

Audit



Report

OFFICE OF THE INSPECTOR GENERAL

**ACQUISITION AND MANAGEMENT OF
OZONE-DEPLETING SUBSTANCES**

Report No. 94-178

August 31, 1994

Department of Defense

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Acronyms

AMC	Army Materiel Command
ATCOM	Aviation and Troop Command
CFC	Chlorofluorocarbon
CECOM	Communications-Electronics Command
DLA	Defense Logistics Agency
OCALC	Oklahoma City Air Logistics Center
ODS	Ozone-Depleting Substances
TACOM	Tank-Automotive Command



**INSPECTOR GENERAL
DEPARTMENT OF DEFENSE
400 ARMY NAVY DRIVE
ARLINGTON, VIRGINIA 22202-2884**

August 31, 1994

**MEMORANDUM FOR ASSISTANT SECRETARY OF THE AIR FORCE
(FINANCIAL MANAGEMENT AND COMPTROLLER)
DIRECTOR, DEFENSE LOGISTICS AGENCY
AUDITOR GENERAL, DEPARTMENT OF THE ARMY**

**SUBJECT: Audit Report on the Acquisition and Management of Ozone-Depleting
Substances (Report No. 94-178)**

We are providing this audit report for your information and use. The audit evaluated the inventory-estimating methods used by the Army and the Air Force and evaluated the DoD plan for acquisition, management, and storage of the long-range inventory of ozone-depleting and replacement substances. The Naval Audit Service conducted an audit of ozone-depleting substances in the Navy. We provided a draft of this report to management for review. Because the report contained no recommendations, management comments were not required, and none were received.

We appreciate the cooperation and courtesies extended to the audit staff. If you have any questions on this audit, please contact Mr. Wayne K. Million, Audit Program Director at (703) 604-9312 (DSN 664-9312) or Mr. Nicholas E. Como, Audit Project Manager, at (703) 604-9302 (DSN 664-9302). Appendix H lists the distribution of this report. The audit team members are listed inside the back cover.

A handwritten signature in black ink, reading "Robert J. Lieberman".

Robert J. Lieberman
Assistant Inspector General
for Auditing

Office of the Inspector General, DoD

Report No. 94-178
(Project No. 4CG-0002)

August 31, 1994

ACQUISITION AND MANAGEMENT OF OZONE-DEPLETING SUBSTANCES

EXECUTIVE SUMMARY

Introduction. An international treaty, "Montreal Protocol on Substances that Deplete the Ozone Layer," to which the United States, and accordingly, DoD, is a party, requires that certain ozone-depleting substances (ODS) be phased out of production early in the 21st century. The Military Departments have an ongoing requirement for eight ODS until viable substitutes are discovered and retrofit or until existing weapon systems and combat support systems that use the eight ODS are replaced. After receiving the one-time estimate of future mission-critical requirements provided by the Military Departments, the Defense Logistics Agency will manage the ODS program for DoD. During FYs 1994 and 1995, the Defense Logistics Agency will complete the acquisition of the entire Defense reserve requirement of chlorofluorocarbons, halon, and 1,1,1 trichloroethane. DoD earmarked \$56.5 million to acquire the required ODS.

Objectives. Our overall audit objective was to evaluate the DoD acquisition strategy and management practices for ODS and more environmentally benign replacements. We evaluated inventory-estimating methods and the DoD plan for acquiring, managing, and storing the long-range inventory of ODS for the Army and the Air Force. We also reviewed how the Army and the Air Force designated mission-critical requirements for ODS and the efforts of the two Military Departments to develop substitutes. Finally, we evaluated internal controls and the adequacy of the DoD Internal Management Control Program as they applied to the acquisition of ODS. The Naval Audit Service conducted the review for the Navy and will separately report its audit results on the Navy requirements for ODS.

Audit Results. The Army and the Air Force did not accurately estimate the ODS quantities needed for a Defense reserve. As a result, the Army overestimated the ODS Defense reserve requirement by 99,867 pounds for one ozone-depleting substance, valued at \$1,241,347. The Air Force overestimated its ODS Defense reserve requirement for five ODS by 1,182,237 pounds, valued at \$14,032,027, and understated the Defense reserve requirements for three ODS by 752,933 pounds, valued at \$8,943,955. During the audit, the Army and the Air Force agreed to revise the estimates for the ODS Defense reserve requirements.

DoD did not uniformly define and implement mission-critical applications for ODS. However, the unnumbered draft DoD Directive, "Ozone Depleting Chemicals," when published, will uniformly define the mission-critical use of ODS and would limit requirements for ODS to combat mission applications. See Part II for a detailed discussion of the audit results.

Internal Controls. Because the acquisition of ODS under this one-time ODS program will be completed during FY 1995, the Military Departments had not established internal control procedures. Although internal controls could have prevented the

incorrect estimates, we made no recommendations about internal controls because the ODS estimating process was a one-time occurrence. See Part I for a discussion of our review of internal controls.

Potential Benefits of Audit. We calculated that, based on the comparison of the original Army and Air Force estimates with our audit results, \$6,329,419 could be put to better use by reducing ODS procurement. Our calculation did not include storage and disposal costs. Appendix F describes the potential benefits.

Summary of Recommendations. As a result of discussions with the Army and the Air Force during this audit, the Military Departments agreed to eliminate the overestimated portions of the ODS Defense reserve requirements from the procurement submissions to Defense Logistics Agency. Also, the draft DoD Directive, when published, will satisfy ODS definitions and clarify mission-critical application issues. Therefore, no recommendations were made.

Management Comments. Because the report contained no recommendations, written comments were not required, and none were received.

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This report was prepared by the Contract Management Directorate, Office of the Assistant Inspector General for Auditing, DoD.

Part I - Introduction

Background

Treaty to Reduce the Production and Consumption of Ozone-depleting Substances. The United States participated in the 1987 international treaty, "Montreal Protocol on Substances that Deplete the Ozone Layer." The treaty required that the production and consumption of chlorofluorocarbons (CFCs), halons, carbon tetrachloride, and 1,1,1 trichloroethane be phased out by the 21st century. The treaty was amended in June 1990 to eliminate the production and consumption of CFCs and halons by the year 2000. The President signed the 1990 amendments to the Clean Air Act into law, implementing the June 1990 changes to the treaty and mandating more stringent reductions of CFCs and halons. In November 1992, the treaty was revised to phase out halon production by January 1, 1994, and CFCs by January 1, 1996.

Defense Logistics Agency Role in Ozone-Depleting Substances Management. The FY 1993 National Defense Authorization Act tasked the Defense Logistics Agency (DLA) to manage the ozone-depleting substances (ODS) program for DoD. Specifically, DLA was tasked to evaluate the use of ODS by the Military Departments; to review plans to reclaim, recycle, and reuse ODS; to create and maintain a reserve of ODS; and to report the progress of the ODS program to Congress. On August 11, 1992, the Under Secretary of Defense tasked the Military Departments to estimate and fund ODS requirements. In December 1992, DLA requested that the Military Departments provide estimates of mission-critical ODS requirements and estimates of ODS procurement requirements for the Defense reserve. Considering the impact of the Military Departments bottom-up review of future personnel, mission, and resource requirements, in July 1993, DLA requested that the Military Departments revalidate their mission-critical and Defense reserve requirements for ODS.

ODS Estimating Criteria. DoD Directive 6050.9, "Chlorofluorocarbons and Halons," February 13, 1989, requires the Military Departments to ensure that "the required amounts and types of CFCs and halons are available for mission-critical applications when substitutes are not yet available." Department of the Army Letter 200-90-1, "Eliminating or Minimizing Atmospheric Emissions of Ozone-Depleting Substances," July 27, 1990, further defines mission-critical applications to include cooling operational assets and charging fire and explosion suppression systems in tactical vehicle crew compartments to protect the lives of combat personnel. Air Force Regulation 19-15, "Reduction in Use of Chlorofluorocarbons, Halons, and Other Substances that Deplete Stratospheric Ozone," September 30, 1991, defines mission-critical applications as those that "directly impact combat-mission capabilities for which no alternatives exist." On March 30, 1993, DLA provided guidance to the Military Departments that defined the ODS Defense reserve requirement as "the mission-critical use quantities minus projected usable quantities recovered, recycled, and reclaimed."

Funding for ODS. During the FY 1994 budget review, the Secretary of Defense added \$90 million for FY 1994 and \$10 million for FY 1995 to the

DLA budget for ODS. However, on December 18, 1993, the Comptroller of the Department of Defense reduced the FY 1994 authorization of \$90 million to \$46.5 million. The FY 1995 authorization of \$10 million remained unchanged.

ODS Mission-critical Requirement and Combat Mission Assets. DoD defined the mission-critical requirement as either the ODS uses that have a direct impact on combat mission capability, including uses that are integral to combat mission assets, or ODS uses that affect operation of those assets. However, DoD permitted the Military Departments to designate the combat mission assets that require ODS. The Army and the Air Force each identified specific combat mission assets and designated specific mission-critical applications for ODS.

ODS Defense Reserve Requirement. DLA defined the ODS Defense reserve requirement as the mission-critical requirement less the quantity that the Army and the Air Force plan to recover from existing systems. See Appendix A for a list of the types and uses of ODS that the Army and Air Force estimated for the Defense reserve.

Army ODS Mission-Critical and ODS Defense Reserve Requirements. The Army included two ODS (CFC-12 and halon 1301) in its mission-critical and ODS Defense reserve requirements. The Army designated mission-critical applications for CFC-12, including cooling ground combat vehicles and combat communication shelters. Halon 1301 mission-critical applications included fire suppression for helicopters and ground combat vehicles. In September 1993, the Army estimated its mission-critical and ODS Defense reserve requirements for CFC-12 for 1994 through 1999 and halon 1301 for 1994 through 2020. The Army revised these requirement estimates in February 1994.

Air Force Mission-Critical and ODS Defense Reserve Requirements. Because our review of the Air Force ODS was limited, we could not identify all of the specific mission-critical applications for six CFCs, one halon, and 1,1,1 trichloroethane identified in the Air Force ODS Defense reserve requirements. The Air Force uses CFC-11 and CFC-12 to cool maintenance facilities, bachelor officers' quarters, and dormitories. The Air Force uses CFC-113 and 1,1,1, trichloroethane as solvents for maintenance facilities and halon 1301 for aircraft fire suppression. In December 1993, the Air Force estimated its mission-critical and ODS Defense reserve requirements for six CFCs, one halon, and 1,1,1 trichloroethane for 1994 through 2003. The Air Force revised these requirement estimates in July 1994.

Objectives

Our overall audit objective was to evaluate the DoD acquisition strategy and management practices for ODS and more environmentally benign replacements. We evaluated inventory-estimating methods and the DoD plan for the acquisition, management, and storage of the long-range inventory of ODS for the Army and the Air Force. We also reviewed how the Army and the Air

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Force designated mission-critical requirements for ODS and the efforts of the two Military Departments to develop substitutes. Finally, we evaluated internal controls and the adequacy of the DoD Internal Management Control Program as they apply to the acquisition of ODS. The Naval Audit Service conducted the review for the Navy and will separately report its audit results of the Navy requirements for ODS.

Scope and Methodology

ODS Quantities Reviewed and Locations. We examined the ODS Defense reserve plan and logistics requirements at DLA and the Defense General Supply Center, Richmond, Virginia. We analyzed Army guidance for calculating ODS requirements at the Army Materiel Command (AMC), Alexandria, Virginia. To review the Army estimates for ODS requirements, we visited the Aviation and Troop Command (ATCOM), St. Louis, Missouri; the Tank-Automotive Command (TACOM), Warren, Michigan; and contacted the Communications-Electronics Command (CECOM), Fort Monmouth, New Jersey. We reviewed Army estimates of 836,000 pounds, or 100 percent, of the ODS Defense reserve requirement for halon 1301 for FYs 1994 through 2020, and 99,867 pounds, also 100 percent, of the original ODS Defense reserve requirement for CFC-12 for FYs 1994 through 1999.

With representatives of the Deputy Assistant Secretary of the Air Force (Environment, Safety, and Occupational Health), we analyzed Air Force guidance for calculating ODS requirements. For the review of the Air Force estimates for ODS requirements, we visited the San Antonio Air Logistics Center, Kelly Air Force Base, Texas, and the Oklahoma City Air Logistics Center (OCALC), Tinker Air Force Base, Oklahoma. We reviewed between 16 percent and 49 percent of the original ODS Defense reserve requirement estimates for halon, CFCs, and 1,1,1 trichloroethane in the Air Force. Our review included 787,664 pounds of the total Air Force ODS Defense reserve requirement totaling 3,459,671 pounds.

Appendix G lists the organizations visited or contacted during the audit.

Audit Methodology. The Army and the Air Force used different procedures to develop ODS requirements. The Army required DLA to procure quantities of only two ODS for the Defense reserve. Three subordinate commands of AMC developed the estimated quantities of the two ODS for the Army. Thus, we were able to reconcile the differences between our audit results and the Army subordinate commands' results with AMC. However, the Air Force required DLA to procure quantities of eight ODS for the Defense reserve, and the computations for the estimated quantities were made at numerous installations and were summarized at eight major commands. We reviewed portions of the Air Force estimates for five ODS at two Air Force installations that report to one of the eight Air Force major commands that estimated ODS requirements.

In July 1994, the Air Force revalidated its entire Defense reserve requirement. Appendixes B through E summarize the audit results of the adjustments to the original Army and Air Force estimates.

Audit Briefings. In January and February 1994, we met with representatives of the Office of the Secretary of Defense, the Military Departments, and DLA to discuss the tentative results of our audit, to reconcile overestimates of requirements with the Army and the Air Force, and to assist DLA in arriving at a reasonable estimate of the quantity of ODS that DLA will procure for the Defense reserve. Because of the short procurement lead times for the acquisition of ODS during FY 1994, the DLA requested that differences between our audit results and the Army and the Air Force estimates be resolved before this audit report was issued.

Audit Standards. This economy and efficiency audit was made from October 1993 through July 1994, in accordance with auditing standards issued by the Comptroller General of the United States as implemented by the Inspector General, DoD. Accordingly, we included tests of internal controls as were considered necessary. We did not use computer-processed data or statistical sampling procedures to conduct this audit.

Internal Controls

Internal Controls Reviewed. We evaluated the internal controls for the acquisition of ODS for the Defense reserve. Specifically, we reviewed internal controls for inventory estimation, mission-critical use designation, and Defense reserve planning for receiving, storing, handling, and shipping ODS.

Internal Control Weaknesses Identified. Because DLA will complete the acquisition of ODS during FY 1995, internal control procedures were not established as defined by DoD Directive 5010.38, "Internal Management Control Program," April 14, 1987. Therefore, the Army and the Air Force did not effectively prevent or identify internal control weaknesses in the accuracy of ODS estimating. In addition, DoD did not establish internal controls to uniformly define the mission-critical use of ODS, nor prevent non-mission-critical uses of ODS from being categorized as mission-critical. DLA had not finalized internal controls for receiving, storing, handling, and shipping ODS. However, because the estimating process was a one-time event, we made no recommendations about internal controls.

Prior Audits and Other Reviews

General Accounting Office Report No. NSIAD-92-21 (OSD Case No. 8825), "Ozone-Depleting Chemicals, Increased Priority Needed if DoD is to Eliminate Their Use," November 13, 1991, states that DoD has not sufficiently clarified

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mission-critical use, has not identified specific chemical uses and quantities, has not given priority to research successful alternatives to ODS, has not justified the need to install equipment that uses ODS in new and existing systems, and has not revised or changed military specifications to facilitate the use of substitutes and alternatives to ODS. The report recommended that the Secretary of Defense define mission-critical use, track ODS use, ensure priority is given to research alternatives to ODS, review the need for the use of ODS in existing and newly procured systems, and expedite the use of nonmilitary specifications and standards to replace the requirements that use ODS. Management did not comment on the report.

Other Matters of Interest

DoD did not uniformly define mission-critical uses of ODS. However, the unnumbered draft DoD Directive, "Ozone Depleting Substances," defines the use of ODS to involve only combat-mission capabilities when no alternative exists. We believe that this directive would uniformly define the mission-critical use of ODS and would limit procurements of ODS for the Defense reserve to combat-mission applications. We encourage DoD to promptly finalize the draft DoD Directive, "Ozone Depleting Substances."

Part II - Results of Review

Estimating Defense Reserve Requirements for Ozone-Depleting Substances

The Army and the Air Force did not accurately estimate the quantities of ODS to be procured and stored for the Defense reserve. The Army and the Air Force estimating procedures were flawed because estimating organizations did not always:

- o use correct asset quantities,
- o use consumption data,
- o adjust for retrofit schedules,
- o segregate mission-critical applications,
- o adjust for local procurements, and
- o consider ODS substitutes and conversions to cleaning methods that use non-ODS solvents.

As a result, the Army overestimated the Defense reserve requirement for one ODS by 99,867 pounds, and the Air Force overestimated the requirements for five ODS by 1,182,237 pounds and understated the requirements for three ODS by 752,933 pounds. If procured, the net overestimated ODS would have cost an estimated \$6,329,419.

Army ODS Defense Reserve Requirements

Army ODS Estimates for Halon 1301 and CFC-12. In September 1993, the Army estimated a mission-critical requirement of 1,867,915 pounds for halon 1301 for 1994 through 2020, and 129,967 pounds of CFC-12 for 1994 through 1999. The Army planned to recover some of the mission-critical requirement and accordingly requested DLA to procure only 836,000 pounds of halon 1301 and 99,867 pounds of CFC-12 to support the ODS Defense reserve requirements for the respective periods.

Army ODS Over- and Underestimates. The Army estimating procedures resulted in both over- and underestimates for both substances. The estimated 836,000 pounds of halon 1301 for the Defense reserve requirement was approximately correct, considering offsetting adjustments. However, the entire estimated 99,867 pounds of CFC-12 for the Defense reserve requirement was overestimated.

Army Halon 1301 Estimate. AMC developed the halon 1301 estimate for the Army. AMC based the 1,867,915-pound mission-critical requirement for halon 1301 on the September 1993 computations for ATCOM helicopters and TACOM ground combat vehicles. For the Defense reserve requirement, AMC estimated that the Army will require DLA to procure and store 496,000 pounds of halon 1301, in addition to the 340,000 pounds procured in 1993, for a total of 836,000 pounds. The Army plans to recover the remaining 1,031,915 pounds of the mission-critical requirement for halon 1301 from existing systems. While almost all of the estimated Defense reserve requirements for halon 1301 required adjustments, the overall net variance in the Army halon 1301 estimate was insignificant (Appendix B).

Accuracy of the Original Army Halon 1301 Estimate. The Army overestimated its September 1993 estimate of the mission-critical requirement for halon 1301 by 648,422 pounds for three types of helicopters and three types of ground combat vehicles. ATCOM used incorrect asset quantities to estimate halon 1301 use requirements by basing the average monthly demand for halon 1301 on the number of helicopter engines instead of the number of helicopters, in effect doubling the actual requirement. TACOM did not adjust for halon 1301 consumption differences from fires and the infrequency of accidental discharges in Army Reserve versus active-duty Army ground combat vehicles. TACOM also incorrectly applied leakage rates and did not reduce expected use of halon 1301 beginning in the first year of the ground combat vehicle engine compartment retrofit schedule.

Preliminary Adjustments to Army Halon 1301 Estimate. After our discussions with ATCOM and TACOM in January 1994, ATCOM and TACOM, with AMC agreement, reduced the mission-critical requirements for halon 1301 for the three types of helicopters and the three types of ground combat vehicles by 648,422 pounds. In February 1994, the Army revised its mission-critical requirement for halon 1301 to 1,802,341 pounds. Table 1 shows the adjustments from the September 1993 estimates to the February 1994 estimates for the amounts overestimated for the Army halon 1301 requirements for 1994 through 2020.

Estimating Defense Reserve Requirements for Ozone-Depleting Substances

	September 1993 <u>Estimate</u> (pounds)	February 1994 <u>Estimate</u> (pounds)	Amount <u>Overestimated</u> (pounds)
ATCOM			
Helicopters	85,108	47,068	38,040
TACOM			
M1 Abrams Tank	828,110	567,451	260,659
Bradley/MLRS*	<u>860,565</u>	<u>510,842</u>	<u>349,723</u>
Total	<u>1,773,783</u>	<u>1,125,361</u>	<u>648,422</u>

*Multiple Launch Rocket System.

At the same time that the Army made the above adjustments, AMC also informed us that TACOM either failed to include or underestimated mission-critical requirements of 409,367 pounds for five additional types of ground combat vehicles. Offsetting the 409,367-pound increased requirement, TACOM decreased the requirement for two other types of ground combat vehicles by 32,519 pounds, resulting in a net increase of 376,848 pounds. Table 2 shows the September 1993 estimate, the revision as of February 1994, and the additional amounts underestimated or overestimated for the Army halon 1301 requirement for 1994 through 2020.

	September 1993 <u>Estimate</u> (pounds)	February 1994 <u>Estimate</u> (pounds)	Amount <u>Overestimated</u> <u>or (Underestimated)</u> (pounds)
Omitted or Underestimated Requirements			
Forward Area Ammunition			
Supply Vehicle	0	200,646	(200,646)
Sheridan Assault Vehicle	0	38,078	(38,078)
M9 Armored Combat Earthmover	0	28,400	(28,400)
Advanced Field Artillery System	22,061	56,070	(34,009)
Field Artillery Resupply Vehicle	<u>22,061</u>	<u>130,295</u>	<u>(108,234)</u>
Subtotal	<u>44,122</u>	<u>453,489</u>	<u>(409,367)</u>
Overestimated Requirements			
Armored Gun System	27,000	17,491	9,509
Line of Sight Anti-Tank	<u>23,010</u>	<u>0</u>	<u>23,010</u>
Subtotal	<u>50,010</u>	<u>17,491</u>	<u>32,519</u>
Total	<u>94,132</u>	<u>470,980</u>	<u>(376,848)</u>

Adjustments for Recovery of Halon 1301. In September 1993, the Army estimated that it could recover 1,031,915 pounds of halon 1301 from existing systems including hand-held fire extinguishers. However, as of the February 1994 review, AMC stated that the Army would not be able to recover an estimated 206,000 pounds of halon 1301 from hand-held fire extinguishers

Estimating Defense Reserve Requirements for Ozone-Depleting Substances

presently deployed in helicopters and ground combat vehicles. The Army estimated that it will deplete the unrecoverable 206,000 pounds of halon 1301, considering the present use rates of halon-1301-filled fire extinguishers and the procurement lead times of replacement substances.

Final Adjustments to Army Halon 1301 Estimate. We validated the additional underestimated 409,367-pound mission-critical requirement of halon 1301, and accepted the 376,848 pound net increase for the seven additional types of ground combat vehicles. We also accepted the Army rationale that it cannot expect to recover 206,000 pounds of halon 1301 from hand-held fire extinguishers. The increased mission-critical requirement and the unrecoverable halon 1301 resulted in a 65,574-pound excess mission-critical requirement (Appendix B). However, the Army contended that it inadvertently excluded 57,135 pounds of halon 1301 from its 1994 estimated use data. This adjustment almost completely compensated for the 65,574-pound excess requirement, resulting in an insignificant variance of only 8,439 pounds. Therefore, we consider the Army February 1994 estimate of 1,802,341 pounds of halon 1301 for mission-critical requirements and the 836,000-pound Defense reserve procurement to be reasonable estimates.

Army CFC-12 Estimate. Three AMC subordinate commands reported a total 129,916-pound* CFC-12 mission-critical requirement to AMC in September 1993. AMC used the CFC-12 mission-critical requirement, less an estimated 30,100 pounds to be recovered from existing systems, to develop the CFC-12 Defense reserve requirement of 99,867 pounds for the Army.

- o ATCOM reported a 68,430-pound CFC-12 mission-critical requirement for use in tactical air conditioners, water chillers, refrigeration equipment, and watercraft. ATCOM computed the CFC-12 mission-critical requirement for these systems using logistics data and failure-rate assumptions.

- o CECOM reported a 24,000-pound CFC-12 mission-critical requirement for use as a refrigerant in air conditioners. CECOM computed the refrigerant requirement by assuming that each air conditioner would be refilled with CFC-12 twice annually. Additionally, CECOM assumed a 20-percent annual phaseout for the 1,029 air conditioners that were on hand at the end of 1993. The command prorated the CFC-12 use requirement accordingly.

- o TACOM reported a 37,486-pound mission-critical requirement of CFC-12 based on use requirements for three types of tactical vehicles: the commercial utility cargo vehicle; the nuclear, biological, and chemical reconnaissance vehicle; and the high mobility multipurpose wheeled vehicle.

*The Army CFC-12 mission critical requirement totals 129,916 pounds; however, the Army submitted to DLA a 129,967-pound requirement that contains a 51-pound math or rounding error that accounts for the difference in the CFC-12 mission critical requirement discussed in this report.

Estimating Defense Reserve Requirements for Ozone-Depleting Substances

Accuracy of ATCOM CFC-12 Estimate. Table 3 shows the September 1993 estimates and the amounts under- or overestimated for the ATCOM CFC-12 requirements for 1994 through 1999.

	September 1993 <u>Estimate</u> (pounds)	Amount <u>(Under-)/Overestimated</u> (pounds)
Air Conditioners	11,326	(537)
Water Chillers	1,664	0
Refrigeration Equipment	43,440	28,153
Watercraft	<u>12,000</u>	<u>6,000</u>
Total	<u>68,430</u>	<u>33,616</u>

ATCOM overestimated its September 1993 estimate of the mission-critical requirement for CFC-12 by 33,616 pounds. The ATCOM CFC-12 requirement estimate for air conditioners, refrigeration equipment, and watercraft differed from our audit results, but the water chiller estimate was the same. To calculate the CFC-12 use requirement for air conditioners, ATCOM used the January 1993 asset quantities, rather than the September 1993 quantities. We computed the requirement using the then-current February 1994 data. As a result, the CFC-12 requirement for air conditioners increased by 537 pounds. To calculate CFC-12 use from losses due to repairs and leaks in refrigerating equipment, ATCOM used February 1993 asset quantities rather than the September 1993 quantities. Additionally, to account for the installation of replacement refrigeration units, ATCOM computed CFC-12 requirement reductions beginning in 1997 rather than beginning in 1995. Further, ATCOM erroneously extended the CFC-12 requirement for refrigeration units by 6 years through 2005. Therefore, ATCOM overestimated the CFC-12 requirement for refrigeration units by 28,153 pounds. For watercraft, ATCOM erroneously extended the CFC-12 requirement by 6 years through the year 2005, and overestimated the CFC-12 requirement by 6,000 pounds (Appendix C).

Accuracy of CECOM CFC-12 Estimate. CECOM overestimated its September 1993 estimate of the mission-critical requirement for CFC-12 for air conditioners by 22,870 pounds. The CECOM CFC-12 estimate for air conditioners differed from our audit results for two reasons. First, for 1994 and 1995, the command duplicated the CFC-12 requirement for 836 air conditioners that were also included in the ATCOM mission-critical requirement. Additionally, CECOM based the CFC-12 estimate on the unsupported assumption that its air conditioners required two CFC-12 refills each year, rather than using actual consumption data (Appendix C).

Accuracy of TACOM CFC-12 Estimate. Table 4 shows the September 1993 estimate and the amounts underestimated or overestimated for the TACOM CFC-12 requirement for 1994 through 1999.

TACOM overestimated its September 1993 estimate of the mission-critical requirement for CFC-12 by 17,692 pounds. After reporting its requirement for

Estimating Defense Reserve Requirements for Ozone-Depleting Substances

CFC-12 to AMC, TACOM decreased its mission-critical estimate for the commercial utility cargo vehicle ambulances by 106 pounds and the high mobility multipurpose wheeled vehicles by 2,439 pounds. In February 1994, General Dynamics Land Systems Division provided a revised annual CFC-12 use requirement of 15,516 pounds for the nuclear, biological, and chemical reconnaissance vehicles. TACOM therefore decreased its CFC-12 estimate for these vehicles by 15,684 pounds. Finally, AMC included a 537-pound CFC-12 requirement in its consolidated estimate that TACOM had not previously included (Appendix C).

Table 4. TACOM CFC-12 Estimate for 1994 Through 1999		
	September 1993 <u>Estimate</u> (pounds)	Amount (Under-)/ <u>Overestimated</u> (pounds)
High Mobility Multipurpose Vehicle	5,100	2,439
Commercial Utility Cargo Vehicle	1,186	106
Nuclear, Biological, and Chemical Reconnaissance Vehicle	31,200	15,684
Paladin Howitzer	<u>0</u>	<u>(537)</u>
Total	<u>37,486</u>	<u>17,692</u>

Preliminary and Final Adjustments to Army CFC-12 Estimate. As a result of our discussions with AMC, the command agreed to adjust the ATCOM, CECOM, and TACOM CFC-12 mission-critical and Defense reserve requirements, as shown in Table 5. Table 5 also summarizes the September 1993 and February 1994 estimates for the ATCOM CFC-12 requirements for 1994 through 1999 and the amounts underestimated or overestimated.

Table 5. ATCOM CFC-12 Estimate for 1994 Through 1999			
	September 1993 <u>Estimate</u> (pounds)	February 1994 <u>Estimate</u> (pounds)	Amount (Under-)/ <u>Overestimated</u> (pounds)
ATCOM			
Air Conditioners	11,326	11,863	(537)
Water Chillers	1,664	1,664	0
Refrigeration Equipment	43,440	15,287	28,153
Watercraft	12,000	6,000	6,000
CECOM			
Air Conditioners	24,000	1,130	22,870
TACOM			
Tactical Vehicles	<u>37,486</u>	<u>19,794</u>	<u>17,692</u>
Total	<u>129,916</u>	<u>55,738</u>	<u>74,178</u>

As a result of the agreed-upon revisions to ATCOM, CECOM, and TACOM CFC-12 requirements, AMC decreased its original mission-critical requirement

Estimating Defense Reserve Requirements for Ozone-Depleting Substances

from 129,967 pounds [sic] to 55,738 pounds. To determine the Defense reserve requirement for CFC-12, AMC originally subtracted 30,100 pounds from the 129,967-pound [sic] mission-critical requirement as an offset for recoverable CFC-12. However, our audit results showed that 66,056 pounds of CFC-12 is available for recovery. AMC agreed to an allowance of 65,299 pounds for recoverable CFC-12. Because AMC revised the mission-critical requirement for CFC-12 to 55,738 pounds and revised the recoverable CFC-12 quantity to 65,299 pounds, the 99,867-pound Defense reserve requirement was completely eliminated and resulted in a potential cost avoidance of \$1,166,447 plus an additional \$74,900 for storage cylinder costs (Appendix C).

Air Force ODS Defense Reserve Requirements

The Air Force required the halons and CFCs listed in Table 6 to supply its Defense reserve requirements for 1994 through 2003. We reviewed between 16 percent and 49 percent of the total Air Force ODS Defense reserve requirement estimate. The Air Force overestimated four CFCs by 473,867 pounds. We accepted the 250,000-pound halon 1301 Defense reserve requirement. In July 1994, the Air Force revalidated its entire Defense reserve requirements for ODS. The Air Force reduced the Defense reserve requirements for five ODS by 1,182,237 pounds and increased the Defense reserve requirements for three ODS by 752,933 pounds.

Table 6 shows the quantities of the ODS that the Air Force estimated for the Defense reserve. The table also shows the percent that we reviewed of each ODS.

<u>ODS</u>	<u>December 1993 Estimate (pounds)</u>	<u>Amount Reviewed (pounds)</u>	<u>Percent Reviewed</u>
Halon 1301	1,291,935	250,000	19
Refrigerants			
CFC-11	175,185	72,000	41
CFC-12	1,269,961	209,000	16
CFC-114	9,289	Not Reviewed	0
CFC-500	43,418	Not Reviewed	0
CFC-502	60,195	Not Reviewed	0
Solvents			
CFC-113	158,654	36,664	23
1,1,1, Trichloroethane	<u>451,034</u>	<u>220,000</u>	49
Total	<u>3,459,671</u>	<u>787,664</u>	

Estimating Defense Reserve Requirements for Ozone-Depleting Substances

Air Force Defense Reserve Halon 1301 Estimate. In September 1993, the Air Force asked DLA to procure 250,000 pounds of halon 1301. The Air Force based the requirement on two factors. The Air Force estimated that a Defense reserve requirement of 150,000 pounds of halon 1301 will be necessary to support the war reserve requirement for F-16 aircraft for one Persian Gulf-size conflict every 10 years. The Air Force also estimated that it would require an additional 50,000 pounds per year of halon 1301 for use during 1994 and 1995. In December 1993, in addition to the war reserve, the Air Force estimated a Defense reserve requirement of 1,291,935 pounds for halon 1301. However, the Air Force informed DLA that it did not need to purchase any additional halon 1301 for the Air Force beyond the 250,000 pounds. The Air Force expects to recover the remainder of the 1,291,935-pound halon 1301 requirement from existing systems.

Air Force Refrigerant Estimate. In December 1993, OCALC estimated a Defense reserve requirement of 72,000 pounds for CFC-11 and 209,000 pounds for CFC-12, which will be used as refrigerants, for 1994 through 2003. OCALC estimated its Defense reserve requirement for CFC-11 and CFC-12 that will be used as refrigerants using 1992 requirements for large air conditioners. For 1994, OCALC estimated a Defense reserve requirement of 14,000 pounds of CFC-11 and 29,000 pounds of CFC-12. However, during 1992, OCALC used 32,200 pounds of CFC-11 and 13,825 pounds of CFC-12 in the air conditioners. Therefore, a wide variance existed between the quantities used and the OCALC estimated requirements. Discussions with the functional personnel in the OCALC Infrastructure Engineering Office disclosed that OCALC may have inadvertently reversed the estimates for the two CFCs used as refrigerants.

Accuracy of Air Force Refrigerant Estimate. OCALC overestimated the December 1993 estimate for the Defense reserve requirement for CFC-11 by 72,000 pounds, the entire requirement, and CFC-12 by at least 163,167 pounds. The OCALC estimates of the two CFCs used as refrigerants for air conditioners differed from our audit results because OCALC did not consider segregation of mission-critical applications, locally procured amounts of CFC-11 and CFC-12, or the impact of substitutes. The use of the two refrigerants in large air conditioners located in the maintenance facility was the only mission-critical application of the two ODS. However, OCALC incorrectly included refrigerant requirements for bachelor officers' quarters and dormitories in its mission-critical estimate. Additionally, OCALC plans to locally procure its entire use requirement for the two ODS for 1994 and 1995. By 1996, OCALC is scheduled to replace the existing air conditioners that use CFC-11, which will eliminate the CFC-11 requirement. Finally, OCALC plans to retrofit air conditioners requiring CFC-12 with a non-ODS by 1998, which will subsequently annually reduce by 55 percent the 1996 level of CFC-12 use. Table 7 summarizes the difference between the OCALC ODS Defense reserve estimates and our audit results.

Estimating Defense Reserve Requirements for Ozone-Depleting Substances

	<u>CFC-11</u> (pounds)	<u>CFC-12</u> (pounds)
1994 Through 2003 Defense Reserve Estimate	72,000	209,000
Audit Results for 1994 Through 2003	<u>0</u>	<u>45,833</u>
OCALC Quantity Overestimated	<u>72,000</u>	<u>163,167</u>

Air Force Solvent Estimate. In December 1993, OCALC estimated a 220,000-pound requirement of 1,1,1, trichloroethane and a 36,664-pound requirement for CFC-113 for 1994 through 2003. The Air Force uses 1,1,1, trichloroethane and CFC-113 as solvents. OCALC estimated its Defense reserve requirement for 1,1,1, trichloroethane and CFC-113 solvents using the 1992 and 1993 use requirements for four OCALC maintenance shops: the Electronic Electro-mechanical, the Avionics, the Constant Speed Drive, and the Tube and Cable.

Accuracy of Air Force Solvent Estimate. Table 8 shows the difference between the OCALC ODS Defense reserve estimates for solvents and our audit results.

	<u>1,1,1, Trichloroethane</u> (pounds)	<u>CFC-113</u> (pounds)
1994 Through 2003 Defense Reserve Estimate	220,000	36,664
Audit Results for 1994 Through 2003	<u>9,300</u>	<u>8,664</u>
OCALC Quantity Overestimated	<u>210,700</u>	<u>28,000</u>

OCALC overestimated the December 1993 estimate for the 1,1,1, trichloroethane requirement by 210,700 pounds, and CFC-113 by 28,000 pounds. The OCALC Defense reserve estimates for 1,1,1, trichloroethane and CFC-113 solvents differed from our audit results because OCALC did not consider the reduction in solvent use that will result from conversions to alternative cleaning methods. The Electronic Electro-mechanical and Avionics shops plan to replace the two solvents with a new cleaning device by the end of 1994. Additionally, the Constant Speed Drive and the Tube and Cable shops are scheduled to install new cleaning systems or devices to replace 1,1,1, trichloroethane and CFC-113 systems or devices during 1994. A minor CFC-113 application equal to an annual requirement of approximately 720 pounds of CFC-113 will continue in the Constant Speed Drive shop until an alternative is identified for that particular application.

Estimating Defense Reserve Requirements for Ozone-Depleting Substances

Preliminary and Final Adjustments to Air Force ODS Requirements. The Air Force initially overestimated the Defense reserve requirement for four refrigerants and solvents by 473,867 pounds. We calculated the potential cost avoidance at \$2,721,328, plus an additional \$335,400 for storage cylinder costs.

Table 9 shows that OCALC overestimated Defense reserve requirements for refrigerants and solvents.

Table 9. Summary of Air Force Overestimated Defense Reserve Refrigerant and Solvent Requirements	
<u>ODS</u>	<u>Overestimated Amount</u> (pounds)
CFC-11	72,000
CFC-12	163,167
CFC-113	28,000
1,1,1, Trichloroethane	<u>210,700</u>
Total	<u>473,867</u>

The Air Force revalidated its entire ODS Defense reserve requirements in July 1994. The Air Force reduced the Defense reserve requirements for five ODS by 1,182,237 pounds and increased the Defense reserve requirements for three ODS by 752,933 pounds from the December 1993 requirement estimates. The Air Force stated that they either failed to include or overestimated the Defense reserve requirements for ODS in its December 1993 requirement estimates. We performed a limited review of the Air Force estimating procedures for the eight ODS. We validated and accepted the Air Force rationale for estimating the revised Defense reserve requirements. We calculated the potential cost avoidance of \$4,766,094, plus an additional \$321,978 for storage cylinder costs.

Table 10 shows the difference between the Air Force December 1993 requirement estimates and the revised July 1994 requirement estimates for eight ODS.

Estimating Defense Reserve Requirements for Ozone-Depleting Substances

<u>Type of ODS</u>	<u>December 1993</u> <u>Estimate</u> <u>(pounds)</u>	<u>August 1994</u> <u>Estimates</u> <u>(pounds)</u>	<u>Difference</u> <u>(pounds)</u>
Overestimated Requirements			
CFC-11	175,185	93,095	(82,090)
CFC-12	1,269,961	263,443	(1,006,518)
CFC-500	43,418	11,720	(31,698)
CFC-502	60,194	26,303	(33,891)
1,1,1 Trichloroethane	451,034	422,994	(28,040)
Subtotal			<u>(1,182,237)</u>
Underestimated Requirements			
Halon 1301	1,291,935	1,879,086	500,000*
CFC-113	158,654	400,397	241,743
CFC-114	9,289	20,479	11,190
Subtotal			<u>752,933</u>
Net Difference			<u>(429,304)</u>

*The Air Force requested DLA to purchase an additional 500,000 pounds, for a total of 750,000 pounds of halon 1301 for Defense reserve requirements.

Appendixes D and E compare the Air Force mission-critical and Defense reserve ODS requirements.

Conclusion

The Army and the Air Force did not use adequate estimating procedures to determine the ODS Defense reserve requirement. Consequently, the Army overestimated the Defense reserve requirement for one ODS and the Air Force overestimated the requirements for five ODS and understated the requirements for three ODS. As much as \$6,329,419 in net costs could be avoided by not procuring the overestimated quantities of the ODS. The Army and the Air Force agreed to eliminate the overestimated portions of the ODS Defense reserve requirements, so no recommendations were made.

Part III - Additional Information

Appendix A. Types and Uses of Army and Air Force Ozone-Depleting Substances for the Defense Reserve

<u>Type of ODS</u>	<u>Substance Use</u>
Chlorofluorocarbon 11 (CFC-11)	Refrigeration, cooling, and air conditioning
Chlorofluorocarbon 12 (CFC-12)	Cooling, air conditioning, refrigeration, spray lubrication, and corrosion prevention; used primarily on ships, aircraft, mobile air conditioners, and in facilities
Chlorofluorocarbon 113 (CFC-113)	Cleaning, degreasing, lubrication, and corrosion prevention; used in maintenance facilities
Chlorofluorocarbon 114 (CFC-114)	Targeting cooling and avionics cooling
Chlorofluorocarbon 500 (CFC-500)	Refrigeration
Chlorofluorocarbon 502 (CFC-502)	Refrigeration
Halon 1301	Fire suppression in the crew compartments and some cargo areas of tactical vehicles, aircraft, and shipboard systems; flightlines; crash-fire-rescue vehicle fire fighting systems; and in command, control, and communications systems
Methyl Chloroform (1,1,1, Trichloroethane)	Cleaner, lubricant, degreaser, and solvent

Appendix B. Army Halon 1301 Defense Reserve Reductions

<u>Commands and Weapon Systems</u>	Army September 1993 <u>Estimate</u> (pounds)	Audit <u>Results</u> (pounds)	Army February 1994 <u>Estimate</u> (pounds)	Army <u>Estimate Difference</u> (pounds)
ATCOM (Helicopters)				
Blackhawk	60,600	25,080	30,300	30,300
Apache	6,300	3,150	3,150	3,150
Chinook	9,180	4,590	4,590	4,590
Commanche	9,028	0	9,028	0
TACOM (Combat Vehicles)				
M1 Abrams Tank	828,110	550,777	567,451	260,659
Bradley/MLRS	860,565	663,892	510,842	349,723
FAASV	0	N/A	200,646	(200,646)
Sheridan Assault Vehicle	0	N/A	38,078	(38,078)
M9 ACE	0	N/A	28,400	(28,400)
AGS	27,000	N/A	17,491	9,509
AFAS	22,061	N/A	56,070	(34,009)
FARV	22,061	N/A	130,295	(108,234)
LOSAT	<u>23,010</u>	N/A	<u>0</u>	<u>23,010</u>
Subtotal	1,867,915	N/A	1,596,341	271,574
Less Amount Recoverable From Existing Systems	<u>1,031,915</u>	N/A	<u>825,915</u>	<u>206,000¹</u>
Total	<u>836,000</u>	N/A	<u>770,426</u>	65,574
Less Amount Omitted for FY 1994 Use				<u>57,135²</u>
Amount Reduced				<u>8,439</u>

AFAS	Advanced Field Artillery System
AGS	Armored Gun System
FAASV	Forward Area Ammunition Supply Vehicle
FARV	Field Artillery Resupply Vehicle
LOSAT	Line of Sight Anti-Tank
M9 ACE	M9 Armored Combat Earthmover
MLRS	Multiple Launch Rocket System

¹The Army does not expect to recover the estimated 206,000 pounds of halon 1301 from hand-held fire extinguishers.

²The Army underestimated its 1994 Defense reserve procurement requirement by 57,135 pounds, which partially offsets the 65,574-pound estimate difference.

Appendix C. Army Chlorofluorocarbons-12 Mission-Critical Requirement Reductions

<u>Commands and Weapon Systems</u>	Army September 1993 <u>Estimate</u> (pounds)	Audit <u>Results</u> (pounds)	Army February 1994 <u>Estimate</u> (pounds)	Army <u>Estimate</u> <u>Difference</u> (pounds)
ATCOM				
Air Conditioners	11,326	11,863	11,863	(537)
Water Chillers	1,664	1,664	1,664	0
Refrigeration Equipment	43,440	15,021	15,287	28,153
Watercraft	12,000	6,000	6,000	6,000
CECOM				
Air Conditioners	24,000	1,103	1,130	22,870
TACOM				
HMMV	5,100	2,661	2,661	2,439
CUCV	1,186	1,080	1,080	106
FOX	31,200	15,516	15,516	15,684
Paladin Howitzer	<u>0</u>	<u>N/A</u>	<u>537</u>	<u>(537)</u>
Subtotal	129,916	54,908	55,738	<u>74,178</u> ¹
Error	51 ²	N/A	N/A	
Less Amount Recoverable From Existing Systems	<u>30,100</u> ³	<u>66,056</u> ⁴	<u>65,299</u> ⁴	
Total	<u>99,867</u>	<u>0</u> ⁵	<u>0</u> ⁵	

CUCV Commercial Utility Cargo Vehicle
FOX Nuclear, Biological, and Chemical Reconnaissance Vehicle
HMMV High Mobility Multipurpose Wheeled Vehicle

¹The potential costs avoided for Army CFC-12 were calculated on the entire original 99,867-pound Defense reserve requirement, not the 74,178-pound submission difference for the mission-critical quantity. We multiplied the 99,867-pound Defense reserve requirement by \$11.68 per pound of CFC-12 to obtain \$1,166,447; an additional \$74,900 for storage cylinder costs resulted in a total potential cost avoidance of \$1,241,347.

²The 129,967-pound CFC-12 mission-critical requirement that the Army submitted to DLA contained an error, accounting for the 51-pound difference from the 129,916-pound requirement above.

³The Army stated that 30,100 pounds of the CFC-12 mission-critical requirement will be recovered from existing systems, and therefore, the Army submitted a 99,867-pound Defense reserve requirement.

⁴The Army revised the CFC-12 mission-critical requirement to 55,738 pounds and will support this requirement using the 65,299 pounds of recoverable CFC-12, which it identified in a revised estimate.

⁵The Defense reserve requirement was reduced to zero because the recovered CFC-12 will offset the entire mission-critical requirement.

Appendix D. Air Force Requirement Reductions for Class I Mission-Critical Ozone- Depleting Substances

<u>Type of ODS</u>	Air Force December 1993 <u>Estimate</u> (pounds)	Audit Results <u>December 1993</u> * (pounds)	Air Force July 1994 <u>Submission</u> (pounds)	Air Force Estimate <u>Difference</u> (pounds)
Halon 1301	2,069,157	N/A	2,405,451	336,294
CFC-11	157,245	0	301,563	144,318
CFC-12	1,551,455	45,833	648,422	(903,033)
CFC-113	475,926	8,664	609,419	133,493
CFC-114	12,075	Not Reviewed	50,571	38,496
CFC-500	62,724	Not Reviewed	36,522	(26,202)
CFC-502	219,170	Not Reviewed	46,735	(172,435)
1,1,1, Trichloroethane	1,053,022	9,300	592,806	(460,216)

*According to our limited review of ODS requirements at San Antonio and Oklahoma City air logistics centers.

Appendix E. Air Force Requirement Reductions for Class I Defense Reserve Ozone- Depleting Substances

<u>Type of ODS</u>	Air Force December 1993 <u>Estimate</u> (pounds)	Audit Results <u>December 1993</u> (pounds)	Air Force July 1994 <u>Submission</u> (pounds)	Air Force Estimate <u>Difference</u> (pounds)
Halon 1301	1,291,935	N/A	1,879,086	587,151*
CFC-11	175,185	0	93,095	(82,090)
CFC-12	1,269,961	45,833	263,443	(1,006,518)
CFC-113	158,654	8,664	400,397	241,743
CFC-114	9,289	Not Reviewed	20,479	11,190
CFC-500	43,418	Not Reviewed	11,720	(31,698)
CFC-502	60,195	Not Reviewed	26,303	(33,892)
1,1,1, Trichloroethane	451,034	9,300	422,994	(28,040)

*The Air Force requested an additional 500,000 pounds, for a total of 750,000 pounds of halon 1301 for Defense reserve requirements.

Appendix F. Summary of Potential Benefits Resulting From Audit

Military Department	Description of Benefit	Amount and/or Type of Benefit
Army	Economy and Efficiency. Reduces procurement of CFC-12.	FYs 1994 and 1995 Defense Procurement appropriation funds of up to \$1,241,347 put to better use.
Air Force	Economy and Efficiency. Reduces procurement of five ODS with offsetting increases in three other ODS.	FYs 1994 and 1995 Defense Procurement appropriation funds of up to \$5,088,072 put to better use.

Appendix G. Organizations Visited or Contacted

Office of the Secretary of Defense

Deputy Under Secretary of Defense (Environmental Security), Washington, DC
Assistant Deputy Under Secretary of Defense (Pollution Prevention), Washington, DC

Department of the Army

Assistant Secretary of the Army (Installations, Logistics, and Environment),
Washington, DC
Deputy Assistant Secretary of the Army (Environment, Safety, and Occupational
Health), Washington, DC
Army Materiel Command, Alexandria, VA
Aviation and Troop Command, St. Louis, MO
Communications-Electronics Command, Fort Monmouth, NJ
Tank-Automotive Command, Warren, MI

Department of the Navy

Office of the Deputy Chief of Naval Operations (Logistics), Washington, DC
Western Region, Naval Audit Service, Point Mugu, CA

Department of the Air Force

Deputy Assistant Secretary of the Air Force (Environment, Safety, and Occupational
Health), Washington, DC
Air Force Materiel Command, Wright-Patterson Air Force Base, OH
Oklahoma City Air Logistics Center, Tinker Air Force Base, OK
San Antonio Air Logistics Center, Kelly Air Force Base, TX

Other Defense Organizations

Defense Logistics Agency, Alexandria, VA
Defense General Supply Center, Richmond, VA

Appendix H. Report Distribution

Office of the Secretary of Defense

Comptroller of the Department of Defense
Assistant Secretary of Defense (Economic Security)
Assistant to the Secretary of Defense (Public Affairs)
Deputy Under Secretary of Defense (Environmental Security)

Department of the Army

Secretary of the Army
Assistant Secretary of the Army (Financial Management)
Assistant Secretary of the Army (Installations, Logistics, and Environment)
Deputy Assistant Secretary of the Army (Environment, Safety, and Occupational Health)
Commander, Army Materiel Command
 Commander, Aviation and Troop Command
 Commander, Communications-Electronics Command
 Commander, Tank-Automotive Command
Auditor General, Department of the Army

Department of the Navy

Secretary of the Navy
Assistant Secretary of the Navy (Financial Management)
Assistant Secretary of the Navy (Installations and Environment)
Deputy Assistant Secretary of the Navy (Environment and Safety)
Deputy Chief of Naval Operations (Logistics)
Auditor General, Department of the Navy

Department of the Air Force

Secretary of the Air Force
Assistant Secretary of the Air Force (Financial Management and Comptroller)
Assistant Secretary of the Air Force (Manpower, Reserve Affairs, Installations, and Environment)
Deputy Assistant Secretary of the Air Force (Environment, Safety, and Occupational Health)

Department of the Air Force (cont'd)

Commander, Air Force Materiel Command
 Commander, Oklahoma City Air Logistics Center
 Commander, San Antonio Air Logistics Center
Auditor General, Department of the Air Force

Other Defense Organization

Director, Defense Contract Audit Agency
Director, Defense Logistics Agency
Director, National Security Agency
Inspector General, Central Imagery Office
Inspector General, Defense Intelligence Agency
Inspector General, National Security Agency
Director, Defense Logistics Studies Information Exchange

Non-Defense Federal Organizations

Office of Management and Budget
Technical Information Center, National Security and International Affairs Division,
 General Accounting Office

Chairman and Ranking Minority Member of Each of the Following Congressional
Committees and Subcommittees:

Senate Committee on Appropriations
Senate Subcommittee on Defense, Committee on Appropriations
Senate Committee on Armed Services
Senate Committee Environment and Public Works
Senate Committee on Governmental Affairs
House Committee on Appropriations
House Subcommittee on Defense, Committee on Appropriations
House Committee on Armed Services
House Committee on Energy and Commerce
House Committee on Government Operations
House Subcommittee on Legislation and National Security, Committee on
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