry studies that may provide a basis for further reliable scientific studies of potentially adverse health impacts of exposure to contaminated water at Camp Lejeune.

³⁷ DOD officials told us that the Agency for Toxic Substances and Disease Registry, however, may consider risks posed by past exposures. DOD officials told us that there were only two examples of DOD attempting to identify individuals who might have been affected by past environmental exposures: (1) the ongoing efforts at determining the health effects of contaminated drinking water at Camp Lejeune; and (2) notifying, via the Internal Revenue Service, former residents about radon levels at higher than regulatory standards in 2007 and 2008 in some housing at the Marine Corps Logistics Base, Albany, Georgia. The Agency for Toxic Substances and Disease Registry officials told us that, from a public health point of view, they would consider notification of prior site occupants when notification could result in actions that directly benefit people's health, such as where past exposures are considered likely to have caused an increased incidence of a disease for which early screening has proven beneficial.

prior site occupants when notification could result in actions that directly benefit people's health. Moreover, where there has been a release of hazardous substances and where DOD is the lead agency, section 111(g) of the Superfund law, in conjunction with an executive order, requires DOD to notify potentially injured parties of such releases.^{38,39} However, it is not required to notify individuals directly; rather, it can issue a broad, public announcement, such as a newspaper notice.⁴⁰ As a result, potentially affected individuals may not be aware of their exposure and subsequent health risks.

Revised DOD Policy May Reduce Previous Gap in DOD's Response to Exposures

During the course of our review, we found that servicemembers' dependents living on permanent overseas installations in nonemergency situations were not covered by any of the policies, but a revised policy may reduce this gap. For example, servicemembers' dependents, who were potentially exposed to contaminated air while at the Naval base in Atsugi, Japan, were not covered by any of the four types of policies. Specifically, according to DOD officials, the base was exempt from (1) environmental restoration policies because these policies apply only in the United States,⁴¹ (2) occupational and environmental health policies because the exposures occurred outside of the workplace, (3) deployment policies because permanent installations are not considered deployments, and (4) the public health emergency management policy because it did not fit the definition of a public health emergency. As such, no DOD policy existed to guide the Navy on their

³⁸ Releases generally include any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment, including abandonment or discarding of barrels or containers. 40 C.F.R. § 300.5 (2012). Hazardous substances include substances such as toxic chemicals and hazardous wastes designated under Superfund and other laws.

³⁹ Section 111(g) directs the President to provide such notification. Executive Order 12580 section 8, Employee Protection and Notice to Injured, delegates this responsibility to DOD for its facilities.

⁴⁰ Comprehensive Environmental Response, Compensation, and Liability Act § 111(g), 42 U.S.C. § 9611(g) (2012).

⁴¹ Outside the United States, the Defense Environmental Restoration Program does not apply; instead, environmental agreements may be negotiated with the host nation. The overseas environmental restoration policy does not specifically address exposures. See DOD Instruction 4715.8 (1998), Deputy Secretary of Defense Memorandum, "Environmental Remediation Policy for DOD Activities Overseas," October 18, 1995.

approach to conducting environmental surveillance, medical testing, or notification of the potentially exposed dependents. In February 2012, DOD revised its comprehensive health surveillance directive to include servicemembers' dependents when collecting health surveillance data in the case of a possible environmental exposure or public health event at a domestic or overseas installation.⁴² DOD officials told us the revised directive has the potential to improve DOD's response to environmental exposures, but not necessarily past exposures, since those would be addressed on a case-by-case basis. However, it is too soon to determine how this directive will be implemented and whether it will improve DOD's ability to address dependents potentially affected by exposures.

Several Programs May Provide Health Care or Compensation for Environmental Exposures but Access May Be Affected by Various Factors

Several Programs May Provide Health Care or Health Benefits for Individuals Harmed by Environmental Exposures While Working or Residing on Military Installations

Although several programs potentially provide either health care or compensation to active servicemembers, military retirees, veterans, dependents, federal workers, or contractors suffering from adverse health conditions potentially caused by environmental exposures, the ability of some individuals to establish eligibility and actually obtain these benefits—particularly compensation—is often affected by documentary, scientific, and legal factors.

Servicemembers, veterans, military retirees, and their dependents, federal workers, and some contractors may have access to health care or health benefits either through the Departments of Defense, Labor, and Veterans Affairs, state workers' compensation, or a private health care program regardless of the cause of the condition. Individuals, depending on their eligibility, may obtain health care or health benefits from one or more of the following programs:

- **TRICARE:** DOD's TRICARE program may provide health care to servicemembers and their dependents, eligible National Guard and Reserve personnel and their dependents, and military retirees and their dependents and survivors. Servicemembers include members of the National Guard and Reserves on active duty for at least 30 days.⁴³

⁴² DOD Directive 6490.02E, Comprehensive Health Surveillance (Feb. 8, 2012).

⁴³ TRICARE is established under the authority of Chapter 55 of Title 10 of the United States Code.

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- **Veterans Health Administration:** The Veterans Health Administration, within the Department of Veterans Affairs may provide health care to veterans, military retirees, and certain other individuals through numerous outpatient clinics, medical centers, and long-term health care facilities. The Veterans Health Administration may also provide health coverage to spouses, survivors, and children of veterans who are permanently and totally disabled from a service-connected disability or who died in the line of duty or from a service-connected disability.⁴⁴
 - **Federal Employees' Health Benefits:** The Federal Employees' Health Benefits program, which is administered by the Office of Personnel Management, may provide health care benefits to federal workers who choose to enroll.⁴⁵
 - **Federal Employee Compensation Act:** For appropriated fund employees, the Department of Labor's Federal Employees Compensation Act program may provide benefits, including medical care, to covered employees who experience work-related injuries. When necessary, the Federal Employees Compensation Act program also provides vocational rehabilitation assistance to help injured workers return to work.⁴⁶
 - **Nonappropriated Fund Instrumentalities Act:** Under the Nonappropriated Fund Instrumentalities Act, an extension of the Longshore and Harbor Workers' Compensation Act,⁴⁷ civilian employees employed by nonappropriated fund operations at domestic and overseas military bases (e.g., base exchanges, child care, food service, housekeeping, etc) may receive medical treatment for work-

⁴⁴ See 38 U.S.C. §§1710 and 1781.

⁴⁵ See generally Chapter 89 of Title 5 of the United States Code.

⁴⁶ See generally, Chapter 81 of Title 5 of the United States Code.

⁴⁷ The Longshore and Harbor Workers' Compensation Act, administered by the U.S. Department of Labor, provides medical benefits, compensation for lost wages, and rehabilitation services to longshoremen, harbor workers, and other maritime workers who are injured during the course of employment or suffer from diseases caused or worsened by conditions of employment. Several other statutes extend the provisions of the act to cover other classes of private-industry workers. These include workers engaged in the extraction of natural resources of the outer continental shelf, employees on American defense bases, and those working under contracts with the U.S. government for defense or public-works projects, outside of the continental United States.

related injuries, including those resulting from environmental exposures.⁴⁸

- **Defense Base Act:** The Defense Base Act, an extension of the Department of Labor's Longshore and Harbor Workers' Compensation Program Act, requires U.S. government contractors and subcontractors to purchase workers' compensation insurance coverage for their employees working overseas.⁴⁹ This insurance would cover medical treatment required as a result of work-related injuries.⁵⁰
 - **State Workers Compensation:** Some state workers' compensation programs may also provide health care benefits for work-related health conditions to contractors working in the United States, although eligibility requirements and benefits may vary from state to state. In some instances, the federal Longshore and Harbor Workers Compensation Act may provide such benefits.
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Several Programs May Provide Compensation for Individuals Harmed by Environmental Exposures While Working or Residing on Military Installations

The Departments of Defense, Veterans Affairs, and Labor, as well as some state workers' compensation programs may also provide compensation to servicemembers, military retirees, veterans, federal workers, and contractors for service or work-related health conditions associated with issues such as exposure to environmental hazards. These programs include:

- **DOD's Disability Evaluation System:** The Department of Defense Disability Evaluation System may provide compensation to servicemembers for service-connected health conditions. Servicemembers may receive either a lump sum for their health condition or monthly compensation, depending on the severity of the condition.
- **Veterans Benefits Administration:** The Veterans Benefits Administration programs within the Department of Veterans Affairs may provide monthly compensation to military retirees and veterans

⁴⁸ See 5 U.S.C. §8171. Nonappropriated fund employees are civilian employees who are paid from funds that are not appropriated by Congress. Nonappropriated fund employees on military installations work, for example, in military exchanges and morale, welfare, and recreation programs.

⁴⁹ Some exceptions may apply for employers who provide proof to the Secretary of Labor, showing the ability to pay compensation directly, and receive authorization to provide direct compensation.

⁵⁰ See 42 U.S.C. §1651.

with service-connected health conditions and sometimes their dependents and survivors.

- **Federal Employees' Compensation Act:** The Federal Employees' Compensation Act program may provide wage-replacement compensation to covered employees with work-related health conditions.
- **Nonappropriated Fund Instrumentalities Act:** The Nonappropriated Fund Instrumentalities Act, an extension of the Longshore and Harbor Workers' Compensation Act, provides disability compensation for work-related injuries and survivor benefits for civilian employees employed by nonappropriated fund operations at domestic and overseas military bases (e.g., base exchanges, child care, food service, housekeeping, etc). Vocational rehabilitation services are available to assist permanently disabled workers to return to work.
- **Defense Base Act:** The Defense Base Act, an extension of the Longshore and Harbor Workers' Compensation Act, may provide financial compensation to eligible civilian employees of U.S. government contractors with work-related health conditions who perform work overseas.
- **State Workers Compensation:** Some state workers compensation programs may provide wage-replacement compensation for work-related health conditions to contractors at military installations within the United States, although eligibility requirements and benefits may vary from state to state. In some instances, the federal Longshore and Harbor Workers Compensation Act may provide such benefits.

Although spouses and dependents who are injured while residing on military installations may access health care through TRICARE or other health care programs, they are not eligible to receive financial compensation from the Departments of Defense, Veterans Affairs, or Labor, under the above programs, for adverse health conditions resulting from environmental exposures on military installations. They may, however, file a tort claim against the federal government seeking financial compensation under the Federal Tort Claims Act.⁵¹ The act provides a means for some individuals injured by wrongful or negligent acts or omissions of federal employees to receive compensation from the U.S. government through an administrative claim process or, if not resolved at the administrative level, through the federal courts, subject to certain exceptions. For example, claimants will be unable to recover in cases in

⁵¹ 28 U.S.C. §§1346(b), 2671-2680.

which federal employees took actions that are susceptible to policy analysis.⁵²

Access to Compensation Is Often Affected by Documentary, Scientific, and Legal Factors

Although the above programs potentially provide either health care or compensation to active servicemembers, veterans, military retirees, and their dependents; federal workers; or contractors suffering from adverse health conditions potentially caused by environmental exposures, the ability of some individuals to establish eligibility and actually obtain these benefits—particularly compensation—is often affected by documentary, scientific, and legal factors.

Difficulty in Documenting an Environmental Exposure

Obtaining compensation for an environmental exposure may depend on an individual's ability to document an actual exposure to a contaminant, since establishing a causal link between the exposure and the adverse health condition may be necessary for obtaining certain benefits or compensation under many existing adjudication processes. This usually requires not only documentation of a release of a contaminant but also that the individual was potentially exposed to the contaminant (i.e., in the area of the release at the time and place it occurred) at a level plausibly related to an adverse health outcome. However, it is often difficult to document the specific time, place, or level of an environmental exposure because such exposures are not always identified, defined, and measured at the time of the occurrence since adverse effects of the exposure may not be immediately apparent. This is true for environmental exposures both on and off military installations. When environmental exposures are not identified at the time of the release, the opportunity to collect data on both the level of exposure and individuals present at the time of the release may be lost. For example, in 2010 we reported that U.S. forces in Afghanistan and Iraq did not sample or monitor burn pit emissions as provided by a key U.S. Central Command regulation, and, as a result, the health impacts of burn pit exposure on individuals are not well understood. Although DOD and the Department of Veterans Affairs have commissioned studies to enhance their understanding of burn pit emissions, the current lack of data on emissions specific to burn pits and

⁵² According to *U.S. v. Gaubert*, 499 U.S. 315, 323 (1991), "...the purpose of this exception is to prevent judicial 'second-guessing' of legislative and administrative decisions grounded in social, economic and political policy through the medium of an action in tort."

related exposures limit efforts to characterize potential health impacts on servicemembers and contractors.⁵³

Additionally, it is often difficult to document those individuals who were potentially exposed to a harmful release because such exposures have not always been recorded in personnel medical files at the time they occurred. For example, after the Vietnam War one of the primary difficulties in determining who was exposed to Agent Orange in Vietnam was the lack of records.⁵⁴ Although many returning veterans suspected a scientific link between dioxin—a key contaminant in Agent Orange—and certain adverse health conditions, veterans filing claims and Department of Veterans Affairs officials adjudicating claims were hampered by a lack of information about who was in Vietnam when certain areas were sprayed with Agent Orange. In many cases, veterans and Department of Veterans Affairs adjudicators had to rely on rudimentary measures such as self-reports of exposure, service in Vietnam, military occupation, and service in combat zones. Similarly, in 2005 we reported that most of the federal agencies identified as likely to have had employees in Vietnam—DOD, the Central Intelligence Agency, and the Departments of State, Agriculture, and Treasury—were unable to provide us with the exact number of civilian employees they had working in Vietnam during the war. Officials from these agencies told us that it was difficult to identify these workers, because personnel records were kept solely on paper, as computers were not in common use at that time. Agency officials told us that these paper records might have been destroyed or, if such records still existed, had not been indexed or organized in searchable formats. In addition, the location of some records was unknown because of the loss

⁵³ See GAO-11-63.

⁵⁴ Agent Orange is a mixture of herbicides initially developed to control broad-leaved weeds in agricultural settings. In large quantities, it causes large-scale defoliation. It primarily was used during the Vietnam War to defoliate large areas in order to deprive the opposition forces of cover and food crops. Between 1962 and 1971, more than 21 million gallons of Agent Orange were sprayed across Southeast Asia. Though the military was unaware of it at the time of its initial use, it was later discovered that Agent Orange also contained a dioxin, which is a by-product of the manufacturing process. This dioxin is classified as a human carcinogen. According to the Department of Veterans Affairs, cancers currently associated with exposure to Agent Orange and other herbicides are chronic lymphocytic leukemia, Hodgkin's lymphoma, multiple myeloma, non-Hodgkin's lymphoma, prostate cancer, various respiratory cancers (lung, bronchus, larynx, trachea), and some soft tissue sarcomas.

of institutional knowledge resulting from staff turnover over the years.⁵⁵ This lack of records may continue to be an issue, particularly for exposures occurring in the past that may at some point in the future result in adverse health conditions. For example, some veterans returning from Afghanistan and Iraq blame emissions from open air burn pits for several health conditions, including respiratory illnesses. However, the Institute of Medicine recently issued a report that was inconclusive regarding the connection between burn pit emissions and adverse health conditions. One of the major reasons cited by the Institute of Medicine for the inconclusive results was insufficient data on troops' exposures to open air burn pits. According to the study, some of the incomplete information that hampered the Institute's analysis included information on how many people worked in or near the pits, for how long, and how frequently.⁵⁶

Difficulty in Scientifically Linking an Environmental Exposure to Health Condition

In many cases, obtaining compensation for an environmental exposure further depends on an individual's ability to establish causation between an exposure and the adverse health condition, but this is often difficult because scientific research has not always established a clear link between the contaminant and an adverse health effect. This is true for environmental exposures both on and off military installations. Further complicating the matter is the fact that for many environmental exposures there is a latency period—the time period from initial exposure to a contaminant and the date an adverse health condition is diagnosed. When there is a long latency period between an environmental exposure and an adverse health condition, choosing between multiple causes of exposure may be difficult. Where multiple alternative causes are present, science is often unable to demonstrate that a particular individual's environmental exposure was the cause of the condition. For example, it is difficult to definitively rule out other environmental or lifestyle risk factors that could have caused the condition during the years between the exposure and the appearance of the condition. Indeed, another major reason cited by the Institute of Medicine for the inconclusive results of their burn pit study was high background levels of ambient pollution from other sources, such as diesel fumes and dust that might also be

⁵⁵ GAO, *Agent Orange: Limited Information is Available on the Number of Civilians Exposed in Vietnam and Their Workers' Compensation Claims*, GAO-05-371 (Washington, D.C.: Apr. 22, 2005).

⁵⁶ Institute of Medicine, *Long-Term Health Consequences of Exposure to Burn Pits in Iraq and Afghanistan* (Washington, D.C.: Oct. 31, 2011).

responsible for the respiratory conditions. According to the Institute of Medicine, because of the existence of these pollutants, it could not establish a conclusive link between burn pit emissions and the adverse health conditions being experienced by some individuals.

The water contamination at Camp Lejeune further underscores the difficulties associated with these documentary and scientific factors. Specifically, little data exist regarding Camp Lejeune's past water quality tests and the extent to which contaminants were found in the water. As a result, the Agency for Toxic Substances and Diseases Registry is conducting a water modeling assessment to fill in the gaps in the data. The Agency for Toxic Substances and Diseases Registry hopes the water modeling will help identify the time and place certain areas at Camp Lejeune received contaminated drinking water and ultimately help to determine who was exposed, at what levels, and for how long. For example, the data collection efforts for the Agency for Toxic Substances and Diseases Registry's studies revealed that the area serviced by Holcomb Boulevard water system on Camp Lejeune received water that may have contained volatile organic compounds for a longer period than was previously thought. Furthermore, once it has been established that a veteran was exposed to contaminated water at Camp Lejeune, the Department of Veterans Affairs needs to determine whether the alleged health condition can generally be caused by the exposures received during service and whether the health condition in a specific claim was caused by the exposure in deciding whether to provide compensation. These difficulties may affect veterans' ability to obtain benefits and compensation. Data provided by the Department of Veterans Affairs show that in calendar year 2011, the department completed decisions on 849 claims from veterans alleging an adverse health condition resulting from the contaminated water at Camp Lejeune. Of these 849 claims, 212 (25 percent) claims were granted and 637 (75 percent) were denied. According to the Department of Veterans Affairs, those claims that were denied failed to demonstrate one or more of the following: (1) service at Camp Lejeune during the period of water contamination, (2) a current disease or disability, or (3) a medical nexus or link between a current disability and service at Camp Lejeune. According to the Department of Veterans Affairs, a total of 1,151 claims are still being adjudicated.

Difficulty in Seeking a Remedy for an Environmental Exposure under the Federal Tort Claims Act

Active duty servicemembers, military retirees, veterans, and other federal workers are able to seek compensation through Departments of Defense, Veterans Affairs, and Labor programs, but other individuals may need to seek a remedy under the Federal Tort Claims Act. Certain individuals have legal standing under the Federal Tort Claims Act to file a lawsuit

against the U.S. government for damages due to an environmental exposure under some circumstances. But damages under the Federal Tort Claims Act are not available to other types of individuals, and for certain types of claims, due to legal precedent or statutes. For example, most active duty servicemembers, military retirees, and veterans may not bring suit under the Federal Tort Claims Act due to the doctrine outlined in the Supreme Court case *Feres v. United States*,⁵⁷ and its successor cases, for personal injuries that arise incident to their military service, and such claims or lawsuits they attempt to file under the Federal Tort Claims Act are subject to dismissal. However, active duty servicemembers, military retirees, and veterans may be eligible for compensation through Department of Defense or Veterans Affairs programs. Similarly, the Federal Employees' Compensation Act provides the exclusive remedy for federal workers and their dependents if the worker is injured or killed in the performance of duties. Thus, the disability compensation, medical, and other benefits provided for under the Federal Employees' Compensation Act are the exclusive means by which federal workers can seek compensation from the U.S. government. While compensation programs are established for some individuals who work on military installations, others, including dependents and contractors, may choose to pursue legal damages from the U.S. government, under the Federal Tort Claims Act, for injuries they sustained as a result of an environmental exposure.

Although the Federal Employees' Compensation Act effectively bars federal workers and their dependents from pursuing compensation through tort claims in civil lawsuits,⁵⁸ employees of government contractors may pursue damages from the U.S. government for an environmental exposure received on the job and dependents of active duty servicemembers may seek compensation for their own personal injuries. However, success under the Federal Tort Claims Act may be unlikely. The discretionary function exception within the Federal Tort Claims Act prevents recovery for health conditions caused by discretionary actions or omissions of federal employees in cases in which the employees' actions are susceptible to policy analysis.⁵⁹ According to

⁵⁷ *Feres v. United States*, 340 U.S. 135 (1950).

⁵⁸ 5 U.S.C. §8116 (c).

⁵⁹ 28 U.S.C. §2680 (a).

Department of Justice officials, this includes many decisions made by federal personnel, although not in cases where the government ignores a specific and mandatory agency rule or policy. Department of Justice officials told us that, as a result, many claims against the U.S. government alleging harm due to governmental negligence are eventually dismissed.

According to Navy officials, as of January 2012, about 2,900 former residents and former employees of Camp Lejeune had filed administrative claims against the U.S. government for adverse health effects, alleged to have resulted from contaminated water, seeking billions of dollars in potential damages. In accordance with limitations on adjudication of claims, set out in the National Defense Authorization Acts for Fiscal Years 2011 and 2012,⁶⁰ the Navy stated it is currently not adjudicating these claims, and is awaiting the outcome of several ongoing and planned studies by the Agency for Toxic Substances and Diseases Registry. In addition to filing administrative claims with the Navy, some claimants have also exercised their rights under the Federal Tort Claims Act and filed lawsuits against the U.S. government in federal district courts. According to the Department of Justice, as of March 2012, 12 of the approximately 2,900 administrative claims had resulted in the filing of lawsuits in federal district court. Among other things, we were told that some of these lawsuits seek damages for various physical ailments and emotional distress alleged to have resulted from the government's alleged negligence in protecting the water supply at Camp Lejeune. Furthermore, Department of Defense officials told us that lawsuits have been filed in federal court in at least 43 states in which current and former servicemembers have alleged, among other things, that a contractor's negligent management of burn pit operations, contrary to applicable contract provisions, exposed them to air pollutants that subsequently caused adverse health conditions. According to officials, the contractor has moved to dismiss the suits, arguing, among other things, that it cannot be held liable for any health conditions that may have occurred to service personnel because its burn pit activities occurred at the direction of the military.

⁶⁰ Limitations on adjudication are found in The Ike Skelton National Defense Authorization Act for Fiscal Year 2011, Pub. L. No. 111-383, §313 (2011).and the National Defense Authorization Act for Fiscal Year 2012, Pub. L. No. 112-81, §319 (2011).

Actions Taken to Limit Difficulties Associated with These Factors

In an effort to limit some of the difficulties associated with these factors, Congress has, in some cases, created presumptions that bridge gaps in the evidence related to causation and documentation, making it easier for a group of veterans to be compensated. For example, to qualify for a Department of Veterans Affairs disability compensation claim, a veteran is normally required to demonstrate the following: (1) that a health condition currently exists, (2) that an event of disease or injury occurred or was aggravated in the line of duty, and (3) that a medical connection or “nexus” can be shown between the service event and the existing health condition. However, when the exposures of military personnel in Vietnam to Agent Orange could not be clearly documented, Congress enacted legislation establishing the presumption that veterans who served in Vietnam during a specified time frame, and subsequently developed certain health conditions, provided in the statute or prescribed in regulations, had been exposed.^{61,62} This presumption relieves the veteran of proving one or more of the eligibility requirements for direct service connection and shifts the burden of proof from the veteran to the government in order to rebut the presumption.

In addition, DOD and Department of Veterans Affairs officials told us they are taking steps to overcome some of the difficulties in confirming scientific links between certain contaminants and adverse health conditions and in maintaining documentation regarding environmental exposures. DOD officials told us they are potentially implementing an electronic individual longitudinal exposure record for every servicemember that would be designed to provide linkages between differing types of data—environmental monitoring, biomarkers, and troop locations and activity—and an individual’s medical records. DOD and the Department of Veterans Affairs are also conducting scientific studies designed to follow a large group of individuals over a long period of time to determine any increased incidence of diseases, including those due to a potential environmental exposure. For example, the Millennium Cohort Study, an ongoing health evaluation led by the Naval Health Research Center, is targeted at examining deployment-related health conditions by comparing a cohort of servicemembers that were deployed and a cohort

⁶¹ Agent Orange Act of 1991, Pub. L. No. 102-4 (1991), as amended.

⁶² 38 U.S.C. §1116. Similar statutory presumptions exist for prisoners of war, veterans exposed to ionizing radiation, and those who served in Southwest Asia during the Gulf War.

Certain Features of Alternative Programs for Compensation Established for Specific Environmental Exposures May Provide Potential Options for Future Programs

that was not deployed. According to Department of Veterans Affairs officials, conducting these types of scientific studies will provide documentation and scientific information on adverse health conditions, that if found to be significantly different between deployed and nondeployed servicemembers, may provide officials with information to further examine the link between potential environmental exposures and adverse health conditions. These efforts may provide exposure-related documentation that is currently not readily available, and may remove some of the burden of documenting an environmental exposure.

Beyond the previously discussed traditional avenues generally available for seeking compensation for work-related injuries or injuries resulting from an environmental exposure, Congress has, in some cases, established alternative programs to provide compensation and some medical benefits to specific populations harmed by specific environmental exposures. The structures of these alternative programs for compensation vary and the programs are not generally designed to address all past or future environmental exposures occurring on military installations, such as those discussed in this report. However, in the past few years, Congress has considered several legislative options to provide benefits and compensation for certain individuals exposed to specific environmental hazards on military installations.⁶³ Some features of the alternative programs for compensation may help to inform any future compensation programs that Congress may choose to create.

⁶³ Caring for Camp Lejeune Veterans Act of 2011, S. 277, 112th Cong. (2011), the Janey Ensminger Act, H.R. 1742, 112th Cong. (2011) and the Examination of Exposures to Environmental Hazards During Military Service and Health Care for Camp Lejeune and Atsugi Naval Air Facility Veterans and their Families Act of 2010, S. 3378, 111th Cong. (2010).

Congress Has Established Alternative Programs for Compensation for Specific Populations Harmed by Specific Environmental Exposures

In a few instances, Congress has established alternative programs for compensating specific populations harmed by specific environmental exposures that take the place of traditional avenues for seeking compensation and may help overcome some of the challenges in compensating individuals for health conditions that result from environmental exposures. We identified three such programs⁶⁴ designed to provide compensation and medical benefits to U.S. citizens harmed by exposure to contaminants and examined the programs' structure and features for providing benefits.⁶⁵ These programs are:

- **The Radiation Exposure Compensation Program**⁶⁶ provides partial restitution to eligible onsite participants, uranium miners, millers, and ore transporters, and nearby populations who were exposed to radiation from atmospheric nuclear weapons testing, or as a result of their employment in the uranium mining industry during the Cold War, and developed certain adverse health conditions.
- **The Energy Employees Occupational Illness Compensation Program**⁶⁷ provides compensation and medical benefits to eligible nuclear weapons workers and their survivors harmed from exposure to radiation or toxic contaminants.
- **The Black Lung Program**⁶⁸ provides medical and income assistance to eligible individuals who were exposed to coal mine dust through work in the mines and were diagnosed with totally disabling pneumoconiosis (black lung disease). In such cases, the former

⁶⁴We identified one other environmental exposure-related compensation program, the Marshall Islands Nuclear Claims Tribunal, but did not include it our analysis because it does not provide compensation to U.S. citizens.

⁶⁵ Congress has also established compensation programs for injuries or death for injuries caused by factors other than environmental exposures, such as the Smallpox Vaccine Injury Compensation Program and the National Vaccine Injury Compensation Program. However, our analysis only included programs that provide compensation for injuries caused by an exposure to a harmful contaminant in the environment, not, for example, as a result of a vaccine. See app. I for a complete description of our compensation program selection criteria.

⁶⁶ See the Radiation Exposure Compensation Act, Pub. L. No. 101-426 (1990), codified at 42 U.S.C. §2210 note, as amended.

⁶⁷ See the Energy Employees Occupational Illness Compensation Act of 2000, Title XXXVI of the Floyd D. Spence National Defense Authorization Act for Fiscal Year 2001, Pub. L. No. 106-398 (2000), codified at 42 U.S.C. §§7384- 7385s-15, as amended.

⁶⁸ See Title IV of the Federal Coal Mine Health and Safety Act of 1969, Pub. L. No. 91-173 (1969), codified at 30 U.S.C. Chapter 22, Subchapter IV, as amended.

Program Costs Expand as Federal Role in Providing Compensation and Eligibility Expand

In 2005 GAO reported that the federal government has played an increasing role in providing benefits to individuals harmed as result of exposure to harmful substances, and the costs of federal compensation programs have exceeded initial estimates. The federal role in providing compensation and costs have expanded as Congress established the Black Lung Program in 1969, and additional compensation programs including the Radiation Exposure Compensation Program in 1990 and the Energy Employees Occupational Illness Compensation Program in 2000. In addition to increases in cost due to the expanding role of the federal government in providing compensation, the costs of the three programs have also exceeded the initial estimates for costs as the programs have expanded to provide compensation to additional categories of claimants, cover more medical conditions, or provide additional benefits. For example, while the initial estimate of benefits for the Black Lung Program developed in 1969 was about \$3 billion, the actual benefits paid through fiscal year 2004 totaled over \$41 billion. For the Radiation Exposure Compensation Program, the costs of benefits paid through fiscal year 2004 exceeded the initial estimate by about \$247 million, in part because the original program was expanded to include additional categories of claimants. See GAO, *Federal Compensation Programs: Perspectives on Four Programs*, GAO-06-230 (Washington D.C.: November 2005).

Source: GAO.

miner's income assistance may be augmented on behalf of certain dependent family members. The program also provides income assistance to the survivors of miners who died due to black lung disease and to certain survivors of miners who were awarded benefits as a result of lifetime claims.⁶⁹ The sidebar illustrates how costs in these three programs exceeded initial estimates as the federal role in the programs expanded.

While these alternative programs for compensation were each designed to compensate individuals injured by exposure to harmful contaminants, the way in which the programs are structured varies, including who administers the program, how it is funded, and the benefits it provides. For example:

- **Administration:** The administration of the programs differs. For example, the Department of Justice administers the Radiation Exposure Compensation Program. In contrast, the Department of Labor administers the Black Lung Program, and shares responsibility for administering the Energy Employees Occupational Illness Compensation Program with the Departments of Health and Human Services, Energy and Justice. Responsibility for administering the Black Lung Program has changed since its inception. Specifically, claims for the Black Lung Program were initially processed and paid by the Social Security Administration but, as designed by the original legislation, the Department of Labor began processing claims in 1973 and took over all Black Lung Program claims processing in 1997. In 2002, Congress officially transferred all legal responsibility and funding for the program to the Department of Labor.
- **Funding:** Funding for the three programs varies. Although initially funded solely through annual appropriations, the Black Lung Program is now funded largely by the coal mining industry. Individual claims are paid either by a responsible coal mine operator (or its insurance carrier) or by the Black Lung Disability Trust Fund, which is financed by an excise tax on coal and supplemented by additional funds. In contrast, the Energy Employees Occupational Illness Compensation Program and the Radiation Exposure Compensation Program are completely federally funded.

⁶⁹ Black lung is a term that includes coal workers' pneumoconiosis and any other chronic respiratory or pulmonary impairment arising out of coal mine employment. 30 U.S.C. § 902 (b).

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- **Benefits:** Benefits also vary among the three programs. Some of the benefits they provide include lump sum compensation payments and payments for lost wages, medical and rehabilitation costs, and attorney's fees. For example, the Black Lung Program provides diagnostic testing for miners; monthly payments based on the federal salary scale for eligible miners or their survivors; medical treatment for eligible miners; and, in some cases, payment of claimants' attorney fees. The Radiation Exposure Compensation Program, in contrast, provides only a lump sum payment for restitution to those that developed adverse health conditions or their survivors.

Certain Features of These Programs May Provide Potential Options for Future Programs

In the past few years, Congress has considered several legislative options to specifically provide compensation and benefits for individuals exposed to specific environmental hazards on military installations.⁷⁰ The alternative programs for compensation that we examined contain certain features that may provide potential options if future programs for environmental exposure compensation are considered. These features address such issues as whether to use an adversarial or nonadversarial approach to adjudicating claims, the kinds of outreach and claims assistance offered, how eligibility for benefits is determined, and the frequencies and types of payments when such compensation is awarded.

Nonadversarial versus Adversarial Proceedings

The Radiation Exposure Compensation Program and the Energy Employees Occupational Illness Compensation Program resolve claims in a nonadversarial manner; thus, claims are adjudicated through a process in which the adjudicator investigates the facts of the case to determine the eligibility of the claimant.⁷¹ In contrast, the Black Lung Program is adversarial; thus, claims are adjudicated through a process in which two opposing parties, such as the coal miner and his former employer, present their arguments for and against awarding compensation, and

⁷⁰ Caring for Camp Lejeune Veterans Act of 2011, S. 277, 112th Cong. (2011), the Janey Ensminger Act, H.R. 1742, 112th Cong. (2011) and the Examination of Exposures to Environmental Hazards During Military Service and Health Care for Camp Lejeune and Atsugi Naval Air Facility Veterans and their Families Act of 2010, S. 3378, 111th Cong. (2010).

⁷¹ See generally, 28 C.F.R. Part 79 for regulations pertaining to claims filed under the Radiation Exposure Compensation Program Act and 20 C.F.R. Part 30 for regulations pertaining to claims filed under the Energy Employees Occupational Illness Compensation Act.

responsibility for the payment of benefits is assigned to the liable party if the claim is approved.⁷² In this process, the coal mine operators typically serve as the opposing party to the claimant, and if a claimant is awarded benefits, the mine operator determined to be the responsible employer of the miner must generally pay the benefits, either directly or through insurance. If no mine operator can be held liable for payments, the Black Lung Disability Trust Fund pays the cost of black lung claims from funds collected through an excise tax on coal.

Department of Labor officials told us that they prefer the nonadversarial features of the Radiation Exposure Compensation Program and the Energy Employees Occupational Illness Compensation Program because these features can improve the timeliness of processing claims.

Conversely, the adversarial features in the Black Lung Program have contributed to delays in reaching a final disposition of claims by allowing opposing parties to provide evidence to refute initial claims and to appeal claim decisions. For example, a party displeased with the initial decision of the Division of Coal Mine Workers' Compensation in the Department of Labor's Office of Workers' Compensation Programs can request a hearing with a Department of Labor Administrative Law Judge within 30 days after the Office of Workers' Compensation Program decision is filed. Dissatisfied parties can appeal Administrative Law Judge decisions to the Department of Labor Benefits Review Board and Benefits Review Board decisions can be appealed to the appropriate United States Circuit Court of Appeals. Finally, Circuit Court of Appeals decisions may be appealed to the Supreme Court of the United States. In 2009, GAO found that this structure led to a high rate of appeals that prolong the resolution of claims.⁷³ Both miners and coal mine operators frequently seek appeals, and for those claimants awarded compensation during the initial adjudication in fiscal year 2008, the coal mine operators found liable appealed the decision approximately 80 percent of the time.⁷⁴ Since decisions are routinely appealed, GAO previously found that each level of appeal review can take up to a year to adjudicate; ultimately, a claim may remain in the adjudication process for years with the administering federal

⁷² See generally 20 C.F.R. Part 725 for regulations pertaining to the claims process of the Black Lung Program.

⁷³ GAO, *Black Lung Benefits Program: Administrative and Structural Changes Could Improve Miners' Ability to Pursue Claims*, GAO-10-7 (Washington, D.C.: Oct. 30, 2009).

⁷⁴ [GAO-10-7](#).

agency incurring the cost for the years of processing the claim. For example, for claims between 2001 and 2008, 28 percent of the claims of miners awarded compensation from coal mine operators spent 3 to 8 years within the adjudication process.⁷⁵ During this period, the claimant's ultimate entitlement to compensation will remain in doubt.⁷⁶

Outreach and Claimant Assistance

All three programs provide outreach and assistance services to potential claimants. The Energy Employees Occupational Illness Compensation Program sponsors outreach activities, including town hall meetings and traveling resource centers, to disseminate information about benefits and provide assistance to claimants in applying for benefits. For the Black Lung Program, 15 black lung grantees, which provide specialized diagnosis and treatment services, outreach, and educational programs to help patients and their families deal with the disease have been established through grants from the Department of Health and Human Services. The Radiation Exposure Compensation Program has established grant-based Radiation Exposure Screening and Education Programs that support programs for health screening, education, medical referral, and appropriate follow-up services for eligible individuals.

Departments of Labor and Justice officials told us that when programs provide outreach and assistance to potential claimants both claimants and administrators benefit because the filed claims are more complete and contain fewer errors. For the Radiation Exposure Compensation Program, these features allow program administrators to meet with citizens, respond to questions about the program, conduct town hall meetings, and assist in filling out claim forms. For the Energy Employees Occupational Illness Compensation Program, town hall meetings have provided information to more remote locations where individuals may not have known they might have been exposed to radiation and, according to the Department of Labor's 2009 annual report, this outreach resulted in 86 new claims in fiscal year 2009. In addition, resource centers located near major Department of Energy facilities helped claimants complete necessary claim forms and gather documentation such as employment

⁷⁵ GAO-10-7.

⁷⁶ The adversarial system in the Black Lung Program does not delay commencement of an awarded claimant's benefits, however; the program provides that benefits shall be paid to awarded claimants prior to the final adjudication of the claim. If the responsible operator does not voluntarily pay interim benefits, the Black Lung Disability Trust Fund will pay on the operator's behalf. See 20 C.F.R. 725.522.

verification to support their claims. In fiscal year 2009, this outreach helped claimants file 9,935 claims. Further, the Energy Employees Occupational Illness Compensation Program continues to assist claimants by enhancing its database on the types of chemical and toxic contaminants that existed at the major Department of Energy facilities, easing claimants' evidentiary burdens and speeding the claims process.

Eligibility Requirements and Associated Presumptions

According to officials from the agencies that administer the alternative programs for compensation we reviewed and our prior work, the eligibility requirements of a given program may have an impact on the difficulty of claimants trying to establish eligibility, the time needed to process claims, and the cost of administering the program. The evidence needed by claimants varies based on the criteria for each program, which are set out in statutes and regulations. For example, under many compensation programs, claimants must typically show a link between an environmental exposure and subsequent adverse health conditions to be eligible. However, the three programs we examined have certain presumptions that alleviate the need for claimants to fully establish a causal link between an environmental exposure and subsequent adverse health condition. These presumptions address, among other things, locations at which environmental exposures are presumed to have occurred, time frames during which claimants present in certain locations are presumed to have been exposed, and health conditions that are presumed to have been caused by an exposure. According to officials from the agencies that administer the alternative programs for compensation, although presumptions may reduce the burden on the claimant they may potentially increase costs. In addition, very specific presumptions can reduce eligibility for individuals who do not meet established criteria but who, in fact, developed adverse health conditions due to exposure, while very broad presumptions may overstate the connection between an exposure and adverse health conditions, allowing claimants who were not harmed by the exposure to obtain benefits and potentially increasing the cost of the program unnecessarily. The three alternative programs for compensation that we reviewed further illustrate how eligibility requirements may have an impact on the difficulty of claimants trying to establish eligibility, the time needed to process claims, and the cost of administering the program.

- The Energy Employees Occupational Illness Compensation Program provides compensation for several different types of claimants. Part B provides compensation for, among others, employees of the Department of Energy, its contractors or subcontractors, and atomic weapons employers with radiation-induced cancer who developed the

cancer after working at a covered facility and whose cancer is determined to be at least as likely as not related to the employment. The Energy Employees Occupational Illness Compensation Program relies on extensive medical and scientific processes that reconstruct the radiation dose exposure by estimating the type and level of radiation exposure to each affected organ to collect accurate evidence for those claimants with a potential radiation-exposure related cancer, which, based on previous GAO work, may increase the time and administrative cost to adjudicate a claim.⁷⁷ In 2010, GAO found that it took 3 or more years to process claims that required a radiation dose reconstruction, while those that did not require this reconstruction took about a year to adjudicate.⁷⁸ In addition, the direct administrative costs for cases that require a dose reconstruction for potential radiation-exposure related cancer, based on our 2010 report, are estimated at about \$20,000 per case, while the administrative costs of other cases under the program ranged from \$6,000-\$8,000 per case.⁷⁹ However, in some cases in which it is not feasible to estimate with sufficient accuracy the radiation dose received by employees at Department of Energy facilities who were likely exposed to radiation—and there is a reasonable likelihood that such radiation dose may have endangered employees' health—the Energy Employees Occupational Illness Compensation Program Act provides for the addition of a class of those employees to the special exposure cohort. Unlike claimants who are not members of the special exposure cohort, members of the cohort who are diagnosed with any of the cancers specified by Congress are not required to establish that the cancer was "at least as likely as not" related to their employment. For members of the cohort, this presumption reduces the evidence necessary to meet eligibility requirements by removing the need to establish causation between the exposure and the illness. According to Department of Labor officials, for members of any of the more than 70 additional classes of employees added to the special exposure cohort, the claim approval rate is 60 percent, compared to 34 percent for claimants who are not in the special exposure cohort.⁸⁰ Agency

⁷⁷ GAO, *Energy Employees Compensation: Additional Oversight and Transparency Would Improve Program's Credibility*, GAO-10-302 (Washington, D.C.: Mar. 22, 2010).

⁷⁸ GAO-10-302.

⁷⁹ GAO-10-302.

⁸⁰ GAO-10-302.

officials told us that the special exposure cohort alleviates the need for administrators to determine whether evidence supports the existence of a link between the employment and the illness for each individual, thus reducing administrative costs and the time needed for adjudicating claims. However, these presumptions may overstate the connection between an exposure and adverse health conditions and potentially increase the cost of benefits provided in the program by allowing claimants who were not harmed by the exposure to obtain benefits.

- In order to receive benefits under the Black Lung Program, claimants must generally show that the miner has or had pneumoconiosis, the pneumoconiosis resulted in total disability or death, and that the pneumoconiosis arose, at least in part, out of coal mine employment. The requirement to establish causation between the coal mine employment and the adverse health condition may increase the difficulty for claimants trying to establish eligibility. For example, prior GAO work has shown that few claimants have been able to meet the program's evidentiary requirements set by law.⁸¹ In 2008, 87 percent of claims within the Black Lung Program were denied, with over 60 percent of the claims denied during the initial adjudication because claimants could not prove that they had pneumoconiosis or that pneumoconiosis had caused disability or death.⁸² The Black Lung Program has some presumptions, set out in statute, that ease this requirement for claimants who worked at a coal mine.⁸³ However, some of these presumptions are rebuttable, and according to agency officials, can still be refuted by the mine operator.
- Claimants seeking compensation under the Radiation Exposure Compensation Program must show that they were exposed to radiation from atmospheric nuclear testing or as a result of their employment in the uranium mining industry, and that they developed a related adverse health condition, specified in law or regulation. These claimants are not required to establish causation between the

⁸¹ GAO-10-7.

⁸² GAO-10-7.

⁸³ For example, 30 U.S.C. §921 (c)(1) states that "if a miner who is suffering or suffered from pneumoconiosis was employed for ten years or more in one or more coal mines there shall be a rebuttable presumption that his pneumoconiosis arose out of such employment."

exposure and the adverse health condition. According to a Department of Justice report, the Radiation Exposure Compensation Program was designed to utilize existing records so that claims could be resolved in a reliable, objective, and nonadversarial manner, with little administrative cost to the program or person filing the claim. For example, residents who lived downwind of atmospheric nuclear weapons tests may use a record for ownership of a home to show that they were present in a location during a specific time frame to meet the qualifications of the program. While this approach may be beneficial for administrators and claimants, the officials from the agencies that administer the compensation programs told us that not requiring the establishment of causation using scientific evidence potentially diminishes the accuracy of decisions for claims, and may increase the number of claimants who were not harmed by the exposure but are approved for benefits. A study by the National Academy of Sciences emphasizes this by concluding that eligibility for the Radiation Exposure Compensation Program should be based on a more scientific approach that emphasizes a “probability of causation” model that uses a mathematical formula to determine whether radiation exposure is likely the cause of an individual’s cancer.⁸⁴

Frequencies and Types of Payment

The frequencies and types of payment provided vary among alternative programs for compensation, and may impact the administrative costs of compensation programs. For example, the Energy Employees Occupational Illness Compensation Program Act and the Radiation Exposure Compensation Act provide lump sum payments in varying amounts, while the Black Lung Program provides monthly payments. The Energy Employees Occupational Illness Compensation Program and the Black Lung Program also provide compensation for some medical expenses, and the Black Lung Program provides, in some cases, payment of claimants’ attorney fees. According to Departments of Labor and Justice officials who administer these programs, the frequency and type of payments a program provides impacts administrative costs of the program. For example, although a lump sum benefit payment has low administrative costs since it is a one-time payment, some officials noted that there may be moral implications with lump sum payments especially in cases where the claimant may misallocate their lump sum award and need to pursue benefits from other federal programs such as Social

⁸⁴ The National Academies Press, *Assessment of the Scientific Information for the Radiation Exposure Screening and Education Program* (Washington, D.C.: 2005).

Security Disability Insurance. Conversely, although monthly payments may cost more in the longer term compared to lump sum payments, especially if an adverse health condition must be periodically monitored through the program in order to establish continued eligibility, a monthly or periodic payment, on the other hand, would provide a steady stream of income to the claimant but may also cost more to administer since the funding agency must process payments on a monthly basis.

Conclusions

In the most recent Defense Installations Strategic Plan, DOD states its goals of providing effective, safe, and environmentally sound living and working places in support of DOD missions. However, limitations in some of the existing policies targeting such areas as environmental restoration complicate DOD's efforts to consistently address environmental exposures for individuals living or working on its installations. DOD only recently revised its policy on health surveillance to include dependents when collecting data that could improve its ability to address health risks that may have resulted from environmental exposures. However, this policy does not apply retroactively to past events such as those at Camp Lejeune.

DOD does not fully track the status of its responses to recommendations and findings of significant risk from the Agency for Toxic Substances and Disease Registry's public health assessments. In addition, the current process does not ensure that status information on recommendations is provided to or documented by the lead agent's office, as prescribed in the guidelines referenced in the memorandum of understanding between the two agencies. As such, DOD cannot ensure that it has taken timely and appropriate responses to all public health risks. Furthermore, because DOD does not have a policy establishing when it is appropriate for installations to request public health assessments or follow-up work beyond the initial assessment of proposed National Priorities List sites by the Agency for Toxic Substances and Disease Registry, DOD could be missing opportunities to identify and resolve concerns about some health threats. While DOD officials told us that cleanup laws do not require identification of individuals potentially affected by past exposures, events like the contamination at Camp Lejeune indicate a need for some guidance on whether, when, and how to respond to health concerns raised about such individuals.

Recommendations for Executive Action

To ensure that DOD meets its goal of providing effective, safe, and environmentally sound living and working places, and to assess potential gaps in policy coverage for individuals living or working on its installations who are exposed to environmental hazards, the Secretary of Defense should direct the Under Secretary of Defense for Acquisition, Technology, and Logistics to take the following three actions:

- (1) Establish procedures to comprehensively track and document the status and nature of DOD responses to Agency for Toxic Substances and Disease Registry recommendations and findings of significant risk to ensure that DOD and its components monitor the status of these recommendations and findings of significant risk and respond in a timely manner. These procedures should be reflected in an updated memorandum of understanding prepared in collaboration with the Agency for Toxic Substances and Disease Registry, and could include revisions to the agencies' joint guidelines or other mechanisms.
- (2) Establish a policy that identifies when installations should consider requesting public health assessments in addition to the initial assessments at National Priorities List sites.
- (3) Provide guidance on what actions, if any, DOD should take to identify and address possible health risks faced by individuals from past exposures at military installations.

Agency Comments and Our Evaluation

We provided copies of this report for review and comment to the Departments of Defense, Veterans Affairs, Health and Human Services, Labor, and Justice. The Departments of Defense, Veterans Affairs, and Health and Human Services provided written comment letters; all of the departments provided technical comments which we have incorporated as appropriate. The Departments of Defense's, Veterans Affairs', and Health and Human Services' written comment letters are reprinted in appendices IV, V, and VI, respectively. The Department of Veterans Affairs supported the recommendations, stating that "the Department of Defense's adoption of the report recommendations would likely lead to prompt provision of additional information on exposures, and ultimately help veterans and others potentially exposed." The Department of Health and Human Services expressed its support for the first recommendation indicating that it would be available to collaborate with DOD to update the current memorandum of understanding. In its comments, DOD partially concurred with our first recommendation and did not concur with our

second and third recommendations. We continue to believe our recommendations remain valid, as discussed in the report.

DOD partially concurred with our first recommendation—to establish procedures to comprehensively track and document the status and nature of DOD responses to public health recommendations and reflect these procedures in an updated memorandum of understanding. Specifically:

- DOD stated that it will review its procedures for tracking DOD's responses to Agency for Toxic Substances and Disease Registry recommendations and, if needed, make the appropriate changes to its tracking system. As noted in our report, the tracking system data provided to GAO indicated that DOD did not have information on the status of DOD's response to 80 percent of the recommendations. Therefore, we believe DOD needs to make improvements to its tracking system. Without these improvements, DOD is missing opportunities to ensure that vital public health issues are adequately addressed.
- In regards to the memorandum of understanding, DOD stated that changes are not necessary. We disagree. The current memorandum of understanding does not expressly call for tracking recommendations, which we believe is an important coordination activity. As we note in our report, the memorandum of understanding does refer to DOD guidelines for tracking recommendations, but these have not been updated in 17 years. Moreover, these guidelines are not being followed, as our report shows and DOD officials acknowledged. These guidelines called for regular updates and an annual report on the status of recommendations and public health actions at each site. On the other hand, the Agency for Toxic Substances and Disease Registry officials told us that updating the memorandum of understanding with DOD, to address tracking recommendations would be useful. Given that DOD is not following the tracking procedures in its existing guidelines and overlooking the status of 80 percent of the recommendations, we believe that the memorandum of understanding should be revised to expressly address tracking responsibilities to help ensure that identified public health risks are addressed.

DOD did not concur with our second recommendation—to establish a policy that identifies when installations should consider requesting public health assessments in addition to the initial assessments at National

Priorities List sites. DOD stated that its agrees that there should be policies in place to guide decisions on soliciting public health assessments, but believes the appropriate policies and responsibilities are already in place. We disagree with DOD for several reasons:

- First, DOD states that additional public health assessments conducted by the Agency for Toxic Substances and Disease Registry would duplicate the risk assessments conducted by DOD and others, which it believes are more comprehensive. We believe DOD's comments overlook the important distinctions between the two assessments. Risk assessments are intended to enable the selection of cleanup remedies to reduce or eliminate current and future exposures, but these risk assessments generally do not include epidemiology or assessments of health risk to populations from current, future, and past exposures, as the public health assessments do—a fact which DOD officials acknowledged. Thus, these assessments have distinct purposes and scopes.
- Second, DOD states that supplementary policy for additional public health assessments for DOD cleanup sites is not needed, but did not elaborate on the reasons why. In the course of conducting a DOD cleanup program, installations may become aware of past exposures—such as at Tyndall Air Force Base or Camp Lejeune—years after an initial health assessment was developed. In fact, site characterization and restoration activities may take many years, and new health risks may be discovered during this process. However, without this guidance, it is unclear when it is appropriate to request a new health assessment.
- Third, DOD states that its current policies require the assessment of health risks to servicemembers and their dependents living on its installations; however, until DOD's February 2012 revised directive, it was unclear when and if health surveillance data were collected for servicemembers' dependents. As we said in the report, it is too soon to determine whether the implementation of this directive will include all individuals living or working on DOD installations—particularly servicemembers' dependents living on overseas installations. As such, policies beyond the general directive are needed to ensure appropriate data are collected that might support a public health assessment when necessary.
- Finally, DOD states that assessments at Naval Air Station Atsugi, Japan, and Naval Air Station Fallon, Nevada, were initiated based

on health concerns raised by military families living on these installations. However, in our view, these examples highlight DOD's reactive—rather than proactive—approach to responding to health concerns. In the case of air pollution at Atsugi, no DOD policy existed to guide the Navy on their approach to conducting environmental surveillance, medical testing, or notification of the potentially exposed dependents. As a result, it took several years for DOD to complete a risk assessment and notify servicemembers and their dependents about the long-term health effects. It took at least 13 years after the initial complaints for DOD and the U.S. government to get the Japanese government to close the incinerator that contributed to the air pollution. Policies to guide decisions on soliciting public health assessments could accelerate DOD's response to future public health concerns.

DOD did not concur with our third recommendation—to provide guidance on actions to identify and address possible health risks faced by individuals from past exposures at military installations. DOD stated that it follows federal law, and its current guidance and policy are adequate for reasonably anticipated actions. We disagree for two reasons:

- The experiences at Atsugi Naval Air Station and Camp Lejeune demonstrate that DOD's current guidance and policy are not adequate to encompass situations that have potentially severe health implications, which DOD has already encountered in the past. At Atsugi, an off-base incinerator in Japan released toxic fumes that drifted onto the naval base and may have exposed over 25,000 individuals on the installation to toxic air contaminants from 1985 through 2001, according to the Department of Veterans Affairs, despite individual complaints starting around 1988. At Camp Lejeune, potential exposure to volatile organic compounds in drinking water has resulted in administrative claims by servicemembers against the U.S. government totaling billions of dollars in potential damages for health conditions alleged to have resulted from exposure to contaminated water. In these examples, no current DOD policy or guidance was available to provide focus and direction in how officials should address past exposures. We continue to believe that these experiences could inform new policies by DOD to provide guidance to the services and their installations on how to manage situations that encounter similar challenges in the future, while maintaining appropriate flexibility.

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- DOD stated that its cleanup policy is adequate because the Comprehensive Environmental Response, Compensation, and Liability Act does not require responsible parties to identify individuals who may have been exposed to contamination in the past. We agree that the act does not generally require responsible parties to identify exposed individuals, but that was not the basis for our recommendation; moreover, DOD is not limited to meeting the minimum requirements of federal law. GAO was mandated by Congress to review the extent to which DOD has a standard framework for responding to environmental hazards and possible exposures, among other things, and to make recommendations for any administrative action “that the Comptroller General deems appropriate in the context of the assessment.”⁸⁵ In determining whether there is a standard framework, we found these gaps in policy. In light of these gaps and our mandate, we believe it is appropriate and have recommended that DOD develop guidance to assist the services and their installations in these situations. Further, we emphasize that our recommendation calls for guidance, but leaves its substance—such as what actions, if any, are appropriate—to DOD.

In its written comments on a draft of this report, the Department of Veterans Affairs stated that environmental exposure data should be available in service treatment records and that this information is vitally important for the Department to adequately adjudicate claims based on environmental exposures. Accordingly, the Department stated that DOD’s adoption of our report recommendations would likely lead to the prompt provision of additional information on exposures, and ultimately help veterans and others potentially exposed. The Department of Veterans Affairs’ written comments are reprinted in appendix V.

In its written comments on a draft of this report, the Department of Health and Human Services stated that in regards to our first recommendation, the Agency for Toxic Substances and Disease Registry would be available for collaboration with DOD to update the current memorandum of understanding that is in place regarding the Agency for Toxic Substances and Disease Registry’s recommendations and findings for

⁸⁵ Ike Skelton National Defense Authorization Act of 2011, Pub. L. No. 111-383 § 314.

significant risk. The Department of Health and Human Services' written comments are reprinted in appendix VI.

We are sending copies of this report to interested congressional committees and the Secretaries of Defense, Labor, Veterans Affairs; the Under Secretary of Defense for Acquisition, Technology, and Logistics; the Attorney General; and the Director of the Centers for Disease Control and Prevention. The report also is available at no charge on GAO's website at <http://www.gao.gov>.

If you or your staff have any questions concerning this report, you may contact us at: Brian J. Lepore, (202) 512-4523 or leporeb@gao.gov or David C. Trimble, (202) 512-9338 or trimbled@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. Key contributors to this report are listed in appendix VII.



Brian J. Lepore, Director
Defense Capabilities and Management



David C. Trimble, Director
Natural Resources and Environment

Appendix I: Objectives, Scope, and Methodology

The objectives of our report were to determine (1) the extent to which the Department of Defense (DOD) has policies for identifying and responding to possible human exposures to environmental hazards on its installations; (2) what programs currently exist to provide health care and compensation to individuals for adverse health conditions resulting from environmental exposures on military installations and any factors that may affect these individuals' access to health care or compensation; and (3) the features of alternative federal programs that provide medical benefits or compensation to large groups of individuals affected by a specific environmental exposure, which may be considered as possible options in the design of any future programs for individuals harmed by environmental hazards.

To determine the extent to which DOD has policies for identifying and responding to possible human exposures to environmental hazards on its installations, we reviewed and analyzed relevant laws as well as DOD, Environmental Protection Agency, and Agency for Toxic Substance and Disease Registry guidance and other documentation to identify the extent to which DOD identifies and responds to environmental exposures that may pose a risk to human health. In conducting this analysis, we catalogued DOD guidance and conducted content analysis to determine the extent to which the guidance addressed environmental exposures on military installations. Additionally, we conducted a literature search in professional journals to identify DOD policies in responding to environmental exposures. We also examined the database used to track the Agency for Toxic Substances and Disease Registry's public health assessment recommendations and DOD's implementation of those recommendations. In addition, we interviewed DOD officials at the Office of the Secretary of Defense and the various components, as well as officials at the Environmental Protection Agency, the Agency for Toxic Substances and Disease Registry, and some members of the Agency for Toxic Substances and Disease Registry's Community Assistance Panel for Camp Lejeune. The Agency for Toxic Substances and Disease Registry created the community assistance panel as the forum for the Camp Lejeune community to voice concerns and provide input into future health studies regarding the water contamination at Camp Lejeune. We attended the July 2011 meeting of the Community Assistance Panel held in Wilmington, North Carolina and also conducted site visits to Camp Lejeune, North Carolina and Aberdeen Proving Ground, Maryland where the Army, as DOD's Executive Agent for interaction with the Agency for Toxic Substances and Disease Registry, has its offices.

To determine what programs currently exist to provide health care and compensation to individuals for adverse health conditions resulting from environmental exposures on military installations and any factors that may affect these individuals' access to health care or compensation, we reviewed and analyzed relevant laws and regulations, agency guidance, scientific journals, and other documentation to identify the eligibility requirements and determination procedures and extent of compensation and medical benefits provided through various processes currently available to different types of individuals (veterans and servicemembers and current and former military dependents, federal civilian workers, and contractors) possibly exposed to environmental hazards while working or living on military installations. We reviewed the following programs: the Federal Employee Compensation Act Program, Department of Defense's TRICARE, Department of Defense's Disability Evaluation System, Department of Veterans Affairs' disability benefits and health care benefits programs, State Workers' Compensation Programs, the Defense Base Act, and Federal Employee Health Benefits Program. We then developed matrices comparing the eligibility requirements and determination procedures of the various programs to identify what types of individuals were eligible for the various programs and if there were any gaps in coverage. We met agency officials from the Departments of Defense, Veterans Affairs, Labor, and Justice, to obtain further insight into the administration and eligibility requirements of the various programs; find out the reasons for any gaps in coverage and what challenges exist in obtaining benefits or compensation; and determine the potential adverse effects any such gaps and challenges may have on individuals exposed to environmental hazards. In addition, we interviewed officials from each of the Army, Navy, and Air Force Judge Advocate Offices to obtain information regarding environmental exposure tort claims and the process for filing claims. To assess the reliability of claims data obtained from the Department of the Navy and the Department of Veterans Affairs, we interviewed agency officials regarding the processes and procedures used to verify accurate data are maintained within the databases. Although we did not independently validate the claims data, we found these data to be sufficiently reliable for our purposes.

To determine the features of alternative federal programs that provide medical benefits or compensation to large groups of individuals affected by a specific environmental exposure, which may be considered as possible options in the design of any future programs for individuals harmed by environmental hazards, we reviewed and analyzed relevant laws and regulations, academic journals, external studies, and previous GAO reports to identify alternative compensation programs that (1)

provided monetary compensation for specific adverse health conditions or death and/or medical benefits, (2) provided compensation based on exposure to a harmful contaminant in the environment, and (3) were federal programs that covered U.S. citizens. Using these criteria, we identified three programs: The Black Lung Program administered by the Department of Labor, the Energy Employee Occupational Illness Compensation Program administered by the Department of Labor, and the Radiation Exposure Compensation Program administered by the Department of Justice as the most comparable of environmental exposure compensation programs. We identified one other environmental exposure-related compensation program, the Marshall Islands Nuclear Claims Tribunal, but did not include it our analysis because it does not provide compensation to U.S. citizens. Although we collected and reviewed information regarding other compensation programs such as the Smallpox Vaccine Injury Compensation Program, the National Vaccine Injury Compensation Program, and the September 11th Victim Compensation Fund, we did not include these programs in our analysis as they do not provide compensation for injuries caused by environmental hazards. Both the Smallpox Vaccine Injury Compensation Program and the National Vaccine Injury Compensation Program provide compensation for injuries caused by vaccines and the September 11th Victim Compensation Fund only provides compensation based on death or injury caused by terrorist attacks. To identify and assess the features of these alternative compensation programs, including the benefit and challenges to the design of features, we reviewed prior GAO reports, met with GAO experts who have reported on these programs, interviewed agency officials with the Departments of Labor and Justice, and obtained and reviewed documentation and claims data on the programs from agency officials. To assess the reliability of claims data obtained by the Departments of Labor and Justice, we interviewed agency officials and received written documentation on internal control used by the agencies and the processes and procedures used to verify accurate data are maintained within the databases. Although we did not independently validate the claims data, we found these data to be sufficiently reliable for our purposes.

We conducted this performance audit between May 2011 and May 2012 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Appendix II: Selected Contaminants That Have Been Found on Some Military Installations and Their Effect on Humans

The Department of Defense has 141 installations on the national priorities list. In some cases, these installations and surrounding areas became heavily contaminated due to storage and disposal of substances such as solvents, machining oils, metalworking fluids, and metals. Many of these contaminants, such as trichloroethylene, perchloroethylene, and vinyl chloride, are known or suspected carcinogens. On some installations, these contaminants have spread far beyond their points of origin because they have been transported by wind currents or have leached into groundwater supplies, resulting in potential environmental exposures. Some of these contaminants include:

- Perchlorate is a rocket fuel component and by-product of rocket and missile testing and is also found in some fertilizers and fireworks. Now ubiquitous in the environment, it has spread from numerous manufacturing sites into drinking water systems and can also accumulate in leafy food crops and fruit irrigated by perchlorate-contaminated water. According to the Agency for Toxic Substances and Disease Registry, perchlorate's main target for toxicity in humans is the thyroid gland. In humans, perchlorate accumulates in the thyroid gland and can block iodide transfer into the thyroid, resulting in iodine deficiency and lower thyroid activity. The populations most sensitive to perchlorate exposure are children and fetuses, as adequate iodide is crucial for neurological development.
- Trichloroethylene and Perchloroethylene are solvents that have historically been used as metal degreasers and as ingredients in dry-cleaning spot removers, adhesives, paint removers, and typewriter correction fluids. According to the Environmental Protection Agency, exposure to trichloroethylene and perchloroethylene can result in cardiac arrhythmia, liver damage, and possible kidney effects, as well as an increased risk for a variety of cancers (esophagus, kidney, bladder, lung, pancreas, and cervix). Trichloroethylene and perchloroethylene degrade in groundwater over time to vinyl chloride.
- Vinyl chloride is a colorless gas with a sweet odor. Vinyl chloride is used to manufacture numerous products in building construction, the automotive industry, electrical wire insulation and cables, piping, industrial and household equipment, and medical supplies, and is depended upon heavily by the rubber, paper, and glass industries. Vinyl chloride is a known human carcinogenic and, according to the Environmental Protection Agency, long-term exposure to vinyl chloride may lead to liver cancer.

**Appendix II: Selected Contaminants That Have
Been Found on Some Military Installations and
Their Effect on Humans**

- Benzene is a colorless liquid with a sweet odor that is highly flammable, evaporates in the air very quickly, and dissolves slightly in water. Benzene is formed from both natural processes and human activities. Natural sources of benzene include volcanoes and forest fires. Benzene is a natural part of crude oil, gasoline, and cigarette smoke. It is widely used in the United States. Some industries use benzene to make other chemicals that are used to make plastics, resins, and nylon and synthetic fibers. Benzene is also used to make some types of lubricants, rubbers, dyes, detergents, drugs, and pesticides. In humans, benzene causes cells not to work correctly. For example, it can cause bone marrow not to produce enough red blood cells, which can lead to anemia. Also, it can damage the immune system by changing blood levels of antibodies and causing the loss of white blood cells. The Department of Health and Human Services has determined that benzene causes cancer in humans.
- Lead is extensively used in ammunition and firearms and, as a result, is prevalent in the soil of current and former firing ranges on many military installations. Lead can affect almost every organ and system in the body. The main target for lead toxicity is the nervous system, both in adults and children. Exposure to high lead levels can severely damage the brain and kidneys in adults or children.

Appendix III: Significant Health Studies and Notification Efforts Related to Contamination at Marine Corps Base Camp Lejeune

1997 – An Agency for Toxic Substances and Disease Registry health assessment stated that exposure to volatile organic compounds in three drinking water systems on base was a public health hazard. The Agency also stated that the exposures were not likely to cause health problems in adults but recommended that studies be conducted to evaluate the risks of childhood cancer related to volatile organic compound exposure at Camp Lejeune and noted that adverse pregnancy outcomes were also of concern.

1998 – An Agency for Toxic Substances and Disease Registry study found a statistically significant association between exposure and some adverse pregnancy outcomes.

1999 – 2012 – An Agency for Toxic Substances and Disease Registry case-control study of specific birth defects and childhood cancers at Camp Lejeune was initiated to evaluate whether in utero exposure and/or exposure during the first year of life to contaminated drinking water at the base was associated with specific birth defects and childhood cancers. Agency for Toxic Substances and Disease Registry expects completion of the study some time in 2012.

2005 – An expert panel reported on the Agency for Toxic Substances and Disease Registry's computer models of past Camp Lejeune drinking water systems. The Agency for Toxic Substances and Disease Registry said it accepted the panel's recommendations for more rigorous record searches in order to reconstruct events for the water modeling studies.

2007 – A Marine Corps online notification registration database and a new telephone line was activated to place former Camp Lejeune residents, workers, and other interested parties on a contact list to receive results from research initiatives.

2008 – The National Defense Authorization Act for Fiscal Year 2008, Pub. L. No 110-181 § 315 required, among other things, that the Secretary of the Navy make reasonable efforts to identify and notify directly certain individuals – those served by the contaminated water systems or civilian employees in particular timeframes—who may have been exposed to the contaminated drinking water at Camp Lejeune.

2008 – A Marine Corps and Internal Revenue Service mailing was sent to about 150,000 individuals who resided or worked at Camp Lejeune during the applicable timeframe encouraging individuals to join the contact list to be notified about research initiatives.

2009 – The Agency for Toxic Substances and Disease Registry said it withdrew its 1997 public health assessment after additional information emerged related to exposures to volatile organic compounds in drinking water at Camp Lejeune. The public health agency said inaccuracies regarding the exclusion of benzene in the 1997 assessment caused the withdrawal. The Agency for Toxic Substances and Disease Registry plans to revise the public health assessment once a water modeling study is complete. In the meantime, the Agency for Toxic Substances and Disease Registry said it stands behind the information related to the other nine exposure pathways.

2009 – The National Research Council completed a report in response to a request from the Navy, mandated by Congress (Pub. L. No. 109-364, §318), to review evidence on whether adverse health outcomes are associated with past contamination of the water supply at Camp Lejeune. Among other things, the National Research Council concluded that most questions about whether exposures at Camp Lejeune resulted in adverse health effects cannot be answered definitively even with further scientific study.

2010 – The Agency for Toxic Substances and Disease Registry began conducting a mortality study looking at all causes of death, including cancers and other fatal diseases to determine if there is a link between the death and exposure to contaminated drinking water at Camp Lejeune. The study focuses on Marines who started active duty and DOD civilian employees who began work at Camp Lejeune between June 1975 and December 1985.

2011 – The Agency for Toxic Substances and Disease Registry launched a health survey of 300,000 Marine Corps personnel and civilians regarding diseases that may be associated with chemical exposures in the drinking water, in response to a mandate in the 2008 National Defense Authorization Act. This is the largest health survey ever conducted by the Agency for Toxic Substances and Disease Registry, which expects to release its findings in 2014.

Source: DOD and Agency for Toxic Substances and Disease Registry.

Appendix IV: Comments from the Department of Defense



OFFICE OF THE UNDER SECRETARY OF DEFENSE
3000 DEFENSE PENTAGON
WASHINGTON, DC 20301-3000

ACQUISITION,
TECHNOLOGY
AND LOGISTICS

APR 23 2012

Mr. Brian J. Lepore
Director, Defense Capabilities and Management
U.S. Government Accountability Office
441 G Street, NW
Washington, DC 20548

Dear Mr. Lepore:

This is the Department of Defense (DoD) response to the GAO Draft Report, GAO-12-412, "DEFENSE INFRASTRUCTURE: DoD Can Improve Its Response to Environmental Exposures on Military Installations," dated March 16, 2012 (GAO Code 351607). The DoD response to the GAO recommendations and our detailed comments on the draft report are provided in the enclosures.

The DoD partially concurs with the first recommendation as we will review and revise, where appropriate, our tracking system of the Agency for Toxic Substances and Disease Registry (ATSDR) public health recommendations. However, we believe that updating the memorandum of understanding with the ATSDR is unnecessary because additional procedures will not contribute to the timely monitoring of ATSDR recommendations. We non-concur with the second recommendation; while DoD concurs that there should be policy in place to guide decisions on soliciting public health assessments – whether from ATSDR or other entities, we believe the appropriate policies and responsibilities are in place. We non-concur with the third recommendation; while DoD agrees with the need to have strong policies, we believe DoD's current policies are adequate to encompass reasonably anticipated actions relate to health risks. If new or emerging situations are identified, we will adjust our policies as needed.

The Department appreciates the opportunity to comment on the draft report.

Sincerely,

Dorothy Robyn
Deputy Under Secretary of Defense
(Installations and Environment)

Enclosures:
As stated

**GAO DRAFT REPORT DATED MARCH 16, 2012
GAO-12-412 (GAO CODE 351607)**

**"DEFENSE INFRASTRUCTURE: DOD CAN IMPROVE ITS RESPONSE
TO ENVIRONMENTAL EXPOSURES ON MILITARY
INSTALLATIONS"**

**DEPARTMENT OF DEFENSE COMMENTS
ON THE GAO RECOMMENDATIONS**

RECOMMENDATION 1: The GAO recommends that the Secretary of Defense direct the Under Secretary of Defense for Acquisition, Technology and Logistics to establish procedures to comprehensively track and document the status and nature of DoD responses to agency for Toxic Substances and Disease Registry recommendations and findings of significant risk to ensure that DoD and its components monitor the status of these recommendations and findings of significant risk and respond in a timely manner. These procedures should be reflected in an updated memorandum of understanding prepared in collaboration with the Agency for Toxic Substances and Disease Registry, and could include revisions to the agencies' joint guidelines or other mechanisms.

DoD RESPONSE: Partially concur. DoD will review the tracking procedures and, if needed, make the appropriate changes to the management of the tracking system created and maintained by the Army Institute of Public Health. While not required by Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Contingency Plan (NCP), DoD established this system to track and monitor the Agency for Toxic Substances and Disease Registry (ATSDR) recommendations provided in ATSDR's public health assessments conducted for DoD Sites. This tracking system supports the management of the ATSDR work performed for DoD under the Memorandum of Understanding (MOU) and assists to identify additional support the DoD Components may request from ATSDR. The MOU establishes responsibilities regarding how the two agencies will identify annual workload and funding requirements.

DoD only partially concurs because changes to the MOU are not necessary. The current MOU is sound and adding additional procedures will not contribute to the timely monitoring of the ATSDR recommendations and findings.

RECOMMENDATION 2: The GAO recommends that the Secretary of Defense direct the Under Secretary of Defense for Acquisition, Technology and Logistics to assess potential gaps in policy coverage for individuals living or working on its

Enclosure 1

installations who are exposed to environmental hazards. In particular: establish a policy that identifies when installations should consider requesting public health assessments in addition to the initial assessments at National Priorities List sites.

DoD RESPONSE: Non-concur. While DoD concurs that there should be policy in place to guide decisions on soliciting public health assessments – whether from ATSDR or other entities, we believe the appropriate policies and responsibilities are in place.

Current DoD policy on conducting health exposure assessments for the cleanup of DoD sites, as required by the CERCLA and the National Contingency Plan (NCP), is comprehensive and more extensive than the ATSDR public health assessments based on the CERCLA section 104(i) for National Priorities List sites. The ATSDR public health assessment is one component of the CERCLA risk assessment required by DoD cleanup policy. Additional ATSDR health assessments would be duplicative of the more comprehensive risk assessment conducted by DoD along with regulatory agencies to reach remedy decisions for all DoD cleanup sites. Supplementary DoD cleanup policy for additional public health assessment for DoD cleanup sites is not needed.

Outside the DoD cleanup program, DoD has policies that require the assessment of health risks to DoD people, including family members living on the installations. DoD public health staff use findings from routine health surveillance, trends from medical data and reports of health concerns as triggers to initiate a health risk assessment. At each stage of the assessment, the public health staff decides whether the evidence indicates the need for further assessment. Assessments at Naval Air Station Atsugi, Japan, and Naval Air Station Fallon, Nevada, were initiated based on health concerns raised by military families, and continued based on evidence at each level of assessment. Health risk assessments may include formal review by outside panels of subject matter experts such as the Defense Health Board, ATSDR, the National Academies of Science, and Committee on Toxicology.

RECOMMENDATION 3: The GAO recommends that the Secretary of Defense direct the Under Secretary of Defense for Acquisition, Technology and Logistics to assess potential gaps in policy coverage for individuals living or working on its installations who are exposed to environmental hazards. In particular: provide guidance on what actions, if any, DoD should take to identify and address possible health risks faced by individuals from past exposures at military installations.

DoD RESPONSE: Non-concur. DoD agrees that if new actions to identify and address possible health risks are required, additional guidance may be needed.

However, our position is that current guidance and policy are adequate to encompass reasonably anticipated actions.

DoD follows current federal law for individuals living or working on military installations who may have been exposed to contamination. CERCLA requires an assessment of actual or potential risks to human health and the environment from existing contamination but does not require responsible parties to identify individuals who may have been exposed to contamination in the past. This is true for private industry, EPA led Superfund cleanup sites, or Federal agency led cleanup sites. Current DoD cleanup policy based on CERCLA addresses actual or potential exposure to contamination for individuals living or working on its installations from DoD cleanup sites; additional DoD cleanup policy is not needed.

In addition to the specific requirements of federal law, DoD also has existing policy that requires the communication of health risk to affected persons. The decision of who has been affected is a judgment call based on local conditions, to include the likelihood of a completed exposure pathway and observed health effects.

Appendix V: Comments from the Department of Veterans Affairs



DEPARTMENT OF VETERANS AFFAIRS
Washington DC 20420

April 9, 2012

Mr. Brian J. Lepore
Director, Defense Capabilities
and Management
U.S. Government Accountability Office
441 G Street, NW
Washington, DC 20548

Dear Mr. Lepore:

The Department of Veterans Affairs (VA) has reviewed the Government Accountability Office's (GAO) draft report, "**DEFENSE INFRASTRUCTURE: DOD Can Improve Its Response to Environmental Exposures on Military Installations**" (GAO-12-412) and is providing technical comments in the enclosure.

VA believes that documentation of environmental monitoring and occupational and environmental exposure data, including medical monitoring, should be available in service treatment records. This information is vitally important for VA to adequately adjudicate claims based on environmental exposures. The Department of Defense's adoption of the report recommendations would likely lead to prompt provision of additional information on exposures, and ultimately help Veterans and others potentially exposed.

VA appreciates the opportunity to comment on your draft report.

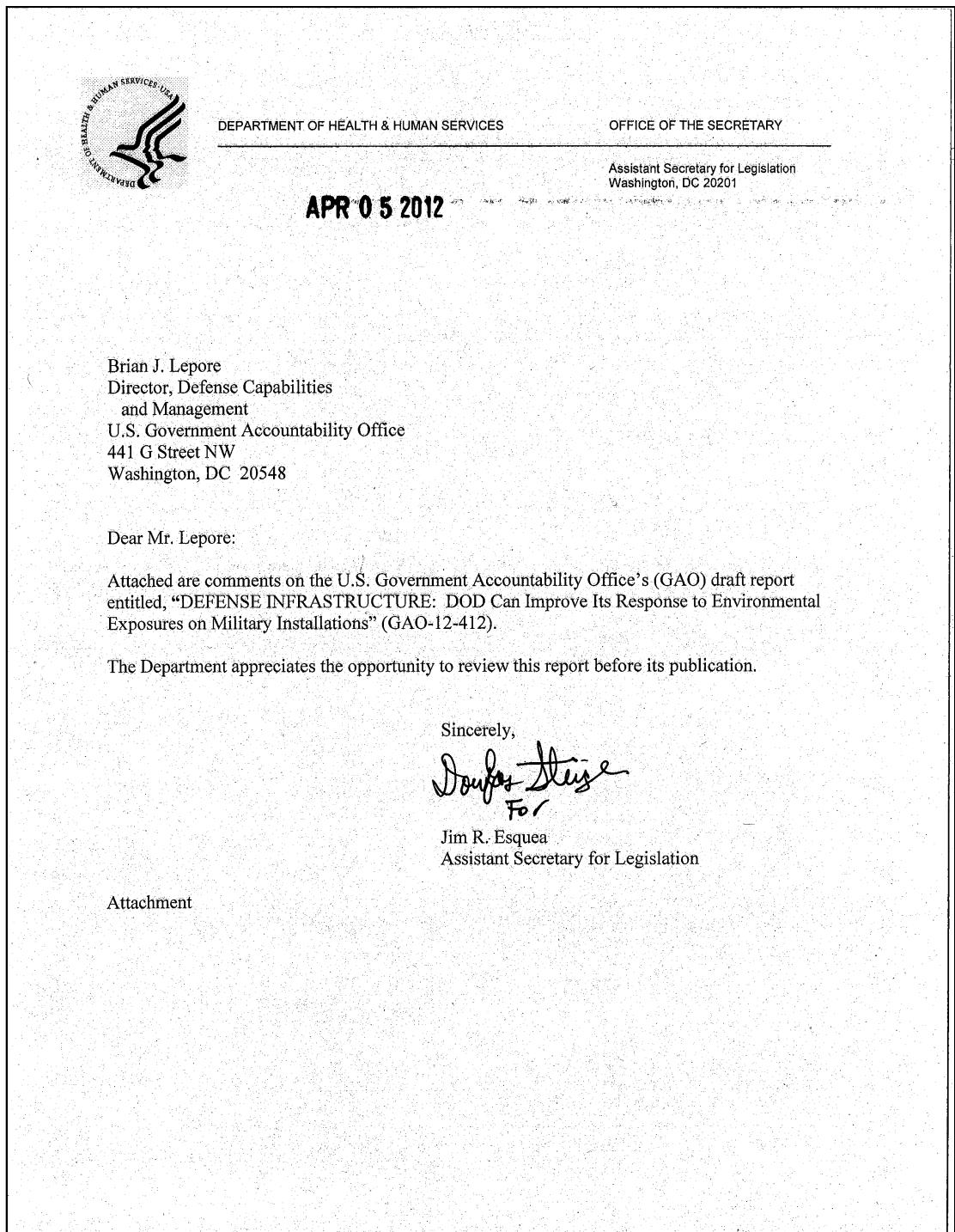
Sincerely,

A handwritten signature in black ink, appearing to read "John R. Gingrich".

John R. Gingrich
Chief of Staff

Enclosure

Appendix VI: Comments from Department of Health and Human Services



**GENERAL COMMENTS OF THE DEPARTMENT OF HEALTH AND HUMAN
SERVICES (HHS) ON THE GOVERNMENT ACCOUNTABILITY OFFICE'S (GAO)
DRAFT REPORT ENTITLED: DEFENSE INFRASTRUCTURE: DOD CAN IMPROVE
ITS RESPONSE TO ENVIRONMENTAL EXPOSURES ON MILITARY INSTALLATIONS
(GAO-12-412)**

The Agency for Toxic Substances and Disease Registry (ATSDR) wishes to thank the GAO for the opportunity to review and comment on this draft report. ATSDR generally concurs with the GAO's recommendations and additionally provides the following general comment:

With regard to Action (1), ATSDR will be available for collaboration with DOD to update the current memorandum of understanding that is in place regarding recommendations and findings for significant risk.

Appendix VII: GAO Contacts and Staff Acknowledgments

GAO Contacts

Brian J. Lepore, (202) 512-4523 or leporeb@gao.gov

David C. Trimble, (202) 512-9338 or trimbled@gao.gov

Acknowledgments

In addition to the individuals named above, Diane Raynes (Assistant Director), Mark J. Wielgoszynski (Assistant Director), Shawn Arbogast, Elizabeth Beardsley, Marissa Dondoe, Laurie Ellington, Dani Greene, Joanne Landesman, Nicholas McKay, Jennifer Neer, Alison O'Neill, Daniel Semick, Amie Steele, and Nicole Willems made key contributions to this report.

Related GAO Products

Hearing Loss Prevention: Improvements to DOD Hearing Conservation Programs Could Lead to Better Outcomes. [GAO-11-114](#). Washington, D.C.: January 31, 2011.

Afghanistan and Iraq: DOD Should Improve Adherence to Its Guidance on Open Pit Burning and Solid Waste Management. [GAO-11-63](#). Washington, D.C.: October 15, 2010.

Superfund: Interagency Agreements and Improved Project Management Needed to Achieve Cleanup Progress at Key Defense Installations. [GAO-10-348](#). Washington, D.C.: July 15, 2010.

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Energy Employees Compensation: Additional Oversight and Transparency Would Improve Program's Credibility. [GAO-10-302](#). Washington, D.C.: March 22, 2010.

Black Lung Benefits Program: Administrative and Structural Changes Could Improve Miners' Ability to Pursue Claims. [GAO-10-7](#). Washington, D.C.: October 30, 2009.

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