

Audit

Report



HAZARDOUS MATERIAL MANAGEMENT FOR THE
NIMITZ-CLASS NUCLEAR AIRCRAFT CARRIER PROGRAM

Report Number 00-022

October 27, 1999

Office of the Inspector General
Department of Defense

DTIC QUALITY INSPECTED 1

DISTRIBUTION STATEMENT A
Approved for Public Release
Distribution Unlimited

20000209 104

AGI00-05-1195

Additional Copies

To obtain additional copies of this audit report, contact the Secondary Reports Distribution Unit of the Audit Followup and Technical Support Directorate at (703) 604-8937 (DSN 664-8937) or fax (703) 604-8932 or visit the Inspector General, DoD, Home Page at: www.dodig.osd.mil.

Suggestions for Future Audits

To suggest ideas for or to request future audits, contact the Audit Followup and Technical Support Directorate at (703) 604-8940 (DSN 664-8940) or fax (703) 604-8932. Ideas and requests can also be mailed to:

OAIG-AUD (ATTN: AFTS Audit Suggestions)
Inspector General, Department of Defense
400 Army Navy Drive (Room 801)
Arlington, VA 22202-2884

Defense Hotline

To report fraud, waste, or abuse, contact the Defense Hotline by calling (800) 424-9098; by sending an electronic message to Hotline@dodig.osd.mil; or by writing to the Defense Hotline, The Pentagon, Washington, DC 20301-1900. The identity of each writer and caller is fully protected.

Acronyms

PESHE
SFFAS

Programmatic Environmental, Safety, and Health Evaluation
Statement of Federal Financial Accounting Standards



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

October 27, 1999

MEMORANDUM FOR ASSISTANT SECRETARY OF THE NAVY (FINANCIAL
MANAGEMENT AND COMPTROLLER)

SUBJECT: Audit Report on Hazardous Material Management for the *Nimitz*-Class
Nuclear Aircraft Carrier Program (Report No. 00-022)

We are providing this audit report for your information and use. The Joint Logistics Commanders requested an audit of hazardous material management for major Defense systems. This report is the sixth in a series of reports resulting from the requested audit.

We considered Navy comments on a draft of this report in preparing this final report. The comments on the draft report conformed to the requirements of DoD Directive 7650.3. Therefore, we do not require additional comments.

We appreciate the courtesies extended to the audit staff. Questions on the audit should be directed to Mr. John E. Meling at (703) 604-9091 (DSN 664-9091) (jmeling@dodig.osd.mil) or Mr. Jack D. Snider at (703) 604-9087 (DSN 664-9087) (jsnider@dodig.osd.mil). See Appendix D for the report distribution. The audit team members are listed inside the back cover.

David K. Steensma

David K. Steensma
Deputy Assistant Inspector General
for Auditing

Office of the Inspector General, DoD

Report No. 00-022

(Project No. 8AE-5037.03)

October 27, 1999

Hazardous Material Management for the *Nimitz*-Class Nuclear Aircraft Carrier Program

Executive Summary

Introduction. The *Nimitz*-Class Nuclear Aircraft Carrier (the *Nimitz* Class), a Navy Acquisition Category IC program, is designed to support and operate aircraft to engage in attacks on targets afloat and ashore that threaten the Navy's use of the sea and to engage in sustained operations in support of other forces. Construction of the *Nimitz*-Class nuclear aircraft carriers began in October 1967. The *Nimitz*-Class consists of 10 carriers, of which 8 are operational. The two remaining aircraft carriers, CVN-76 and CVN-77, are scheduled for delivery in December of 2002 and 2008, respectively. The December 31, 1998, Selected Acquisition Report, estimates the cost for the CVN-76 and the CVN-77 to be \$5.4 billion and \$5.9 billion, respectively.

Objectives. The Joint Logistics Commanders requested an audit of hazardous material management for major Defense systems. The *Nimitz*-Class Program is one of a series of programs included in the audit. The overall audit objective was to evaluate the adequacy of planning and providing for the reduction and control of hazardous materials used in the design, manufacture, maintenance, and disposal for the *Nimitz* Class. Specifically, we evaluated whether the program manager managed the selection, use, and disposal of hazardous materials so that DoD incurs the lowest cost possible that is consistent with the system's cost, schedule, and performance goals while protecting human health and the environment over the system's life cycle. We also evaluated the management control program as it related to the audit objective.

Results. The Aircraft Carrier Program Office approved and funded several environmental improvements that Naval Sea Systems Command initiated to reduce and eliminate hazardous material on the *Nimitz*-Class carriers. Also, the Program Office supported environmental pollution reduction efforts and carrier pollution prevention programs initiated at contractor and support organizations. However, the following areas warrant management attention.

- The Aircraft Carrier Program Office did not develop a total life-cycle cost estimate to establish its total ownership cost objective and threshold to include environmental costs for demilitarization, disposal, and associated cleanup of the *Nimitz*-Class carriers at the end of their useful life and for applicable ship alterations and overhauls. As a result, the Program Office can not accurately baseline the *Nimitz*-Class Program costs to establish a total ownership cost objective and threshold as part of the Navy's long-term cost reduction initiative. Further, the Program Office would not be able to accurately report the liability for demilitarization, disposal, and environmental cleanup costs when DoD guidance for reporting those costs in financial statements becomes available (finding A).

-
- The Aircraft Carrier Program Office had not developed a programmatic environmental, safety, and health evaluation (PESHE) that included a strategy for meeting environmental, safety, and health requirements; identified demilitarization and disposal requirements; established program environmental responsibilities; and identified a methodology to track progress throughout the acquisition life-cycle of the *Nimitz*-Class Program to include ship alterations and overhauls. Without the PESHE, the Program Office cannot ensure that it is aware of the impact of environmental, safety, and health issues on mission and cost and may also be forgoing opportunities to further reduce environmental life-cycle costs over the life span of the *Nimitz*-Class Program (finding B).

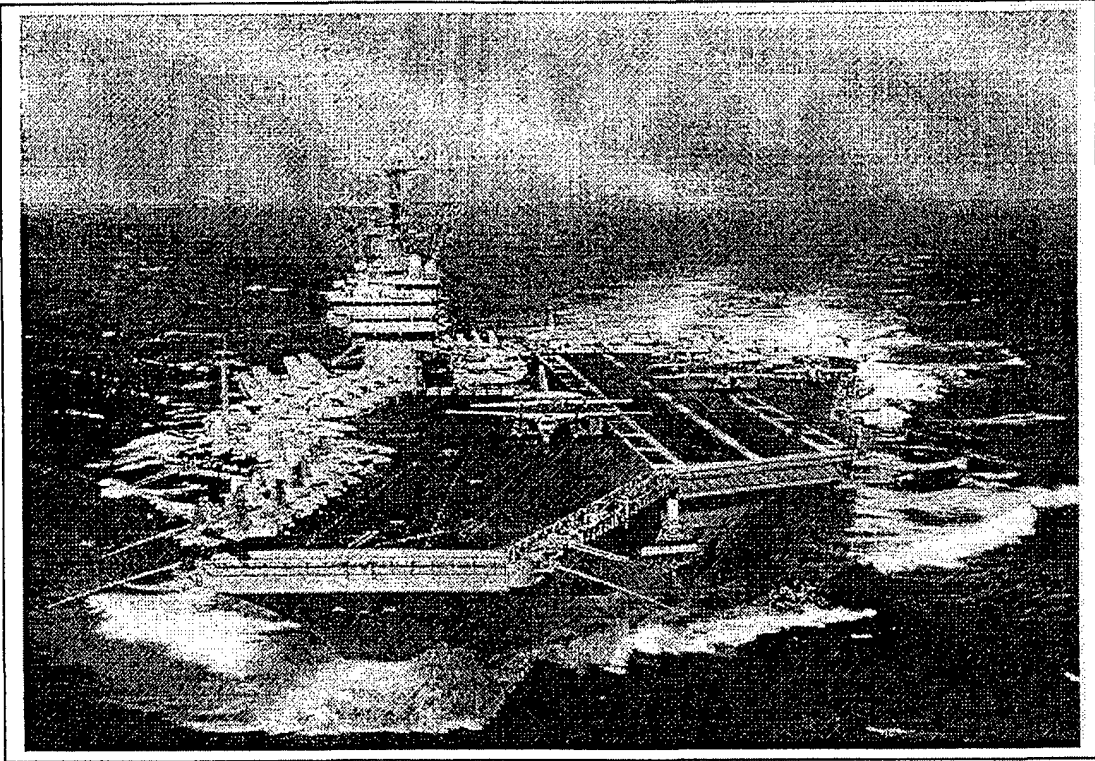
Recommendations in this report, if implemented, will improve the hazardous material management of the *Nimitz*-Class Program. The management controls reviewed were effective in that we identified no material management control weakness (Appendix A).

Summary of Recommendations. We recommend that the Navy develop a total life-cycle cost estimate that includes environmental costs for demilitarization, disposal, and associated cleanup of the *Nimitz*-Class carriers at the end of their useful life to include ship alterations and overhauls for the *Nimitz*-Class carriers; and include those costs in annual total ownership cost updates. We also recommend that the Navy prepare and update annually, as appropriate, a *Nimitz*-Class Nuclear Aircraft Carrier Program environmental management plan that addresses the strategy for meeting environmental, safety, and health requirements; identifies demilitarization and disposal requirements; establishes program environmental responsibilities; and identifies a methodology to track progress for the remainder of the *Nimitz*-Class life cycle to include ship alterations and overhauls.

Management Comments. The Office of the Assistant Secretary of the Navy (Research, Development, and Acquisition) concurred with the recommendations, provided clarifying comments and recommended changes to selected statements in the report, and discussed the actions the Program Executive Office for Aircraft Carriers and the Aircraft Carrier Program Office have taken or plan to take in response to the recommendations. A discussion of the management comments is in the Findings section of the report, and the complete text is in the Management Comments section.

Table of Contents

Executive Summary	i
Introduction	
Background	1
Objectives	2
Noteworthy Environmental Efforts	2
Findings	
A. Environmental Life-Cycle Costs	6
B. Programmatic Environmental, Safety, and Health Evaluation	14
Appendixes	
A. Audit Process	
Scope and Methodology	17
Management Control Program Review	18
Summary of Prior Coverage	19
B. Definitions of Technical Terms	20
C. Audit Responses to Navy Comments Concerning the Report	22
D. Report Distribution	25
Management Comments	
Department of the Navy Comments	27



Nimitz-Class Nuclear Aircraft Carrier

Background

This report discusses the adequacy of planning and providing for the reduction and control of hazardous materials used in the design, manufacture, maintenance, and disposal for the *Nimitz*-Class Nuclear Aircraft Carriers (the *Nimitz* Class). DoD environmental management policy relating to hazardous materials is to prevent, mitigate, or remediate environmental damage that acquisition programs cause. In designing, manufacturing, testing, operating, and disposing of systems, DoD program managers are to prevent or reduce all forms of pollution at the source, whenever feasible. Prudent investments in pollution prevention can reduce life-cycle environmental costs and liability and improve environmental quality and program performance. Further, the Secretary of Defense, in his 1998 annual report to the President and Congress, stated that DoD urgently needed to reduce the total ownership costs of its systems to sustain force modernization and recapitalization. To reduce total ownership costs, program managers need to focus on total life-cycle costs in the development and production phases of the weapon system acquisition life cycle so that trade-offs can be made between investments in the development and production phases and reduced costs in the operation and support phase. Appendix B provides definitions of technical terms used in this report.

The *Nimitz* Class is an Acquisition Category 1C program. A *Nimitz*-Class carrier supports and operates aircraft to engage in attacks on targets afloat and ashore that threaten the Navy's use of the sea and engages in sustained operations in support of other forces. They are the largest warships in the world with an overall length of 1,092 feet and a flight deck that is 252 feet wide and covers 4.5 acres. *Nimitz*-Class carriers have a combat load displacement of approximately 97,000 tons, two nuclear reactors, and nuclear fuel for at least 20 years of normal carrier operations. The basic life-cycle for a *Nimitz*-Class carrier is 49 years with one mid-life refueling and recapitalization at approximately 23 years of service. The *Nimitz*-Class consists of 10 carriers, of which 8 are operational¹ and 2 remain to be delivered.² Newport News Shipbuilding, Newport News, Virginia, began construction on the first *Nimitz*-Class carrier, the *USS Nimitz* (CVN-68), in 1967. The *USS Nimitz* deployed on May 3, 1975, and is undergoing its first refueling during a 33-month refueling complex overhaul at Newport News Shipbuilding. The two remaining aircraft carriers, CVN-76 and CVN-77, are scheduled for delivery in December of 2002 and 2008, respectively. The December 31, 1998, Selected Acquisition Report, estimates the cost for the CVN-76 and the CVN-77 to be \$5.4 billion and \$5.9 billion, respectively.

¹The eight operational aircraft carriers include the *USS Nimitz* (CVN-68), *USS Dwight D. Eisenhower* (CVN-69), *USS Carl Vinson* (CVN-70), *USS Theodore Roosevelt* (CVN-71), *USS Abraham Lincoln* (CVN-72), *USS George Washington* (CVN-73), *USS John C. Stennis* (CVN-74), and *USS Harry S. Truman* (CVN-75).

²CVN-76, the *Ronald Reagan*, is under construction at Newport News Shipbuilding, Newport News, Virginia. The Navy also selected Newport News Shipbuilding to construct the as yet to be named CVN-77.

Objectives

The Joint Logistics Commanders requested an audit of hazardous material management for major Defense systems. The *Nimitz*-Class Program is one of a series of programs included in the audit. The overall audit objective was to evaluate the adequacy of planning and providing for the reduction and control of hazardous materials used in the design, manufacture, maintenance, and disposal for the *Nimitz* Class. Specifically, we evaluated whether the program manager managed the selection, use, and disposal of hazardous materials so that DoD incurs the lowest cost possible that is consistent with the system's cost, schedule, and performance goals while protecting human health and the environment over the system's life cycle. We also evaluated the management control program as it related to the audit objective. This report is the sixth in a series of reports on our ongoing audit of hazardous material management for major Defense systems. The first five reports address hazardous material management for the Army Grizzly Program, the Air Force C/KC-135 Stratotanker Aircraft Program, the Navy T-45 Undergraduate Jet Pilot Training System, the Army Black Hawk Helicopter Program, and the Air Force F-15 Aircraft Program. Appendix A discusses the scope and methodology used to accomplish the objective as well as management controls and prior audit coverage.

Noteworthy Environmental Efforts

The Aircraft Carrier Program Office approved and funded several environmental improvements that Naval Sea Systems Command initiated to reduce and eliminate hazardous material on the *Nimitz*-Class carriers.

Pollution Prevention Afloat Program. Naval Sea Systems Command established the program to develop techniques, methods, and better management practices for use by the Fleet and to facilitate pollution prevention practices in daily operations and maintenance procedures. The Pollution Prevention Afloat Team tests and evaluates opportunities to reduce shipboard use of hazardous materials on designated prototype ships.³ The Program Office approved, programmed, and funded 20 successfully tested pollution prevention opportunities⁴ for installation on all *Nimitz*-Class carriers beginning with CVN-69 and CVN-74 in FY 1999 that resulted in reduced hazardous material offload, handling, and disposal costs; reduced hazardous material procurement costs, labor savings; and, improved safety and health for the sailors onboard

³Two *Nimitz*-Class carriers serve as prototype platforms to test and evaluate pollution prevention opportunities.

⁴The Pollution Prevention Afloat Program identifies opportunities as tools that effectively reduce shipboard use of hazardous materials.

carriers. The pollution prevention equipment installed included aqueous parts washers, paint-gun cleaning stations, paint dispensing systems, vacuum sanding systems, cable lubricators, and maintenance free batteries.

Consolidated Hazardous Material Reutilization and Inventory Management Program. The Program Office implemented the Consolidated Hazardous Material Reutilization and Inventory Management Program as a ship alteration on CVN-68 through CVN-73 and as a forward fit on CVN-74 through CVN-76. The program minimizes the purchase of unnecessary hazardous materials and reduces the generation of hazardous waste while properly accounting for and storing all materials, thereby minimizing the risk of spills and personnel exposure. The ship alteration also included compactors and waste consolidation facilities to minimize the volume of excess hazardous material generated.

Joint Acquisition Sustainment Pollution Prevention Activity. The Program Office in coordination with the Naval Sea Systems Command initiated two projects for the Joint Acquisition Sustainment Pollution Prevention Activity to study coatings for ballast tanks and nonskid materials. Tank corrosion is a major maintenance burden on ship crews. The Program Office is investigating new paints for ballast tanks that will adhere to the stiffeners and webs inside the tanks where most corrosion starts. Reducing the corrosion extends the coating life and reduces the amount of hazardous material generated through removal and disposal of old coatings. Likewise, new coatings for nonskid materials are needed that not only prevent corrosion and deflect heat, but also reduce the amount of hazardous material generated by the removal of old nonskid.

Activities that interact with, support, or maintain the *Nimitz*-Class Program also incorporated environmental pollution reduction efforts and carrier pollution prevention into the acquisition and maintenance process.

Preventative Measures to Reduce Hazardous Material and Waste. Contractor personnel from Newport News Shipbuilding (the Shipyard) identified several examples of preventative measures taken to reduce hazardous materials and waste in the production and maintenance of Navy vessels such as testing city waste streams entering the shipyard, and establishing an installation chemical waste treatment plant and a crushing facility to reduce waste.

Testing City Waste Streams. The Shipyard uses its own on-site laboratory to test city waste flowing into the Shipyard from the downtown business district. Through this testing, Shipyard personnel determined that a local plating company was illegally dumping waste and notified state officials of the violation. Shipyard personnel continue to monitor the incoming waste stream and randomly collect weekly samples.

Installing a Chemical Waste Treatment Plant. In 1982, the Shipyard purchased a chemical waste treatment plant that includes two 20,000-gallon cyanide reduction tanks. The Shipyard uses the plant to remove heavy metals such as silver, cadmium, lead, and chromium from its wastewater. After the wastewater is treated, the remaining sludge is allowed to dry. By allowing the moisture from the sludge to evaporate, the remaining sludge material weighs

less, thereby reducing disposal costs. The chemical waste treatment process resulted in an annual 66 percent reduction of hazardous material disposal costs.

Installing a Drum Cleaning and Crushing Facility. In 1994, the Shipyard purchased a drum cleaning and crushing facility. Shipyard personnel bring 5-gallon and 55-gallon drums to the facility where the drums are washed and returned for reuse or crushed. The Shipyard collects wastewater from the drum cleaning, treats it at the Oily Waste Treatment Facility, and sends the treated water to the Hampton Roads Sanitation District. The facility also crushes paint cans and aerosol cans.

Recycling Opportunities and New Technologies. Navy Environmental, Health, and Safety personnel at the Norfolk Naval Base, Norfolk, Virginia, identified several recycling opportunities and new technologies to reduce or eliminate hazardous material and pollution, such as transferring fire retardant between vessels at no cost, establishing a spruce barge paint facility, recycling oxygen breathing apparatus canisters, and implementing plasma arc technology.

Aqueous Film Forming Foam. Norfolk Naval Base removed 20,000 pounds of aqueous film forming foam, a fire retardant, from CVN-68, in preparation of its mid-life refueling overhaul and provided the fire retardant to another Navy vessel at no cost. As a result of "cross-decking" the fire retardant from one vessel to another, the Navy avoided disposal costs of about \$26,000 and did not need to acquire additional retardant for the outgoing vessel resulting in an additional savings of about \$80,000.

Spruce Barge. A spruce barge⁵ is a floating barge that allows Navy personnel to paint parts for submarines and carriers. Pollution from the painting process is minimized because the job is completed within encased paint booths. Spruce barge personnel operate a centralized hazardous materials minimization center that dispenses hazardous material in small quantities. For instance, barge personnel use a plastic bag as a liner in pint cans to issue hazardous material, so that when the sailor who receives the hazardous material completes the job, only the plastic liner is disposed and barge personnel can reuse the can. Spruce barge personnel stated that waste for the Norfolk Naval Base is about 27 percent paint disposal, whereas paint waste for the spruce barge is about 3 percent.

Oxygen Breathing Apparatus. The Norfolk Naval Base is recycling oxygen breathing apparatus canisters instead of disposing of them, resulting in a \$200,000 savings in disposal costs.

Plasma Arc Technology. The Norfolk Naval Base is in the process of testing plasma arc technology to dispose of hazardous material. Norfolk Naval Base Environmental Protection personnel anticipate installation of the technology in FY 2001. When installed, the plasma arc unit can eliminate up to 8 tons of all types of hazardous waste per day. The plasma arc turns hazardous material into a rock-like material the Navy plans to sell. Industry is considering

⁵The Navy developed the barge for submarine repairs at a cost of \$620,000 per barge.

the material for use as an abrasive. The Navy is also studying whether the unit can be made smaller and adapted for use aboard the next generation of carriers. Personnel also stated that plasma arc technology will result in life-cycle savings of about \$25 million over 20-years. The Program Office is represented on the Naval Sea Systems Command, Office of Naval Research, overarching integrated product team for the plasma arc destruction system and its application on CVN-77 and CVNX-Class carriers.

Consolidating Hazardous Waste. The Fleet Industrial Supply Center, Norfolk, Virginia, won the Hammer Award⁶ in 1998 for:

- consolidating hazardous materials that are no longer needed aboard ship or at a shore facility into one central location, and
- making those materials available to other Naval personnel at no cost before the shelf life of the material expired.

Fleet Industrial Supply Center personnel stated that the consolidation of unneeded hazardous material resulted in a cost avoidance in excess of \$12 million over a 3-year period by avoiding the purchase of additional hazardous material.

⁶The Vice President gives the Hammer Award to individuals, agencies, and companies that promote efficiency and economy in Government.

A. Environmental Life-Cycle Costs

The Aircraft Carrier Program Office did not develop a total life-cycle cost estimate to establish its total ownership cost objective and threshold to include environmental costs for demilitarization, disposal, and associated cleanup of the *Nimitz*-Class carriers at the end of their useful life and for applicable ship alterations and overhauls. The Program Office did not develop a total life-cycle estimate because:

- the Program Manager maintains that the requirement did not apply because the program started full-rate production before the DoD 5000 series of directives and regulations existed; and
- the Program Office intended to develop the total life-cycle cost estimate for the *Nimitz*-Class Program concurrently with Navy efforts to revise the total life-cycle cost estimate for the Future Carrier Program⁷ and Newport News Shipbuilding efforts to develop a cost estimating model.

Without a total life-cycle cost estimate, the Program Office can not accurately baseline the *Nimitz*-Class program costs to establish a total ownership cost objective and threshold as part of the Navy's long-term cost reduction initiative.⁸ Further, the Program Office would not be able to accurately report the liability for demilitarization, disposal, and environmental cleanup costs for the *Nimitz* Class in the Navy's financial statements when DoD guidance for reporting those costs in financial statements becomes available.

Life-Cycle Cost Estimating and Reporting Guidance

DoD Guidance. DoD Regulation 5000.2-R, Change 4, May 11, 1999;⁹ DoD Manual 5000.4-M, "Department of Defense Cost Analysis Guidance and Procedures," December 1992; the Defense Acquisition Deskbook, and Under Secretary of Defense for Acquisition and Technology¹⁰ memorandum, November 13, 1998, provide life-cycle cost estimating and reporting guidance.

⁷The Future Carrier Program (CVNX) is an Acquisition Category ID program, currently in the Concept Exploration phase. Milestone I, Approval to Begin a New Acquisition Program, decision is scheduled for April 2000.

⁸Reduction of total ownership cost is an initiative of the Defense Systems Affordability Council.

⁹DoD initially issued DoD Regulation 5000.2-R on March 15, 1996, canceling DoD Instruction 5000.2, "Defense Acquisition Management Policies and Procedures," February 23, 1991. Both the Regulation and the Instruction included a requirement to estimate life-cycle costs.

¹⁰Renamed Under Secretary of Defense for Acquisition, Technology, and Logistics in October 1999.

DoD Regulation. DoD Regulation 5000.2-R requires that life-cycle cost estimates be comprehensive and identify all costs for the development, production, and operation of a system regardless of the source of funding.

DoD Manual. DoD Manual 5000.4-M provides guidance on the content of a cost analysis requirements description. Program offices and DoD Component cost analysis teams use the cost analysis requirements description as the basis for preparing program life-cycle cost estimates.

Defense Acquisition Deskbook. The Defense Acquisition Deskbook addresses life-cycle estimates in its "Scope of Life-Cycle Cost Estimates" and the "Cost Estimate Documentation Guidelines" sections. Specifically, the Deskbook states that life-cycle cost estimates should:

- cover the entire planned life of a program and include all cost categories (concept exploration, if applicable; demonstration and validation; engineering and manufacturing development; production and deployment; operations and support; and demilitarization and disposal) and all appropriation accounts; and
- address environmental costs (examples of such costs include pollution prevention, hazardous waste management, demilitarization and disposal of equipment, and cleanup of real estate).

Under Secretary of Defense Memorandum. The Under Secretary of Defense for Acquisition and Technology Memorandum, "Definition of Total Ownership Costs, Life Cycle Cost, and the Responsibilities of Program Managers," November 13, 1998, defines total ownership cost as life-cycle cost. Life-cycle cost includes not only acquisition program direct costs, but also the indirect costs attributable to the acquisition program, which include the costs related to planning, managing, and executing a program over its full life and common support items and systems.

Navy Policy. Secretary of the Navy Instruction 5000.2B, "Implementation of Mandatory Procedures for Major and Non-Major Defense Acquisition Programs and Major and Non-Major Information Technology Acquisition Programs," December 6, 1996,¹¹ and the Assistant Secretary of the Navy (Research, Development, and Acquisition) memorandum, "Implementation of Total Ownership Cost (TOC) Baselines in the Department of the Navy," May 5, 1998, provide life-cycle cost estimating and reporting guidance for the Navy.

Navy Instruction. Secretary of the Navy Instruction 5000.2B defines life-cycle ownership cost to include the cost to develop, acquire, operate,

¹¹Secretary of the Navy Instruction 5000.2B amplifies DoD Regulation 5000.2-R. Appendix VII, "Glossary," of the Instruction defines terms used in the Instruction but not found in the DoD Regulation 5000.2-R glossary.

support, and dispose of the system and the related logistics infrastructure. The Instruction designates the Naval Center for Cost Analysis (the Naval Center) as the Navy organization responsible for preparing Acquisition Category IC independent cost estimates. The Naval Center participates in developing life-cycle cost estimates and establishes policy on cost analyses. However, the Director of the Naval Center stated that the Naval Center has yet to establish Navy policy requiring the cost analyses to include demilitarization and disposal data. The Instruction also requires program offices to prepare a program life-cycle cost estimate at the initial program milestone and later milestone reviews and a cost analysis requirements description before the preparation of the program life-cycle cost estimate.

Assistant Secretary of the Navy Memorandum. In the May 5, 1998, memorandum, the Assistant Secretary of the Navy directed each Navy acquisition category program to revise its current approved acquisition program baseline and to establish a total ownership cost objective and threshold as part of the Navy's cost reduction initiative. Program offices were to provide total ownership cost reduction plans to the appropriate milestone decision authority for Acquisition Category I programs by December 31, 1998, and for Non-Acquisition Category programs by June 30, 1999.¹²

Federal Financial Accounting Standards Guidance. The Statement of Federal Financial Accounting Standards (SFFAS) No. 6, "Accounting for Property, Plant, and Equipment," requires that Federal agencies, beginning in FY 1998, recognize a liability in agency financial statements for cleanup costs associated with Federal property, plant, and equipment, including weapons systems, when the agency places the property, plant, and equipment into service. SFFAS No. 6 defines cleanup costs as those costs to remove, contain, or dispose, or any combination of the three, of hazardous waste from material or property that is permanently or temporarily shut down. In addition, cleanup costs include decontamination, decommissioning, site restoring, site monitoring, and closure and post-closure costs. As yet, DoD has not provided guidance to the Military Departments for reporting on the environmental liability.

Nimitz-Class Life-Cycle Cost Estimate

The Aircraft Carrier Program Office did not develop a total life-cycle cost estimate to establish its total ownership cost objective and threshold to include environmental costs for demilitarization, disposal, and associated cleanup of the *Nimitz-Class* carriers at the end of their useful life and for applicable ship alterations and overhauls. Further, the Program Office needs the total life-cycle cost estimate to formulate its total ownership cost management plan.

¹²Naval Sea Systems Command letter 7700, Ser 017/15, dated March 26, 1998, provided additional guidance on developing total ownership cost reduction plans and reporting requirements on total ownership cost reduction efforts.

Demilitarization, Disposal, and Environmental Cleanup. Although the Aircraft Carrier Program Office did not prepare a demilitarization and disposal plan for the *Nimitz* Class, the Naval Sea Systems Command has a nuclear-powered ship inactivation, disposal, and recycling program, "U.S. Naval Nuclear Powered Ship Inactivation, Disposal, and Recycling," April 1999. The program addresses demilitarization and disposal of cruisers and submarines because those are the only nuclear-powered vessels currently being inactivated; however, it does not address the *Nimitz*-Class carriers. The first *Nimitz*-Class carrier inactivation is scheduled for FY 2025. The Navy plans to adapt the technology and processes associated with the current nuclear-powered ship inactivation, disposal, and recycling program to *Nimitz*-Class carriers.

During the audit, CVN-68, the first *Nimitz*-Class carrier, was undergoing its mid-life refueling overhaul in Newport News Shipyard. In FY 2001 and FY 2005, CVN-69 and CVN-70, respectively, will also undergo mid-life refueling complex overhauls. The General Accounting Office Report No. NSIAD-98-1, "Navy Aircraft Carriers: Cost-Effectiveness of Conventionally and Nuclear-Powered Carriers," August 1998, estimates that mid-life modernization¹³ costs for a nuclear-powered carrier was about \$2.4 billion in FY 1997 dollars. The Report also estimated that the cost to inactivate and dispose of CVN-68, the first *Nimitz*-Class carrier, would be between \$819 million and \$955 million. The disposal costs were based on an estimate that the Navy provided in FY 1994 and updated in FY 1996.

In response to a draft of the Report, the Office of the Under Secretary of Defense for Acquisition and Technology issued a memorandum dated March 30, 1998, that provided a new Navy estimate of life-cycle cost which was about 40 percent less than the Navy's 1996 estimate. The Report states that most of the reductions in the Navy's new estimate were attributed to a large learning curve and to new technologies. The General Accounting Office did not use the newer estimate because the Navy did not provide any evidence to support the significant changes to the 1996 estimate. The Report concludes that it was highly unlikely that any significant cost reductions could be obtained from learning in an episodic activity such as the refueling or inactivations of a *Nimitz*-Class carrier. Further, over the past 20 years, the methods and technologies used have remained fairly constant.

The Aircraft Carrier Program Office estimated that demilitarization and disposal costs of a *Nimitz*-Class carrier would be about \$500 million at the end of its useful life. The estimate was based on the cost to inactivate a *Nimitz*-Class carrier after the mid-life refueling and overhaul of eight *Nimitz*-Class carriers and at the end of the life cycle in 2025 for the *USS Nimitz*.

Total Ownership Costs. In response to the Assistant Secretary of the Navy's memorandum of May 5, 1998, the Program Executive Office for Aircraft

¹³The mid-life modernization represents the nuclear refueling complex overhaul for nuclear carriers.

Carriers submitted the "Total Ownership Cost Reduction Management Plan," (the Plan) on December 15, 1998. The Plan is applicable to future U.S. Navy aircraft carriers including CVN-77, the last *Nimitz*-Class carrier under development, and the CVNX Class.¹⁴ The Plan stated that the Program Executive Office would submit a separate plan for "Active Carriers"¹⁵ no later than June 30, 1999. In September 1999, the Program Executive Office updated the Plan to include active carriers. The Plan contains a total life-cycle cost estimate that includes the cost to conduct a mid-life overhaul and to inactivate and dispose of a *Nimitz*-Class carrier and is applicable to all U.S. Navy aircraft carriers under the cognizance of the Program Executive Office. The Aircraft Carrier Program Office stated that it did not complete the total life-cycle cost estimate before the total ownership cost reduction management plan requirement because the Navy Acquisition Executive did not hold the *Nimitz*-Class Program to the DoD 5000 series of directives and regulations and because the *Nimitz* Class was in full-rate production before the DoD 5000 series existed. The Program Office developed the total life-cycle cost estimate for the *Nimitz*-Class concurrently with Navy efforts to revise the total life-cycle cost estimate for the Future Carrier Program and Newport News Shipbuilding efforts to develop a cost estimating model.

Estimating and Reporting DoD Liability for Ship Disposal and Removal of Hazardous Materials

The General Accounting Office Report No. AIMD-97-135R, "Financial Management: Factors to Consider in Estimating Environmental Liabilities for Removing Hazardous Materials in Nuclear Submarines and Ships," August 7, 1997, states that:

- DoD did not implement SFFAS No. 6, which requires recognizing and reporting liabilities such as those associated with nuclear ship disposal.
- DoD did not provide implementation guidance to the Military Departments.
- Navy management information systems contain data that can be used to estimate an environmental liability as a portion of the costs to inactivate and dispose of nuclear ships.

¹⁴The CVNX Class, an Acquisition Category ID program, is in the Concept Exploration phase. Milestone I is scheduled for April 2000.

¹⁵The Program Executive Office for Aircraft Carriers considered *Nimitz*-Class Carriers CVN-68 through CVN-76 as Non-Acquisition Category "Active Carriers."

-
- Navy environmental liability will be significant regardless of whether the Navy reports environmental liability based solely on the environmental costs associated with the cleanup and disposal of ships or total disposal costs.
 - Navy officials estimated environmental costs that ranged from \$807 million to \$942 million in FY 1996 dollars to inactivate and dispose of the first *Nimitz*-Class carrier. The Navy expected that as it gained experience in defueling during the refueling cycles of *Nimitz*-Class carriers, the cost to inactivate and dispose of the tenth *Nimitz*-Class carrier could be reduced to about \$500 million. The General Accounting Office stated that the Navy had not provided a basis for them to assess the reasonableness of the new estimate; although, as the Navy gains experience in the inactivation and disposal of aircraft carriers, cost efficiencies could occur.
 - Disclosure of the Navy environmental liability could provide important information for congressional and other budget decisionmakers on the annual impact of ship inactivations that have occurred or are expected to occur during various budget periods, including those outside the Future Years Defense Program.

The report also states that Congress, in the National Defense Authorization Act for FY 1995, required DoD to develop life-cycle environmental costs, including demilitarization and disposal costs, for major defense acquisition programs. Beginning with FY 1998, Federal accounting standards require that financial statements contain information about the extent of an agency's environmental liabilities for the cleanup of hazardous materials related to Federal agencies' property, plant, and equipment. For DoD, mission assets such as submarines, ships, aircraft, and combat vehicles are a major category of property, plant, and equipment.

DoD Environmental Line Item Liability

The Inspector General, DoD, Report No. 99-209, "Data Supporting the DoD Environmental Line Item Liability on the FY 1998 Financial Statements," July 9, 1999, evaluated the reliability and completeness of the data used to calculate the DoD environmental liability for FY 1998. The report states that:

- the data supporting the environmental line item liability stated in the Balance Sheet were not reliable or complete;
- DoD had not provided criteria for reporting environmental liabilities;
- the data were not adequately supported;
- the computer model used to prepare cleanup cost estimates was materially inaccurate;

-
- the reported liability did not include amounts for weapon system disposal, overseas environmental liabilities, or disposal of unexploded ordnance and ammunition; and
 - proposed guidance on environmental liabilities in DoD Regulation 7000.14-R, the "DoD Financial Management Regulation," includes questionable guidance on recognition of dollar amounts and the timing of environmental and disposal liabilities.

The report recommended that the Under Secretary of Defense (Comptroller) amend DoD Regulation 7000.14-R to require that environmental and disposal liabilities included amounts for weapon system disposal, overseas environmental cleanup, and disposal of unexploded ordnance and ammunition. The report also recommended that the Defense Finance and Accounting Service report material weaknesses related to reporting environmental liabilities in its Annual Statement of Assurance. The Under Secretary of Defense did not agree with the recommendation; however, he recognized the need for additional guidance on environmental and disposal liabilities and prepared two draft chapters of DoD Regulation 7000.14-R addressing environmental and disposal liabilities.

Future Navy Financial Statements

Without a life-cycle cost estimate that includes demilitarization, disposal, and environmental cleanup costs for the *Nimitz*-Class carriers, the Aircraft Carrier Program Office could not accurately report the liability for environmental cleanup and disposal costs in future Navy financial statements. Because the *Nimitz* Class is a fielded system, the Navy is required to report the environmental cleanup and disposal cost liability in accordance with SFFAS No. 6 when DoD guidance becomes available. Although demilitarization, disposal, and environmental cleanup costs may not be highly significant in terms of percentage of system life-cycle costs, they should not be ignored. Cumulatively, the environmental cleanup and disposal costs for Navy weapon systems are likely to represent a material value on Navy and DoD-wide consolidated financial statements.

Management Comments on the Finding and Audit Responses

Summaries of management comments on the finding and our responses are in Appendix C.

Recommendation and Management Comments

A. We recommend that the Program Manager for Aircraft Carriers develop a total life-cycle cost estimate that includes environmental costs for demilitarization, disposal, and associated cleanup of the *Nimitz*-Class carriers at the end of their useful life and for ship alterations and overhauls for the *Nimitz*-Class carriers in annual total ownership cost updates.

Management Comments. The Deputy Assistant Secretary of the Navy for Planning, Programming, and Resources, Office of the Assistant Secretary of the Navy (Research, Development, and Acquisition), concurred and stated that the Navy developed a total life-cycle cost estimate for *Nimitz*-Class carriers. On September 17, 1999, the Program Executive Officer for Aircraft Carriers signed the "Program Executive Office for Aircraft Carriers Total Ownership Cost (TOC) Reduction Management Plan-Revision A," which includes data for in-service aircraft carriers. The Deputy considered action on the recommendation to be complete. The complete text is in the Management Comments section of this report.

B. Programmatic Environmental, Safety, and Health Evaluation

The Aircraft Carrier Program Office had not developed a programmatic environmental, safety, and health evaluation (PESHE) that included:

- a strategy for meeting environmental, safety, and health requirements; identified demilitarization and disposal requirements;
- program environmental responsibilities; and
- a methodology to track progress throughout the acquisition life-cycle of the *Nimitz*-Class to include ship alterations and overhauls.

The Program Office did not develop a PESHE because it maintains that the DoD 5000 series of directives and regulations did not apply as the program started full-rate production before the DoD 5000 series existed. Without the PESHE, the Program Office cannot ensure that it is aware of the impact of environmental, safety, and health issues on mission and cost and may also be forgoing opportunities to further reduce environmental life-cycle costs over the life span of the *Nimitz* Class.

Environmental, Safety, and Health Evaluation Policy

DoD Regulation 5000.2-R, Change 4, May 11, 1999,¹⁶ requires that all programs, regardless of acquisition category, conduct environmental, safety, and health analyses to integrate environmental, safety, and health issues into the system engineering process. The analyses must support the development of a PESHE that the program office includes in the acquisition strategy. The program manager must initiate the PESHE at the earliest possible time, usually in support of a program initiation decision (Milestone I), and must update the evaluation throughout the life cycle of the program. Acquisition managers use the PESHE to do the following:

- describe the program manager's strategy for meeting environmental, safety, and health requirements;
- establish program responsibilities; and
- identify how a program manager will track progress.

¹⁶DoD initially issued DoD Regulation 5000.2-R on March 15, 1996, canceling DoD Instruction 5000.2, "Defense Acquisition Management Policies and Procedures," February 23, 1991. Both the Regulation and the Instruction included the environmental, safety, and health evaluation policy.

Environmental, Safety, and Health Evaluation

The Aircraft Carrier Program Office and the Future Carriers Program Office are involved in developing an environmental, safety, and health integration tool for the CVNX Class. The tool will describe the Program Office strategy for meeting PESHE requirements, establish responsibilities, and identify how the Program Office will track progress for the CVNX Class. The Aircraft Carrier Program Office did not previously prepare a PESHE or related document because the Program Manager maintains that the *Nimitz*-Class Program full-rate production decision predated the DoD 5000 series of directives and regulations. However, the Program Executive Office approved the CVN-77 Acquisition Plan No. NAVSEA 98-002, on February 3, 1998, that requires an Environmental Safety, and Health Plan. Section 5.10 of the Acquisition Plan, states that an Environmental, Safety, and Health Plan will be developed that will provide for a CVN-77 PESHE in accordance with the requirements of DoD Regulation 5000.2-R.

As of October 1999, the Program Office is working with the Future Carrier Program Office Environmental, Safety, and Health Integrated Product Team to develop environmental, safety, and health baselines associated with the *Nimitz*-Class carriers for an environmental, safety, and health integration tool for the CVNX Class. By necessity the CVNX-Class environmental, safety, and health analysis for the tool must include all carriers, *Nimitz*-Class modernization programs, and legacy platforms.

Integrated Product Team. The Future Carrier Program has begun to form an Environmental, Safety, and Health Integrated Product Team (the Team) to:

- identify and evaluate environmental, safety, and health requirements and related risk;
- propose preventative, mitigating, and other associated life cycle beneficial actions; and
- develop and maintain PESHE documentation for all future Navy carriers, including CVN-77.

The Team will consist of a core leadership team plus other representatives from the Navy, DoD, contractor support, and Newport News Shipbuilding to address PESHE and operational needs of the future carrier fleet. In March 1999, team members began work to develop an environmental, safety, and health integration tool for the CVNX Class to meet PESHE requirements for all future Navy carriers, including CVN-77.

Environmental, Safety, and Health Integration Tool. The Future Carrier Program Office stated that the environmental, safety, and health integration tool for the CVNX Class will describe the program manager's strategy for meeting the PESHE requirements in DoD Regulation 5000.2-R. The tool will be an on-line living document for any class of carrier and will discuss how to handle ship alterations, disposal, assessments of new technology, and provide related

environmental information. The Future Carrier Program Office believes that Section 9, "Environmental, Safety, and Health during Production, Fielding, Deployment, and Operational Support (Phase 3),"¹⁷ of the tool can be used as the *Nimitz*-Class environmental management plan for the remainder of the *Nimitz*-Class life cycle; however, the Team was still collecting data for Section 9 as of October 1999. The Future Carrier Program Office is primarily focused on preparing documentation for the Future Carrier Program Milestone I decision review in April 2000.

Benefits of Environmental, Safety, and Health Evaluation

When program managers perform the analyses for the PESHE, they gain timely information on the potential environmental, safety, and health effects of developing, fielding, storing, demilitarization, and disposing of their weapons system. The information is critical because any unforeseen environmental, safety, or health effects that violate local, state, or Federal law could cause lengthy program delays and affect mission and program cost. Moreover, negative effects may lessen opportunities to further reduce maintenance-process environmental life-cycle costs over the extended life span of the *Nimitz*-Class carriers, including ship alterations and program upgrades, as appropriate. Therefore, the program manager must analyze and document all possible programmatic actions and update the evaluation throughout the program's life cycle.

Recommendation and Management Comments

B. We recommend that the Program Manager for Aircraft Carriers prepare and update annually, as appropriate, a *Nimitz*-Class Nuclear Aircraft Carrier Program environmental management plan that addresses the strategy for meeting environmental safety, and health requirements; identifies demilitarization and disposal requirements; establishes program environmental responsibilities; and identifies a methodology to track progress for the remainder of the program's life cycle to include ship alterations and overhauls.

Management Comments. The Deputy Assistant Secretary of the Navy for Planning, Programming, and Resources, Office of the Assistant Secretary of the Navy (Research, Development, and Acquisition), concurred and stated that the Program Manager for Aircraft Carriers will develop a *Nimitz*-Class environmental management plan as part of the CVNX Environmental, Safety, and Health Integration Tool (the Tool). The first draft of the Tool is scheduled to be completed by April 30, 2000. The complete text is in the Management Comments section of this report.

¹⁷Section 9 data will be developed from in-service carrier data to include the *Nimitz* Class.

Appendix A. Audit Process

Scope and Methodology

We conducted this audit from November 1998 through July 1999 and reviewed documentation dated April 1993 through July 1999. To accomplish the audit objective, we took the following steps:

- discussed the issues relating to DoD environmental management and the associated acquisition strategy with Government and contractor personnel;
- assessed whether the Aircraft Carrier Program Office implemented the DoD environmental management process in accordance with DoD Regulation 5000.2-R, "Mandatory Procedures for Major Defense Acquisition Programs (MDAPs) and Major Automated Information System (MAIS) Acquisition Programs," Change 4, May 11, 1999;
- reviewed life-cycle costs of the *Nimitz* Class contained in General Accounting Office Report No. NSIAD-98-1 to determine whether the Program Office included environmental costs;
- evaluated Supervisor of Shipbuilding Newport News, Virginia, involvement to reduce life-cycle environmental costs and liability while improving environmental quality and program performance;
- reviewed the contractors' environmental program for the *Nimitz* Class and reviewed available supporting documentation;
- determined whether the Aircraft Carrier Program Office had adequate funding to test alternative environmental technologies to reduce pollution;
- determined whether the Aircraft Carrier Program Office searched for opportunities to form partnerships for environmental projects, environmental alternative test and evaluation, and validation testing;
- determined whether the Aircraft Carrier Program Office was aware of the environmental management process; and
- reviewed the contractor logistics support process to reduce environmental pollution for the *Nimitz* Class.

Auditing Standards. We conducted this program audit in accordance with auditing standards issued by the Comptroller General of the United States, as implemented by the Inspector General, DoD. We included such tests of management controls as we deemed necessary.

Use of Computer-Processed Data. We did not rely on computer-processed data to develop conclusions on this audit.

Contacts During the Audit. We visited or contacted individuals and organizations within DoD and the Newport News Shipbuilding, Newport News, Virginia. Further details are available on request.

DoD-Wide Corporate-Level Government Performance and Results Act Goals. In response to the Government Performance and Results Act, DoD established 2 DoD-wide corporate-level goals and 7 subordinate performance goals. This report pertains to achievement of the following corporate-level goal and subordinate performance goal.

Corporate-level Goal 2: Prepare now for an uncertain future by pursuing a focused modernization effort that maintains U.S. qualitative superiority in key warfighting capabilities. Transform the force by exploiting the Revolution in Military Affairs, and reengineer the Department to achieve a 21st century infrastructure. **Performance Goal 2.4:** Meet combat forces' needs smarter and faster, with products and services that work better and cost less, by improving the efficiency of the DoD acquisition processes. (00-DoD-2.4)

DoD Functional Area Reform Goals. Most major DoD functional areas have also established performance improvement reform objectives and goals. This report pertains to achievement of the following acquisition functional issue area objective and goal.

Objective: Fostering Partnerships. **Goal:** Reduce total release of toxic chemicals by 20 percent. (ACQ-2.4)

General Accounting Office High-Risk Area. The General Accounting Office has identified several high-risk areas in DoD. This report provides coverage of the Defense Weapons Systems Acquisition high-risk area.

Management Control Program Review

The DoD Directive 5010.38, "Management Control (MC) Program," August 26, 1996, requires DoD managers to implement a comprehensive system of management controls that provides reasonable assurance that programs are operating as intended and to evaluate the adequacy of the controls.

Scope of Review of the Management Control Program. In accordance with DoD Directive 5000.1, "Defense Acquisition," March 15, 1996, and DoD Regulation 5000.2-R, acquisition managers are to use program cost, schedule, and performance parameters as control objectives to implement the requirements of DoD Directive 5010.38. Accordingly, we limited our review to management controls directly related to the hazardous material management of the *Nimitz* Class. Because we did not identify a material weakness, we did not assess management's self-evaluation.

Adequacy of Management Controls. Management controls were adequate in that we did not identify any material management control weakness applicable to the audit objective.

Summary of Prior Coverage

During the last 5 years, the General Accounting Office; the Inspector General, DoD; and the Military Department audit agencies have not issued reports specifically addressing the adequacy of planning and providing for the reduction and control of hazardous materials for the *Nimitz* Class. However, the Inspector General, DoD, recently issued four final reports that address hazardous material management for major Defense systems and a final report that addresses reporting environmental and disposal liabilities.

Inspector General, DoD, Report No. 00-012, "Hazardous Material Management for the F-15 Aircraft Program," October 15, 1999.

Inspector General, DoD, Report No. 99-242, "Hazardous Material Management for the Black Hawk Helicopter Program," August 23, 1999.

Inspector General, DoD, Report No. 99-221, "Hazardous Material Management for the T-45 Undergraduate Jet Pilot Training System," July 21, 1999.

Inspector General, DoD, Report No. 99-177, "Hazardous Material Management for the C/KC-135 Stratotanker Aircraft," June 4, 1999.

Inspector General, DoD, Report No. 99-160, "Hazardous Material Management on the Grizzly Program," May 17, 1999.

Inspector General, DoD, Report No. 99-209, "Data Supporting the DoD Environmental Line Item Liability on the FY 1998 Financial Statements," July 9, 1999.

Appendix B. Definitions of Technical Terms

Acquisition Category. An acquisition category is an attribute of an acquisition program that determines the program's level of review, decision authority, and applicable procedures. The acquisition categories consist of I, major Defense acquisition programs; IA, major automated information systems; II, major systems; and III, all other acquisition programs.

Demilitarization. Demilitarization is part of the disposal process and is the act of deactivating or rendering a system inoperable by destroying its inherent military offensive or defensive advantage.

Disposal. Disposal is the process of transferring, donating, selling, abandoning, or destroying a system.

Hazardous Material. Hazardous material is any waste that because of its quantity; toxicity; corrosiveness; flammability; or physical, chemical, or infectious characteristics may:

- cause or significantly contribute to an increase in mortality or an increase in a serious irreversible or incapacitating reversible illness; or
- pose a substantial present or potential hazard to human health or the environment when the waste is improperly treated, stored, transported, or disposed of.

Integrated Product Team. An integrated product team is a group of selected individuals representing multiple disciplines formed to produce a specific product or service. The individuals selected have mutual as well as individual accountability; contribute to integrated, concurrent decisionmaking; and are empowered within defined limits to decide and act to ensure the realization of the specific product or service.

Overhaul. An overhaul is a major ship availability established for general maintenance and alterations at a naval shipyard or other shore-based depot-level repair activity. During this period, the ship generally undergoes the installation of alterations and modifications to update its capabilities and large-scale maintenance that cannot be undertaken at other times.

Recapitalization. Recapitalization is the modernization of weapons and equipment.

Ship Alteration. A ship alteration is any change in the hull, machinery, equipment, or fittings which involves change in design, materials, number, location, or relationship of the component parts of any assembly.

Total Ownership Cost. Total ownership cost is the cost associated with the research, development, procurement, operation, logistical support and disposal of an individual weapon system, including the total supporting infrastructure that

plans, manages, and executes the weapon system program over its full life. Total ownership cost also includes the cost of common support items and systems that are incurred because of the introduction of that weapon system. However, total ownership cost does not include Navy infrastructure costs that are not affected by the individual weapon systems' development, introduction, deployment or operations.

Appendix C. Audit Responses to Navy Comments Concerning the Report

Our detailed responses to the comments from the Deputy Assistant Secretary of the Navy for Planning, Programming, and Resources, Office of the Assistant Secretary of the Navy (Research, Development, and Acquisition), on statements in finding A of the draft report follows. The complete text of those comments is in the Management Comments section of this report.

Management Comments. The Deputy Assistant Secretary of the Navy for Planning, Programming, and Resources provided comments that specifically addressed the total life-cycle cost estimate for the *Nimitz*-Class Program; the demilitarization and disposal of *Nimitz*-Class carriers; the demilitarization and disposal cost estimate for a *Nimitz*-Class carrier; the Total Ownership Cost Reduction Management Plan; the General Accounting Office estimate for inactivation and disposal of the first *Nimitz*-Class carrier; and reporting the liability for environmental cleanup and disposal costs in future Navy financial statements. The following discusses those specific comments and the audit response.

Total Life-Cycle Cost Estimate. The Deputy stated that the draft report states that the Aircraft Carrier Program Office did not develop a total life-cycle cost estimate to establish its total ownership cost objective and threshold to include environmental costs for demilitarization, disposal, and associated cleanup of the *Nimitz*-Class carriers at the end of their useful life and for applicable ship alterations and overhauls. He noted that, since the issuance of the draft report, the Navy has developed a total life-cycle cost estimate for a *Nimitz*-Class carrier. The estimate includes the cost for ship alterations, inactivation, and disposal and all environmental costs to be incurred during ship alterations, demilitarization, and disposal.

Audit Response. We updated the discussion section of the report to indicate that the Navy has developed a total life-cycle cost estimate for a *Nimitz*-Class carrier.

Demilitarization and Disposal of *Nimitz*-Class Carriers. The Deputy stated that the draft report states that the program addresses demilitarization and disposal of cruisers and submarines because those are the only nuclear vessels currently being inactivated; however, it does not address the *Nimitz*-Class carriers. Naval Sea Systems Command personnel stated that the Navy will adapt its demilitarization and disposal program to include defueling, recycling, and disposal of *Nimitz*-Class carriers. He suggested that, because the Navy plans to adapt the existing inactivation, recycling, and disposal program to *Nimitz*-Class carriers, the statement should be revised to address the Navy's planned action instead of referencing a statement by Naval Sea Systems Command personnel. He also recommended stating that the first *Nimitz*-Class carrier inactivation is scheduled for FY 2025.

Audit Response. We revised the report to address the Navy plans to adapt the existing inactivation, recycling, and disposal program to *Nimitz*-Class carriers and to inactivate the first *Nimitz*-Class carrier in FY 2025.

Demilitarization and Disposal Cost Estimate. The Deputy stated that the draft report states that personnel from the Nuclear Propulsion Directorate stated that the estimate [demilitarization and disposal cost estimate] was based on the cost to inactivate a *Nimitz*-Class carrier after the mid-life refueling and overhaul and at the end of its life cycle. He suggested that the statement not be attributed to specific Navy personnel and provided revisions to the statement that specified that the estimate was based on the cost to inactivate a *Nimitz*-Class carrier after the mid-life refueling and overhaul of eight *Nimitz*-Class carriers and at the end of the life cycle in 2025 for the *USS Nimitz*.

Audit Response. We revised the report to indicate that the demilitarization and disposal cost estimate was based on the cost to inactivate a *Nimitz*-Class carrier after the mid-life refueling and overhaul of eight *Nimitz*-Class carriers and at the end of the life cycle in 2025 for the *USS Nimitz*.

Total Ownership Cost Reduction Management Plan. The Deputy stated that the draft report states that, as of August 1999, the Program Executive Office had not completed the total ownership cost management plan for active carriers. Further, the Aircraft Carrier Program Office had not prepared its total life-cycle cost estimate, which includes the costs to inactivate and dispose of the *Nimitz* Class at the end of its life cycle and any ship alterations or mid-life overhauls, that the Program Executive Office needs to complete the total ownership cost management plan for active carriers. He stated that the Program Executive Office for Aircraft Carriers updated the total ownership cost management plan to include active carriers and signed the plan on September 17, 1999. The plan contains a total life-cycle cost estimate that includes the cost to conduct a mid-life overhaul and to inactivate and dispose of a *Nimitz* Class carrier.

Audit Response. We revised the report to indicate that the Program Executive Office for Aircraft Carriers updated the total ownership cost management plan to include active carriers in September 1999 and that the plan contains a total life-cycle cost estimate that includes the cost to conduct a mid-life overhaul and to inactivate and dispose of a *Nimitz* Class carrier.

General Accounting Office Estimate. The Deputy addressed a statement in the draft report concerning an excerpt from General Accounting Office Report No. AIMD-97-135R, "Financial Management: Factors to Consider in Estimating Environmental Liabilities for Removing Hazardous Materials in Nuclear Submarines and Ships," August 7, 1997. The statement states, in part, that Navy officials estimated environmental costs that ranged from \$807 million to \$942 million in FY 1996 dollars to inactivate and dispose of the first *Nimitz*-Class carrier. The Navy expected that as it gained experience in defueling during the refueling cycles of *Nimitz*-Class carriers, the cost to inactivate and dispose of the tenth *Nimitz*-Class carrier could be reduced to about \$500 million. The Deputy stated that the statement did not portray the

Navy's most current estimate of the life-cycle costs for nuclear carriers and cited an Under Secretary of Defense for Acquisition and Technology memorandum, dated March 30, 1998. The memorandum states, in part, that the General Accounting Office estimate for a nuclear carrier inactivation is overstated by \$400 million per ship. The Navy's current estimate of \$500 million per ship is based on planning for the FY 1998 *USS Nimitz* refueling overhaul and on cost data from defueling and inactivating other classes of nuclear-powered ships.

Audit Response. In the report, we address the Under Secretary of Defense for Acquisition and Technology memorandum, dated March 30, 1998, and state that the memorandum responded to General Accounting Office Report No. NSIAD-98-1, "Navy Aircraft Carriers: Cost-Effectiveness of Conventionally and Nuclear-Powered Carriers," August 1998, that estimates the cost to inactivate and dispose of CVN-68, the first *Nimitz*-Class carrier, to be between \$819 million and \$955 million. We also stated that the Aircraft Carrier Program Office estimated that demilitarization and disposal costs of a *Nimitz*-Class carrier would be about \$500 million at the end of its useful life.

Environmental Cleanup and Disposal Cost Liability. The Deputy stated that the draft report states that, without a life-cycle cost estimate that includes demilitarization, disposal, and environmental cleanup costs for the *Nimitz*-Class carriers, the Aircraft Carrier Program Office could not accurately report the liability for environmental cleanup and disposal costs in future Navy financial statements. He stated that, for the *Nimitz*-Class carrier, the estimated cost for inactivation and disposal is \$500 million (FY 1998), inclusive of environmental cleanup costs. The Navy could use the \$500 million amount in financial statements if DoD implements the requirement to recognize and report environmental and disposal cost liabilities. However, as stated in the draft report, DoD has neither implemented the requirement to recognize and report environmental liabilities nor defined the constituent costs of these liabilities. Therefore, the Navy cannot provide an estimate for the liability until DoD defines what constitutes an environmental liability.

Audit Response. By having identified the estimated cost for inactivation and disposal of a *Nimitz*-Class carrier and developing a total life-cycle cost estimate for *Nimitz*-Class carriers, the Aircraft Carrier Program Office is not only ready when DoD establishes guidance for reporting the liability for environmental cleanup and disposal costs in future Navy financial statements, but it also has a benchmark for:

- determining environmental cost resource requirements for future budget submissions and
- ensuring that the *Nimitz*-Class Program incurs the lowest cost possible that is consistent with the system's cost, schedule, and performance goals while protecting human health and the environment over the system's life cycle.

Appendix D. Report Distribution

Office of the Secretary of Defense

Under Secretary of Defense for Acquisition, Technology, and Logistics
Deputy Under Secretary of Defense (Environmental Security)
Deputy Under Secretary of Defense (Logistics)
Director, Defense Logistics Studies Information Exchange
Under Secretary of Defense (Comptroller)
Deputy Chief Financial Officer
Deputy Comptroller (Program/Budget)

Department of the Army

Commander, Army Materiel Command
Assistant Secretary of the Army (Installations and Environment)
Auditor General, Department of the Army

Department of the Navy

Assistant Secretary of the Navy (Financial Management and Comptroller)
Assistant Secretary of the Navy (Research, Development, and Acquisition)
Commander, Naval Sea Systems Command
Program Executive Office for Aircraft Carriers
Program Manager for Aircraft Carriers
Supervisor of Shipbuilding Newport News
Deputy Chief of Naval Operations (Logistics)
Auditor General, Department of the Navy
Deputy Chief of Staff (Installations and Logistics), Headquarters, Marine Corps
Director, Naval Center for Cost Analysis

Department of the Air Force

Commander, Air Force Materiel Command
Assistant Secretary of the Air Force (Financial Management and Comptroller)
Auditor General, Department of the Air Force
Chairman, Joint Acquisition Sustainment Pollution Prevention Activity

Other Defense Organizations

Director, Defense Contract Audit Agency
Director, Defense Logistics Agency
Commander, Defense Contract Management Command
Commander, Defense Contract Management Command East
Commander, Defense Contract Management Command West

Other Defense Organizations (cont'd)

Director, National Security Agency
Inspector General, National Security Agency
Inspector General, Defense Intelligence Agency

Non-Defense Federal Organizations and Individuals

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

Congressional Committees and Subcommittees, Chairman and Ranking Minority Member

Senate Committee on Appropriations
Senate Subcommittee on Defense, Committee on Appropriations
Senate Committee on Armed Services
Senate Committee on Governmental Affairs
House Committee on Appropriations
House Subcommittee on Defense, Committee on Appropriations
House Committee on Armed Services
House Committee on Government Reform
House Subcommittee on Government Management, Information, and Technology,
Committee on Government Reform
House Subcommittee on National Security, Veterans Affairs, and International
Relations, Committee on Government Reform

Department of the Navy Comments



DEPARTMENT OF THE NAVY
OFFICE OF THE ASSISTANT SECRETARY
RESEARCH, DEVELOPMENT AND ACQUISITION
1000 NAVY PENTAGON
WASHINGTON DC 20350-1000

OCT 13 1999

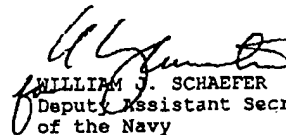
MEMORANDUM FOR DEPARTMENT OF DEFENSE ASSISTANT INSPECTOR
GENERAL FOR AUDITING

SUBJECT: DEPARTMENT OF DEFENSE INSPECTOR GENERAL (DODIG) DRAFT
AUDIT REPORT ON HAZARDOUS MATERIAL MANAGEMENT FOR THE
NIMITZ-CLASS NUCLEAR AIRCRAFT CARRIER PROGRAM (Project No.
8AE-5037.03) - INFORMATION MEMORANDUM

REFERENCE: (a) DODIG memo of 13 August 1999

ENCLOSURE: (1) Department of the Navy Comments

In response to reference (a), our comments are provided at Enclosure (1). Although we concur with the recommendations, we have clarifying comments and recommended changes to selected statements made in the report. Action on Recommendation A is complete. The Navy's Aircraft Carrier Total Ownership Cost Reduction Management Plan - Revision A, that contains the recommended data for in service aircraft carriers, was signed on 17 September 1999.


WILLIAM J. SCHAEFER
Deputy Assistant Secretary
of the Navy
Planning, Programming, and
Resources

Copy to:
ASN(FM&C) (FMO-31)
NAVSEA (SEA-00N3)
DASN (SHIPS)

Final Report
Reference

Pages i, 6,
and 8

Page 9,
Revised

NAVY RESPONSE TO
DODIG DRAFT AUDIT REPORT ON
HAZARDOUS MATERIAL MANAGEMENT FOR THE
NIMITZ-CLASS NUCLEAR AIRCRAFT CARRIER PROGRAM
PROJECT NUMBER SAR-5037.03

I. Detailed Comments to Specific Audit Points Contained in
the Draft Report

Audit Comment #1: Executive Summary, page 1, Results
paragraph, bullet 1, 1st sentence; page 6, paragraph 1, 1st
sentence; and page 8, paragraph 4.

"The Aircraft Carrier Program Office did not develop a
total life-cycle cost estimate to establish its total
ownership cost objective and threshold to include
environmental costs for demilitarization, disposal, and
associated cleanup of the Nimitz-Class carriers at the end
of their useful life and for applicable ship alteration and
overhauls."

Navy Response: Since issuance of the DoD Inspector
General's draft report, the Navy has developed a total life
cycle cost estimate for a Nimitz-Class carrier. The
estimate includes the cost for ship alterations,
inactivation and disposal (including all environmental
costs to be incurred during ship alterations,
demilitarization and disposal).

Audit Comment #2: Page 9, paragraph 1, 2nd and 3rd
sentences.

"The program addresses demilitarization and disposal
of cruisers and submarines because those are the only
nuclear vessels currently being inactivated; however, it
does not address Nimitz-Class aircraft carriers. Naval Sea
Systems Command personnel stated that the Navy will adapt
its demilitarization and disposal program to include
defueling, recycling, and disposal of Nimitz-Class
carriers."

Navy Response: Since the Navy plans to adapt the existing
inactivation, recycling, and disposal program to Nimitz-
Class carriers, it would be more appropriate to directly
state this fact rather than referring to a statement by
NAVSEA personnel. Therefore, Navy recommends changing the
statement to: "The nuclear ship inactivation and disposal

Enclosure (1)

program addresses demilitarization and disposal of cruisers and submarines because those are the only nuclear-powered ships currently being inactivated. The first Nimitz-Class carrier inactivation is scheduled for FY 2025. The Navy plans to adapt the proven technology and processes associated with the current nuclear-powered ship inactivation, recycling, and disposal program to Nimitz-Class carriers."

Audit Comment #3: Page 9, Paragraph 4, 2nd sentence.

"Personnel from the Nuclear Propulsion Directorate stated that the estimate was based on the cost to inactivate a Nimitz-Class carrier after the mid-life refueling and overhaul and at the end of its life cycle."

Navy Response: Consistent with the previous Navy response, the report should not refer to conversations with specific personnel. Therefore, recommend replacing the sentence with "The estimate was based on the cost to inactivate a Nimitz-Class carrier after the mid-life refueling and overhaul of eight Nimitz-Class carriers and at the end of the Nimitz's life in 2025."

Audit Comment #4: Page 10, paragraph 1, 8th sentence.

"As of August 1999, the Program Executive Office had not completed the total ownership cost management plan for active carriers. Further, the Aircraft Carrier Program office had not prepared its total life-cycle cost estimate, which includes the costs to inactivate and dispose of the Nimitz-Class at the end of its life cycle and any ship alterations or mid-life overhauls, that the Program Executive Office needs to complete the total ownership cost management plan for active carriers."

Navy Response: The PEO Total Ownership Cost Management Plan was updated to include active carriers and was signed by PEO Carriers on 17 September 1999. The plan includes a total life cycle cost estimate for a CVN 68 Nimitz-Class aircraft carrier, which includes costs to inactivate and dispose of the ship as well as midlife overhaul costs.

Audit Comment #5: Page 11, bullet 3.

"Navy officials estimated environmental costs that ranged from \$807 million to \$942 million in FY 1996 dollars

Page 9,
Revised

Page 10,
Revised

Page 11,
Revised

to inactivate and dispose of the first Nimitz-Class carrier. The Navy expected that as it gained experience in defueling during the refueling cycles of Nimitz-Class carriers, the cost to inactivate and dispose of the tenth Nimitz-Class carrier could be reduced to about \$500 million. The General Accounting Office stated that the Navy had not provided a basis for them to assess the reasonableness of the new estimate; although, as the Navy gains experience in the inactivation and disposal of aircraft carriers, cost efficiencies could occur."

Navy Response: Since this statement comes from a 1997 published GAO report, it does not reflect the Navy's most current estimate of life cycle costs for nuclear carriers. In a 30 March 1998 memo, the Under Secretary of Defense for Acquisition and Technology stated: "The GAO estimate for a nuclear carrier inactivation [\$807-\$942 million] is overstated by \$400 million per ship. GAO used an out-of-date 1992 rough-order-of-magnitude estimate for inactivating the lead ship (Nimitz) in FY 1998. This estimate assumed little advance planning for an efficient inactivation process and did not reflect lessons learned from conducting a series of scheduled Nimitz-Class refuelings/defuelings. The Navy's current estimate of \$500 million per ship is based on [the] careful planning [completed] for the [ongoing] FY98 Nimitz refueling overhaul (an estimate which has been reduced by over 30 percent since 1992) and on return cost data from [other classes of] nuclear ship defueling/inactivation work."

Audit comment #5: Page 12, last paragraph, 1st sentence.

"Without a life cycle cost estimate that includes demilitarization, disposal, and environmental cleanup costs for the Nimitz-Class carriers, the Aircraft Carrier Program Office could not accurately report the liability for environmental cleanup and disposal costs in future Navy financial statements."

Navy response: For a Nimitz-Class carrier, the estimated cost for inactivation and disposal is \$500 million (FY 1998), inclusive of environmental cleanup costs. The Navy could use this figure in financial statements if DoD implements the requirement to recognize and report environmental and disposal cost liabilities at a macro level. However as stated in the draft report, DOD has not implemented the requirement to recognize and report

environmental liabilities nor has DoD defined the constituent costs of these liabilities. Hence, the Navy cannot provide an estimate for the environmental liability until DOD provides a definition of what to include as an environmental liability.

II. Navy Response to Draft Report Recommendations

Recommendation A: We recommend that the Program Manager for Aircraft Carriers develop a total life-cycle cost estimate that includes environmental costs for demilitarization, disposal, and associated cleanup of the Nimitz-Class carriers at the end of their useful life and for ship alterations and overhauls for the Nimitz-Class carriers in annual total ownership cost updates.

Navy Response: Concur.

The Navy developed a total life cycle cost estimate for Nimitz-Class carriers as detailed in the response to Audit comment #1 above. The PEO Aircraft Carriers Total Ownership Cost (TOC) Reduction Management Plan - Revision A was signed on 17 September 1999. Revision A includes data for in-service aircraft carriers. Action on this recommendation is complete.

Recommendation B: We recommend that the Program Manager for Aircraft Carriers prepare and update annually, as appropriate, a Nimitz-Class Nuclear Aircraft Carrier Program environmental management plan that addresses the strategy for meeting environmental safety, and health requirements; identifies demilitarization and disposal requirements; establishes program environmental responsibilities; and identifies a methodology to track progress for the remainder of the program's life cycle to include ship alterations and overhauls.

Navy Response: Concur.

The Program Manager for Aircraft Carriers will develop a Nimitz-Class Environmental Management Plan as a part of the CVNX Environmental, Safety and Health (ESH) Integration Tool. The first draft of the ESH Integration Tool is scheduled to be completed by 30 April 2000.

Audit Team Members

The Acquisition Management Directorate, Office of the Assistant Inspector General for Auditing, DoD, prepared this report.

Thomas F. Gimble
Patricia A. Brannin
John E. Meling
Jack D. Snider
Susan J. Lippolis
Sean A. Davis
Cynthia B. Stull


INTERNET DOCUMENT INFORMATION FORM

A . Report Title: Hazardous Material Management for the NIMITZ-Class Nuclear Aircraft Carrier Program

B. DATE Report Downloaded From the Internet: 02/08/99

C. Report's Point of Contact: (Name, Organization, Address, Office Symbol, & Ph #):
OAIG-AUD (ATTN: AFTS Audit Suggestions)
Inspector General, Department of Defense
400 Army Navy Drive (Room 801)
Arlington, VA 22202-2884

D. Currently Applicable Classification Level: Unclassified

E. Distribution Statement A: Approved for Public Release

F. The foregoing information was compiled and provided by:
DTIC-OCA, Initials: __VM__ Preparation Date 02/08/99

The foregoing information should exactly correspond to the Title, Report Number, and the Date on the accompanying report document. If there are mismatches, or other questions, contact the above OCA Representative for resolution.