

GAO

Report to the Chairman, Subcommittee
on Environment, Energy, and Natural
Resources, Committee on Government
Operations, House of Representatives

August 1994

ENVIRONMENTAL COMPLIANCE

DOD Needs to Better Identify and Monitor Equipment Containing Polychlorinated Biphenyls





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

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**National Security and
International Affairs Division**

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The Honorable Mike Synar
Chairman, Subcommittee on Environment,
Energy, and Natural Resources
Committee on Government Operations
House of Representatives

Dear Mr. Chairman:

This report was prepared in response to your request that we review how the Department of Defense manages polychlorinated biphenyl (PCB) equipment at its installations. The Toxic Substances Control Act cited PCBs as a threat to human health and restricted the manufacture and use of equipment containing it.

Unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days after its issue date. At this time, we will send copies to the Secretaries of Defense, the Army, the Navy, and the Air Force. Copies will also be made available to other interested parties on request.

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

Sincerely yours,

Donna M. Heivilin
Director, Defense Management and
NASA Issues

Executive Summary

Purpose

From 1929 to 1975 an estimated 1.4 billion pounds of polychlorinated biphenyls (PCB) were produced in the United States. The 1976 Toxic Substances Control Act specifically cited PCBs as a threat to human health and restricted the manufacture and use of equipment containing this substance. The military services have significant quantities of PCBs in equipment such as electrical transformers and capacitors on their installations.

At the request of the Chairman of the Subcommittee on Environment, Energy, and Natural Resources, House Committee on Government Operations, GAO assessed the Department of Defense's (DOD) efforts to identify, replace, monitor, store, and dispose of equipment containing PCBs.

Background

PCBs are a class of organic chemical compounds that are nonflammable and can conduct heat without conducting electricity. PCBs are used primarily in electrical equipment and heat transfer systems. If released into the environment, PCBs tend to persist and are considered a chronic toxic hazard since they are readily absorbed and retained in human and animal tissues. Short-term exposure to PCBs may cause skin problems and long-term exposure may cause liver damage or impairment of the nervous system. PCB exposure has also caused reproductive problems and cancer in animals.

The Environmental Protection Agency (EPA) issued regulations pursuant to the act that generally allow the continued use of PCB items already in service, and provide specific storage and disposal requirements for items removed from service and specific monitoring requirements for known PCB items still in use. Federal executive agencies, including DOD, must comply with the act and the EPA regulations. DOD has not provided specific implementing guidance to the services, but has provided general guidance on complying with legal environmental requirements. The services have individually issued regulations incorporating the EPA requirements.

DOD also has PCB in electrical equipment located on military installations located outside of the United States. The EPA regulations do not apply to U.S. military installations overseas, but in some cases, the services have incorporated standards from the EPA regulations in overseas directives. DOD guidance states that overseas bases should comply with the environmental laws of host countries and, to the extent practicable, U.S. laws. The policy guidance provides that a designated executive agent in

each country determine appropriate standards by October 1993 and that Unified Commanders are to coordinate and maintain oversight of the implementation of specific directives. This goal was not met and DOD now expects that the standards will be set by December 1994.

Results in Brief

Because DOD has not provided specific guidance on the identification and replacement of PCB items, each service has been free to establish its own program. Accordingly, service efforts to identify and replace PCB items vary considerably. The Air Force and the Navy implemented identification and replacement programs, but their inventory data may not be accurate based on GAO's work at Navy and Air Force installations. In 1991, the Air Force discontinued collecting detailed inventory information centrally, leaving it up to the installations to maintain such data. The Army, like the Air Force, leaves the responsibility for monitoring PCB identification and replacement to the installations. As with the other services, similar problems were noted for the Army. Only one of the four installations GAO visited had a program to identify PCB items. Goals to become PCB-free through replacement actions also did not exist at the Army installations.

More than 15 years after the act was enacted, some installations are still not meeting the EPA regulations regarding monitoring, storing, and disposing of PCB items. At 12 installations GAO visited in the United States, 9 were found not to comply with the EPA regulations. Examples are (1) improper storage of PCB items, (2) transformers with previously undetected leaks, (3) inadequate monitoring of known PCB items, (4) slow responses to PCB spills, and (5) incomplete or missing documentation for PCB disposals. Although EPA periodically inspected some installations to see if they were complying with PCB regulations, the correction of deficiencies was basically left to an individual installation, and some had been slow in initiating and completing corrective actions.

Principal Findings

Need for Identification of PCB Items

In the absence of specific EPA or service requirements to identify all PCB items, many installations did not know how many PCB items are in use at their specific bases. DOD only tracked the number of reported PCB-free installations, and the number of notices of violation under the act. While the Air Force and the Navy either maintain or have maintained the PCB

inventory in greater detail, GAO found inaccuracies in their counts. The Army has not accumulated a complete inventory. Three of the four Army installations GAO visited did not have a complete inventory. The eight Navy and Air Force installations GAO visited had inventory data but two of them had not provided current data to the service level.

Service efforts to replace PCB items, in the absence of guidance to do so, vary considerably. The Air Force implemented a replacement program in 1986 with a goal of being PCB free of major items by the end of 1991. The Air Force did not meet this goal and has not formally established a new date. The Navy implemented its replacement program in 1990 with a goal to become PCB free of major items by the year 2003, replacing larger transformers and capacitors by 1998 and smaller transformers by the year 2003. The Army does not have a centrally managed replacement program, but their officials state that the Army was moving toward elimination of PCBs. None of the four Army installations GAO visited had established programs to become PCB free.

Monitoring PCB Items

Some installations did not meet the EPA requirements regarding monitoring of PCB items. Monitoring helps to ensure that PCB items do not present a risk to health or the environment. EPA requires periodic inspections of certain PCB items, notification to fire departments as to the location of PCB items, labeling of these items, and prompt clean-up of spills involving PCB fluids. In GAO's review, 8 of 12 installations visited were not complying with one or more of the EPA requirements. For example, one installation identified a PCB spill in June 1991, but the transformer was still leaking at the time of the GAO survey in September 1992.

EPA periodically inspected some DOD installations to see if they were complying with the EPA regulations but generally relied on the assurances of the installations that any deficiencies identified are corrected. GAO found an instance where, despite installation assurances to EPA, deficiencies were not corrected 3 years later.

Storage and Disposal

DOD installations also did not meet the EPA regulations regarding storage and disposal of PCB items removed from service. GAO found that 5 of 12 installations visited experienced problems in meeting storage regulations. For instance, the EPA requires PCB equipment, stored for disposal for over 30 days, to be stored in a facility that conforms with EPA specifications. GAO found that one installation had PCB equipment improperly stored in an

abandoned building, a parking lot, and outside an electrical shop for over 30 days. Also, three other installations GAO visited had PCB storage facilities that did not meet EPA storage standards. DOD officials stated that budget constraints have sometimes caused difficulty in modifying facilities, especially ones that would not be required once PCBs were eliminated.

In addition, EPA requires that installations prepare and maintain manifests documenting the shipment of PCB items and a certificate of disposal from the disposal company certifying proper disposal of the items. Four installations could not provide these documents to support disposal of PCB items. DOD officials stated that records might have been obtainable through DOD offices. In another instance, an installation disposed of transformers, through sales to salvage operators, based on chlorine screening tests not recognized by EPA as an acceptable basis for establishing PCB concentration levels. Retests, using EPA accepted chemical tests, of other transformers previously categorized as not PCB contaminated by the chlorine tests, identified 16 transformers with PCB concentrations above acceptable limits for sale in this manner.

Recommendations

To improve military practices regarding the monitoring, storage, and disposal of PCBs and to insure identified deficiencies are corrected, GAO recommends that the Secretary of Defense direct the services to improve regulatory compliance by

- requiring all installations to identify and maintain inventories of major PCB items and
- implementing a follow-up program to ensure that deficiencies identified by EPA and other monitoring organizations are corrected.

In addition, GAO recommends that the Administrator of EPA

- require installations to report on actions being taken to remedy instances of noncompliance and
- improve on the timeliness of its follow-up inspections conducted at installations.

Agency Comments

As requested, GAO did not obtain written agency comments on a draft of this report. GAO discussed the issues in this report with DOD officials and incorporated their comments where appropriate.

Contents

Executive Summary		2
Chapter 1		8
Introduction	PCB Uses and Health Hazards	8
	Toxic Substances Control Act of 1976	8
	Requirements for PCB Items	9
	Use of PCBs in DOD	10
	Objectives, Scope, and Methodology	10
Chapter 2		13
Limited Data on Major PCB Items at DOD Installations	No Specific EPA Requirements to Identify and Replace PCB Items	13
	No DOD Program to Identify and Replace PCB Items	13
	Identification and Replacement of PCB Items Varied Among Services	14
Chapter 3		18
Weaknesses in Monitoring and Corrective Actions	Periodic Inspections Not Performed	18
	Lack of Timely Corrective Actions to Remedy PCB Leaks	18
	Failure to Notify Fire Departments of PCB Sites	20
	Installations Generally Had Adequate Labeling	21
	Accurate Annual Reports Not Always Prepared	21
Chapter 4		22
DOD Experiencing Problems in Storing and Disposing of PCB Items	Storage Facility Requirements Not Always Met	22
	PCBs Removed From Service Not Disposed of Within Required Time Frames	22
	Lack of Required Documentation for PCB Disposals	23
	Items Disposed of Without Laboratory Tests	24
Chapter 5		26
Conclusions and Recommendations	Conclusions	26
	Recommendations	26
Appendix	Appendix I: Major Contributors to This Report	28

Contents

Abbreviations

DLA	Defense Logistics Agency
DOD	Department of Defense
DRMO	Defense Reutilization and Marketing Office
EPA	Environmental Protection Agency
GAO	General Accounting Office
NEESA	Naval Energy and Environmental Support Activity
OSD	Office of the Secretary of Defense
PCB	Polychlorinated Biphenyl
PPM	parts per million

Introduction

Polychlorinated biphenyls (PCB), a family of organic chemical compounds, was commonly used as a coolant or lubricant in various electrical equipment manufactured from the late 1920s until the mid-1970s. As health hazards associated with PCBs became known, Congress regulated its use. The Toxic Substances Control Act of 1976 prohibits the manufacture or use of PCBs, but allows the continued use of some PCB items under certain restrictions. Since 1976, overall, the Department of Defense's (DOD) PCB usage has decreased, but many older PCB items, such as electrical transformers, remain in use. DOD installations still have a significant number of PCB items in use and are responsible for complying with the act.

PCB Uses and Health Hazards

PCBs are any of various compounds produced by substituting atoms of chlorine for atoms of hydrogen in a hydrocarbon called biphenyl. PCBs are used in a variety of electrical equipment and other industrial applications because they are nonflammable and can conduct heat without conducting electricity. They have been produced industrially since 1929 and have been mainly used as insulators or heat transfer liquids in electrical equipment such as transformers and capacitors. PCBs have also been used in paints, adhesives, caulking compounds, and certain plastics. From 1929 to 1975, an estimated 1.4 billion pounds of PCBs were produced in the United States.

Researchers have found that exposure to PCBs can cause serious health problems. They do not break down quickly in the body or in the environment. Rather, PCBs accumulate in body tissues and can reach harmful levels. Short-term exposure to PCBs may cause the development of skin problems such as chloracne, a skin ailment similar to acne. Long-term exposure may cause liver damage or impairment of the nervous system. Where the liver damage has been severe the exposed person may pass into a coma and die. PCB exposure has also caused reproductive problems and cancer in animals.

PCB fumes can also be dangerous. Although PCBs are used as a fire retardant, when heated to decomposition in uncontrolled environments they emit highly toxic fumes. Thus, transformer fires potentially can be very hazardous.

Toxic Substances Control Act of 1976

The act (15 U.S.C. §§ 2601-2692), passed in 1976, directs the Administrator of the Environmental Protection Agency (EPA) to regulate chemicals that "pose an unreasonable risk of injury to health and the environment." The

act specifically bans the use, manufacture, processing, and distribution in commerce of PCBs and PCB items, except in certain limited circumstances. PCBs are the only chemicals specifically cited in the act.

The act charges EPA with the enforcement of PCB regulations promulgated under the act. These regulations (40 C.F.R. 761) generally prohibit the manufacturing of PCBs and the use of PCBs unless they are totally enclosed. Some PCB items such as transformers and capacitors were permitted to remain in use for the remainder of their useful lives, subject to servicing, record keeping, and inspection conditions. The regulations also require proper disposal, labeling to indicate PCB content, and spill containment procedures. Executive Order 12088 of October 13, 1978, requires federal executive agencies to comply with the act and implement the EPA regulations.

EPA periodically selects military facilities to check for compliance with 40 C.F.R. 761 and cites deficiencies. EPA officials said EPA issues letters of noncompliance for violations, but no fines are levied as is the practice when violations are found at non-federal facilities. They further stated that EPA does not follow-up immediately to ensure violations are corrected but requires a written response describing corrective actions taken or planned to be taken at federal facilities.

Requirements for PCB Items

The EPA regulations do not specifically require activities to test to determine the PCB concentration of fluid in equipment in use. Once PCB concentrations are identified, EPA requirements for monitoring, inspecting, storing, and disposing of PCBs vary depending on the PCB concentration in fluid, which is expressed in parts per million (ppm). EPA considers fluid or items containing fluid with PCB concentrations of

- 500 ppm or more to be PCB,
- 50 ppm but less than 500 ppm to be PCB contaminated, and
- under 50 ppm to be non-PCB.

PCB items (500 ppm or greater) must be monitored when in use. For example, PCB items must be labeled and listed on an annual log. Their locations must be reported to local fire departments, and PCB transformers must be periodically inspected for leaks. PCB items that are no longer in use must be labeled and may be stored up to 1 year in a building that meets certain standards. The items must be disposed of in an incinerator or, in certain circumstances, chemical waste landfill.

The use of PCB-contaminated items (50 ppm but less than 500 ppm) is not as stringently regulated. Once taken out of use, however, PCB-contaminated items are subject to storage and disposal requirements.

Laboratory tests may be used to determine PCB concentrations. For items not tested, users must assume they are PCB items if the nameplate indicates the equipment contains PCB fluid, there is any reason to believe the equipment contained PCB fluid at one time, or there is no nameplate on the equipment. Generally, untested items that do not meet the above conditions must be assumed to be PCB contaminated.

PCB spills must be contained and cleaned up according to approved disposal methods. The cleanup must begin within 48 hours after a spill is discovered. In addition to the environmental hazard they create, PCB spills are expensive to clean up because of training and labor costs, testing requirements, and disposal expenses.

Currently, the EPA regulations only specifically address those PCBs found in electrical equipment. An EPA official said EPA is considering rules to address other PCB uses, such as in adhesives, insulation, and paint. However, this official said the uses of PCBs in manners other than in electrical equipment generally present less of a risk to health and the environment than those PCBs found in dielectric fluid.

Use of PCBs in DOD

Military installations have thousands of electrical transformers and other electrical equipment that either contain or are suspected to contain PCBs. The Secretary of Defense has not issued any PCB guidance to the military services and does not maintain DOD-wide statistics. The Air Force fiscal year 1990 inventory indicates 4,904 PCB and PCB-contaminated transformers were in service at Air Force installations.¹ Calendar year 1993 Navy inventory shows a total of 6,461 PCB items were in use or in storage, including 4,600 transformers. This total is a reduction from the 1992 data showing 6,984, including 4,891 transformers. The Army does not collect service-wide inventory data.

Objectives, Scope, and Methodology

The Chairman of the Subcommittee on Environment, Energy, and Natural Resources, House Committee on Government Operations, asked that we review DOD's efforts to identify, replace, monitor, store, and dispose of equipment containing PCBs.

¹Air Force headquarters no longer has reporting requirements for such information.

To meet these objectives, we interviewed the Office of the Secretary of Defense (OSD), Army, Navy, and Air Force officials responsible for environmental matters, and discussed policy, guidance, and programs concerning PCBs that they have given to their installations.

We reviewed 40 CFR 761 of the EPA regulations and discussed EPA interpretation of the act with EPA headquarters and the Southeast and Southwest Regional EPA offices.

To determine how military installations had implemented relevant policy and guidance, we visited sites in all three services that have a variety of missions. At the following sites, we reviewed installation records on tests, inventory, monitoring, and disposals; inspected transformers in use; and examined storage facilities:

- Redstone Arsenal, Alabama;
- Anniston Depot, Alabama;
- Fort Ord, California;
- Fort Belvoir, Virginia;
- Robins Air Force Base, Georgia;
- Eglin Air Force Base, Florida;
- Andrews Air Force Base, Maryland;
- George Air Force Base, California;
- Long Beach Naval Shipyard, California;
- Charleston Naval Weapons Station, South Carolina;
- Philadelphia Naval Shipyard, Pennsylvania; and
- Camp Pendleton, California.

We supplemented our review with information gathered during a similar review conducted earlier at the following DOD locations in Hawaii:

- Bellows Air Force Base,
- Fort Shafter,
- Hickam Air Force Station, and
- Pearl Harbor Naval Shipyard.

These installations are included as case examples in our report but are not included in the 12 installations cited as meeting or failing to meet the EPA regulations.

We conducted our review from August 1992 to February 1993 and updated selected data in May 1993 and July 1994 in accordance with generally

Identification and Replacement of PCB Items Varied Among Services

The Air Force and the Navy, on their own initiative, maintained and regularly updated PCB inventory databases of individual installations. The Air Force stopped maintaining a centralized inventory database after fiscal year 1990. The Army, like the Air Force, only maintains PCB inventory information at the installation level.

Navy Testing and Tracking of PCB Items

The Navy instituted a policy in 1990 to be free of all PCB transformers and PCB large capacitors by October 1998 and free of all PCB-contaminated transformers by October 2003. As a part of this initiative, the Navy directed all Navy and Marine Corps installations to test and record the PCB concentration for all pad and pole mounted transformers. As part of this program, the Navy attempts to track PCB, PCB contaminated, and unknown transformers, capacitors, and dielectric fluid for each installation for each calendar year. This tracking system includes PCB items in use, stored, or disposed of.

Navy and Marine installations annually report PCB information to the Naval Facilities Engineering Service Center, which compiles an annual servicewide inventory. The Center tasks each installation to update its prior year PCB inventory by annotating known changes and forwarding the revised inventory. It relies primarily on the data submitted by the facilities without much verification, according to Navy officials.

The Navy's inventory showed 6,067 PCB items in use at the end of 1993, down from 6,572 in 1992 and 8,749 in 1991. The above totals included 4,256 transformers and 603 capacitors in 1993, 4,555 transformers and 745 capacitors in 1992, and 6,163 transformers and 1,672 capacitors in 1991. The Navy disposed of 375 transformers and 102 capacitors in 1993, 834 transformers and 499 capacitors in 1992, and 2,174 transformers and 2,787 capacitors in 1991. The Navy had an additional 394 items in storage for disposal or reuse in 1993, 412 items in storage for disposal or reuse in 1992, and 1,361 items in storage for disposal or reuse in 1991. The Navy estimated in 1993 that 37 percent of its transformers were yet to be tested to determine PCB status. The estimate in 1992 was 32 percent and 66 percent in 1991.

All four Navy and Marine Corps sites we visited had completed testing of their transformers. However, one installation, Charleston Naval Weapons Station, had not reported PCB items identified as needed by the Center, known then as the Naval Energy and Environmental Support Activity (NEESA), for accurate inventory update data. Contracted laboratory test

Limited Data on Major PCB Items at DOD Installations

In the absence of specific EPA requirements, OSD has not implemented a Defense-wide program to identify and replace PCB items. OSD leaves the implementation of the Toxic Substances Control Act to the individual services and identifies only the number of reported PCB-free installations. Although the Air Force and the Navy, on their own initiative, have instituted programs to identify and/or replace major PCB items, their inventory data were not always accurate. Air Force headquarters no longer maintains a centralized inventory of PCB items. The Army headquarters does not collect servicewide PCB inventory data.

No Specific EPA Requirements to Identify and Replace PCB Items

Although the EPA regulations established in response to the act set standards for monitoring, storing, and disposing of PCB items, these regulations do not specifically require organizations to identify and replace PCB items. An EPA official said the regulations "indirectly" require the identification of PCB items since they set standards for monitoring PCB items and items cannot be monitored unless they are identified. The official also said that not inspecting all equipment to identify PCB items is not a violation of the act, but if an EPA inspector found a PCB item that had not been identified, and thus, not properly monitored, this would constitute a violation.

The act allows the continued use of PCB items in service. The act provides specific monitoring requirements for these items while in service and storage and disposal requirements after such items are removed from service.

No DOD Program to Identify and Replace PCB Items

In the absence of specific EPA requirements, OSD does not require inspection or testing of in-use equipment to identify PCB items, nor did it require reporting or replacement of PCB items identified. Currently, DOD has no regulations nor directives concerning PCBs although an environmental official said that DOD will be issuing a general environmental directive, which will include PCBs, on protection and enhancement of environmental quality by the end of 1994.

Although DOD maintains no data on the number and type of PCB items at its installations, a DOD official said DOD does track the number of installations that are free of major PCB items. This official said that DOD stopped collecting other quantified data in 1988 due to questions as to the accuracy of the information supplied by the installations.

accepted government auditing standards. As requested, we did not obtain written comments on a draft of this report. However, we discussed our preliminary work with responsible military officials and incorporated their comments where appropriate.

results showed the installation had 35 PCB transformers and 76 PCB-contaminated transformers in use at the end of 1991. However, the Navy inventory data showed that the Charleston Naval Weapons Station had 23 PCB transformers and no PCB-contaminated transformers in use. An installation official recently stated that for fiscal year 1993, the number of PCB transformers was 35 and the number of PCB-contaminated transformers in use was 25.

In 1991, the Center, known then as NEESA, noted discrepancies in their 1991 inventory compilation. According to information provided to them by Navy and Marine Corps installations, 670 items were stored for disposal at the end of 1990, but only 388 items were accounted for by disposal or storage at the end of 1991. In comparison to 1991, the number was 293 items in 1992 and 392 items in 1993. Our analysis of the inventory data over the last 5 years revealed similar discrepancies. An official at the Center indicated that recent inventory reports reflect the Navy's continued efforts to improve the accuracy of the data.

Air Force Is Identifying and Replacing PCB Items

Before fiscal year 1991, the Air Force required its installations to test for PCBs and provide an updated status of PCB and PCB-contaminated equipment each year. Each Air Force installation provided information about PCB equipment in use that contains less than 49 ppm, between 49 ppm and 499 ppm, and those 500 ppm and over as well as an estimated date to be PCB free at each installation. Air Force headquarters also asked installations to report the number of other PCB equipment in use as well as the number of PCB suspected items yet to be tested. Currently, item management is the responsibility of the installations.

The Air Force originally established a goal to be PCB free of all major PCB items by fiscal year 1991. They did not meet this goal, but have continued their identification program. Air Force environmental officials say being PCB free is still their objective, although no new deadline has been set. The four Air Force installations we visited had tested all their transformers, but only one installation had removed all its PCB equipment in accordance with the Air Force's objective.

According to their fiscal year 1990 inventory, the Air Force had 1,042 PCB transformers over 500 ppm, an additional 3,862 PCB-contaminated transformers over 50 ppm, and 2,599 other PCB items. Additionally, the Air Force identified 2,780 items suspected to contain PCBs that require testing.

Weaknesses in Monitoring and Corrective Actions

Over half of the installations we visited did not comply with one or more of the EPA requirements for monitoring PCB items and correcting PCB spills discovered through this monitoring. This lack of attention to regulations, designed to minimize risk to health and the environment, unduly increases the risks of PCB contamination and the potential harmful health effects.

Periodic Inspections Not Performed

Military installations were not consistently performing or documenting periodic inspections of PCB items as required by EPA. The EPA regulations allow the continued use of PCB items, but require periodic inspections of such items so that leaks or ruptures may be discovered and repaired on a timely basis. These inspections must be documented. However, at five installations, such inspections were either not being done or were not documented.

Not properly monitoring known PCB items increases the health risks since PCB leaks may go undetected for long periods. EPA cited two installations in 1988 for not keeping required inspection records. These installations still lacked the records at the time of our visits in 1992. For example, Fort Ord was cited in 1988 by EPA for failure to prepare required inspection reports. Despite assurances to EPA that the problem was corrected, the installation still did not have inspection reports for any year when we visited the site in October 1992.

In addition, **George Air Force Base** was not performing PCB inspections when we visited in September 1992. Officials said that quarterly inspections had been done up until the installation began support of Operations Desert Shield and Storm. As demonstrated in the following section, some military installations had ruptured equipment leaking PCB fluids for extended periods of time.

Lack of Timely Corrective Actions to Remedy PCB Leaks

At four sites we visited, we found leaking PCB transformers that had not been properly repaired or replaced as the EPA regulations require. At three of the installations, officials had attempted to contain the leak, but then did not repair or replace the transformer and failed to monitor it for further seepage. At one installation, officials had not taken corrective actions to abate a leak reported months earlier by a contractor testing for PCB contamination.

If a PCB transformer is found to have a leak, EPA requires that the transformer be repaired or replaced to eliminate the source of the leak.

grow to over 200. In fiscal year 1992, there were 14 out of 91 installations reporting to be PCB free.

None of the four Army installations we visited had established programs to become PCB free and three of the four had not tested all their electrical equipment for PCBs. For example, several hundred older pole-mounted transformers still in use at the Anniston Army Depot have not been tested. Similarly, officials at Fort Belvoir and the Army Missile Command said they have hundreds of transformers that they have not tested. These officials said that they do not plan to test the transformers until they are scheduled for replacement.

Only Fort Ord has tested for PCBs and inventoried their transformers, but questions exist as to the accuracy of the Fort's inventory. Subsequent laboratory tests found a transformer, thought to contain less than 1 ppm PCB, to be PCB contaminated. It actually contained 86 ppm. Fort Ord officials agreed that the remaining transformers need to be accurately inventoried.

An Army official stated that Army guidance on hazardous waste is under revision and should be issued by the end of 1994. Guidance changes, regarding PCB items, will address small capacitor requirements, inventory requirements, and requiring the installation commander to sign the PCB annual report. According to the official, one of the most significant changes will be that equipment containing PCBs must be labeled, and that oil filled equipment without records or manufacturers label stating "No PCBs" will be treated as containing PCBs above 500 ppm until analyzed. The official said such a change should increase testing of equipment and enhance program management.

The Air Force relied on information provided by its individual installations to update its PCB inventory databases. However, we noted that the Air Force compilation had inaccurate information for one of the four Air Force installations we visited. This inventory showed Eglin Air Force Base with no PCB equipment in use in 1990, but we found Eglin had 14 PCB items and 16 PCB-contaminated transformers in use during our visit in September 1992.

In 1991, Air Force headquarters changed from collecting detailed PCB item information to tracking only the number of PCB items rendered PCB free or removed. As of calendar year 1992, the Air Force reported that 70 percent of PCB items had been rendered PCB free or were removed. In 1994, the Air Force again changed the way PCB data was tracked. The Air Force now requires its major commands to report only on how many installations are and are not PCB free and when all installations assigned to each command will be PCB free. Air Force statistics show that 142 out of 226 installations were PCB free at the end of calendar year 1993, or 63 percent. As of the most recent report, Air Force records indicate that all installations should be PCB free by the end of 1998. According to Air Force headquarters officials, the collection of item data was discontinued because the inventory was constantly going up and down and was hard to track. Also, officials stated that OSD does not require the services to report such data. Subsequently, item monitoring and managing has solely become the responsibility of the installation.

Army Identification and Replacement of PCB Items

The Army does not require testing of equipment to determine PCB status, nor has it set a goal to remove PCBs from its installations. The Army directs its installations to comply with EPA regulations and to manage their own replacement programs. The Army does not centrally track detailed PCB data.

In 1991, the Army implemented a tracking system used by the Army Environmental Center to monitor hazardous waste. Among many types of hazardous material, the system tracks whether an installation has PCB equipment in service or in storage, PCB containers, and PCB-contaminated electrical equipment. However, the system does not track how many PCB items are at an installation or the number of PCB ppm are contained in each item. According to the system, the Army had 17 out of 100 installations that were PCB free in fiscal year 1993. An Army official stated that some installations, predominantly National Guard and Reserve, did not report. When these installations are added, the total number of installations would

Cleanup of the released PCBs must be initiated no later than 48 hours after its discovery, and any leaking material must be cleaned up and properly disposed of in accordance with the EPA regulations. Once a leak is discovered, the transformer must be inspected daily to verify that the leak has been contained until the transformer is repaired or removed.

At Eglin Air Force Base we found a PCB transformer leaking PCB fluid. According to installation officials, the pad-mounted transformer, located in the occupied section of a radar site behind an occupied building, was identified as leaking about June 1991. The transformer was still in service and still leaking PCBs at the time of our initial visit in September 1992 even though at least one cleanup had already been performed. The containment booms were saturated, and fluid was running off the cement transformer pad onto the surrounding gravel. According to the inventory list, the transformer originally contained 830 gallons of 355,000 ppm PCB fluid. Eglin officials awarded a contract to replace the transformer in May 1992 but, according to the officials, the contractor refused to begin work because of the PCB contamination in the soil surrounding the transformer. At the time of our follow-up visit in February 1993, the transformer had not been replaced. The contract for replacement was still being negotiated. Eglin officials said that, after the transformer is replaced, another contract would be awarded to assess and clean up the site. According to an installation official, the transformer was removed and replaced; however, substantiating paperwork was unavailable.

Eglin Air Force Base also identified a PCB spill in 1984, but did not take soil samples until 1986 and did not excavate the site until 1988. The last soil samples were taken from the site in 1990, and it was still an open case when we visited in September 1992. Eglin has submitted data to EPA requesting, based on clean-up work and tests done to date, that the site be declared safe and the case closed. The current EPA clean-up requirements do not apply to this spill because it occurred before May 1987. However, 8 years would seem to be an unacceptable response time.

At the Charleston Naval Weapons Station, our installation inspection revealed one leaking PCB transformer in the officer housing area. Even though the EPA regulations require periodic inspections of PCB transformers, this transformer was not on the station's list of transformers to be inspected. It was identified by a contractor, hired to test transformers for PCBs, approximately 6 months before our visit. The pad-mounted PCB transformer was leaking at its posts, and fluid ran down the front of the transformer and into the gravel base. It originally

contained 88.6 gallons of 1,210 ppm PCB fluid. The station replaced the transformer and, according to descriptions provided by an environmental official, cleaned up the spill site in accordance with the EPA regulations.

At Fort Shafter, two of the five transformers we inspected were leaking. Both had drip pans to contain the seepage, but one had an additional leak that was dripping directly onto the concrete floor of an electrical vault. The transformer, which contained a highly concentrated PCB fluid, was located in the headquarters building of the U.S. Army, Pacific Command. Similarly, we found two leaking PCB transformers at Andrews Air Force Base. These leaks were being contained by drip pans filled with absorbent material.

Failure to Notify Fire Departments of PCB Sites

Although the EPA regulations require installations to notify fire departments of PCB locations, four installations we surveyed had not done so. Not notifying fire department personnel of potential PCB locations unnecessarily increases the health risks to both emergency personnel and the environment.

When PCBs are burned in an uncontrolled situation they emit highly toxic fumes. This factor, along with the other potential health hazards associated with PCBs, resulted in the EPA requirement that PCB transformers must be registered with fire response personnel in writing within 30 days of discovery. This registration includes the location of the PCB transformers, the principal PCB fluid in the transformer, and the name and telephone number of the person to contact in the event of a fire. If a PCB transformer is involved in a fire-related incident, the incident must be immediately reported to the National Response Center in Washington, D.C.

We found four installations that had identified PCB transformers but had not notified the fire department within the allotted time frame. Fort Belvoir's fire station received its first inventory of the Fort's known PCB equipment the day prior to our visit. The Charleston Naval Weapons Station identified 13 PCB transformers in February 1992, but did not notify the fire department until our visit in September 1992. We found similar situations at Andrews Air Force Base and the Long Beach Naval Shipyard.

Installations Generally Had Adequate Labeling

Installations generally complied with the EPA requirements for PCB warning labels on all identified PCB containers, PCB transformers, other PCB equipment, and access areas. However, four of the installations had not labeled PCB storage areas and doors, fences, hallways, or other means of access to PCB transformers.

The Long Beach Naval Shipyard did not mark a PCB storage facility and means of access to five PCB transformers. Andrews Air Force Base, Fort Shafter, and Fort Belvoir also did not have all accesses to PCB transformers marked.

Accurate Annual Reports Not Always Prepared

EPA requires maintenance of an annual report that lists all identified PCB equipment in use, stored for disposal, and disposed of during the year. Our tests of PCB inventory data showed that 6 of the 12 installations had incomplete or inaccurate annual reports of major PCB items in use or storage. Furthermore, EPA had cited two of our sample sites for not preparing the report at all.

Both **George Air Force Base** and Fort Belvoir were cited by EPA previously for not maintaining an annual report. George Air Force Base was first cited by EPA in 1988 for not having the required report, then was subsequently cited in 1991 by the Environmental Compliance and Management Program, a DOD environmental audit team. In addition, during our visit, Air Force officials could not locate a copy of the 1990 annual PCB report. EPA cited Fort Belvoir in 1986 for not having annual PCB document reports for 1978 through 1984. When we visited the base 6 years later, Fort Belvoir officials still did not have any annual documents.

DOD Experiencing Problems in Storing and Disposing of PCB Items

Service installations were not complying with EPA established storage facility requirements, time limits for storage, and documentation standards for PCB disposal. Not meeting storage standards increases the risk of harmful spills of PCB fluids and consequently increases the chances of contaminating water levels. The lack of adequate documentation for PCB disposals disrupts the accountability trail and could result in compliance or liability problems if disposals are not properly accomplished. In addition, one installation sold transformers without adequate laboratory testing to demonstrate the absence of PCBs, thereby putting themselves at risk of improper disposal.

Storage Facility Requirements Not Always Met

Three installations we visited were using storage facilities that did not conform to the EPA requirements. Facilities used to store PCB items must have adequate roof and walls to prevent rain water from reaching the stored PCBs and PCB items. The facility floor must be constructed of continuous smooth and impervious materials and have continuous curbing for containment with no drains or other openings that would permit liquids to flow from the curbed area. The facility and access to the facility must be marked with PCB warnings.

For example, the Anniston Army Depot's facility was properly marked and had the adequate walls, roof, and the containment curb. However, the floor of the facility was made of porous concrete with cracks and holes. According to a depot official, the depot intends to build a new PCB storage facility that conforms to the EPA requirements.

PCBs Removed From Service Not Disposed of Within Required Time Frames

Three of the sites we visited had PCB items in storage longer than the EPA regulations allow. EPA requires that any PCB article or PCB container that is stored for disposal must be removed from storage and disposed of within 1 year from when it was first placed into storage. EPA also specifies that certain PCB items may be stored temporarily, for up to 30 days, in an area that does not comply with the PCB facility requirements.

At the Charleston storage area, two PCB transformers were stored outside their hazardous waste building in a nonconforming area for more than the allowed 30 days. Each of the transformers contained 178 gallons of PCB fluid. These transformers were shipped out for disposal after our visit.

Camp Pendleton had a PCB transformer with 230 gallons of PCB fluid stored for over 120 days outside of its PCB storage facility. Officials stated that the transformer was too large to fit into the facility.

Eglin Air Force Base had a number of storage violations when we visited. Although the Eglin site has a complying PCB storage area, officials said it is too small to accommodate larger capacitors or transformers. As a result, the base stores its PCB and PCB-contaminated items on an asphalt surface outside of their electrical shop where there is no spill containment, no walls or roof to keep off the rain, and no limited access. The EPA regulations require removal of material from this area within 30 days of its removal from service. However, when we visited the installation in September 1992, 6 of the 13 items stored in the area had been removed from service for over 30 days. These items were shipped out in October 1992.

Also at Eglin, we found 2 rectifiers containing 278 gallons of highly concentrated PCB fluid stored in an abandoned building with porous floors, no spill containment, and unlocked doors. Officials could not tell us how long the equipment had been there, but one official said that it could have been in storage for over 10 years. At the time of our follow-up visit in February 1993, about 5 months after our initial visit, the rectifiers were still stored in the same place and had not been added to the list of items to be periodically inspected. An installation official stated that the rectifiers were removed in December 1993.

In addition, at Eglin Air Force Base, we found seven barrels marked with the PCB warning labels stored in a parking lot behind an occupied building. Officials said that these barrels contain soil that had been excavated from a spill and although they could not provide us with the exact date, they said that the barrels were placed in the parking lot anywhere from 3 months to 12 months prior to our visit. These barrels were shipped out for disposal in October 1992.

Lack of Required Documentation for PCB Disposals

In an effort to maintain accountability for PCB items, EPA requires documentation for all PCB items disposed of by an installation. This documentation includes a manifest that describes the PCB waste, an identification number, and the designated disposal facility. The installation should then receive a certification from the disposal facility certifying proper disposition of the PCB waste. Fort Ord, Fort Shafter, Long Beach Naval Shipyard, and Marine Camp Pendleton did not maintain this PCB

disposal documentation. However, DOD officials stated that the documentation may have been maintained by the Defense Logistics Agency (DLA).

Fort Ord officials told us that delivery orders, manifests, tests, and certificates of disposal go to the west regional Defense Reutilization and Marketing Office (DRMO). EPA requires installations that generate PCB waste to maintain records on site documenting disposal of such items. However, DOD officials stated that in PCB removed under DLA contracts, records would be available through DLA.

Long Beach Naval Shipyard officials said that their facility was in the process of streamlining its record keeping process. Similarly, officials at Camp Pendleton, California, could provide complete disposal documentation for only one PCB transformer. No other information was available, according to representatives, because of inaccurate data in their automated system that made it impossible to trace all other PCB items to disposal documentation.

Items Disposed of Without Laboratory Tests

The Missile Command at Redstone Arsenal was not using the testing method DRMO now requires—a gas chromatography test, which is the minimum acceptable method EPA has approved for determining the concentration and nature of PCBs in oil. Instead, Redstone was using a total chlorine field test that the local DRMO had previously accepted. EPA has found such chlorine field tests to yield an unacceptable number of false negatives, thus, not detecting some items that actually contain PCBs.

In 1991, the Missile Command, as part of a total electric grid changeout, removed over 300 transformers from service. They tested these transformers using the chlorine test and turned them into the local DRMO for disposal. DRMO sold about 290 of these transformers, certified non-PCB by the chlorine test, to the general public. Subsequently, DRMO learned that the chlorine test is not acceptable because it sometimes yields false negatives. An EPA official said the Missile Command could be held legally liable if any of the transformers sold actually contained PCB fluid.

During our initial visit to Redstone Arsenal in July 1992, the Missile Command had a second batch of 281 transformers awaiting disposal. The transformers had been tested by a chlorine screening method, as standard practice at the Arsenal at that time, and labeled either non-PCB or PCB as the screening results indicated. However, when these transformers were

retested using the gas chromatography method, 16 of the transformers identified as non-PCB were actually PCB and PCB contaminated.

Missile Command environmental officials contend that the errors in mislabeling this batch of transformers were the result of poor quality control in the documentation by the testing subcontractor and not in the testing method. Missile Command officials found errors in the paperwork, such as incorrect manufacturer and incorrect serial numbers, that lead them to believe that this particular batch of transformers was incorrectly labeled.

Missile Command officials believe that transformers disposed of prior to this batch were accurately tested because the installation's chemist performed the screening. According to these officials, the chemist has been doing these analyses for 35 years. The chemist believes that the government screening of PCBs at Redstone Arsenal has been accurate and correct. However, Missile Command officials stated that all future disposals will be certified using the gas chromatography method.

Conclusions and Recommendations

Conclusions

Neither EPA nor DOD specifically require that services identify PCB items still in use, but we believe such identification is essential to ensure protection of health and environment. All of the services identify their items containing PCBs, either at the headquarters or installation level. While their identification efforts have been marred by some discrepancies in reporting inventories to the headquarters, each individual installation has a listing of PCB items that require monitoring and other special treatment to comply with the EPA regulations.

Although the Toxic Substances Control Act has been in existence for more than 15 years, DOD installations are still not meeting the EPA requirements regarding monitoring, storing, labeling, and disposing of PCB items. In some cases, installations have not corrected problems even when cited by EPA or other monitoring agencies for violations, such as not performing periodic inspections or not cleaning up spilled PCB material. Although EPA does require installations to report what actions are being taken to remedy any instances of noncompliance, some of these problems have not been corrected years after the fact, in part, because neither EPA nor DOD conduct timely follow-up inspections.

Recommendations

In view of the frequent lapses in identification, labeling, monitoring, storage, and disposal of PCBs, and the instances where identified problems had not been corrected even years after the fact, we recommend that the Secretary of Defense direct the military services to fully comply with the Toxic Substances Control Act and the EPA regulations by

- requiring all installations to identify and maintain inventories of major PCB items and
- implementing a follow-up program to ensure that deficiencies identified by EPA and other monitoring organizations are corrected.

In addition, we recommend that the Administrator of EPA

- require installations to report on actions being taken to remedy instances of noncompliance and
- improve on the timeliness of its follow-up inspections conducted at installations.

Major Contributors to This Report

National Security and
International Affairs
Division, Washington,
D.C.

David Warren
Uldis Adamsons

Atlanta Regional
Office

Bob Cowl
Don Howard
David Schechter

Los Angeles Regional
Office

Sam Van Wagner
James Bancroft

Dallas Regional Office

C. F. Harlow
Jim Viola

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