Audit Report

NAVY ACQUISITION OF AIR MEMBRANE DEHYDRATORS

Report No. D-2000-107 March 23, 2000

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Acronyms

LCM	Life Cycle Manager
NAVSEA	Naval Sea Systems Command

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

March 23, 2000

MEMORANDUM FOR NAVAL INSPECTOR GENERAL

SUBJECT: Audit Report on Navy Acquisition of Air Membrane Dehydrators (Report No. D2000-107)

We are providing this report for information and use. The audit was requested by Congressman Tom Allen to determine whether the Navy violated procurement regulations when procuring low-pressure air membrane dehydrators. We considered management comments on a draft of this report when preparing the final report.

The Navy comments conformed to the requirements of DoD Directive 7650.3 and left no unresolved issues. Therefore, no additional comments are required.

We appreciate the courtesies extended to the audit staff. Questions on the audit should be directed to Mr. Joseph P. Doyle at (703) 604-9349 (DSN 664-9349) (jdoyle@dodig.osd.mil) or Mr. John Yonaitis, at (703) 604-9340 (DSN 664-9340) (jyonaitis@dodig.osd.mil). See Appendix C for the report distribution. Audit team members are listed on the back cover.

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Office of the Inspector General, DoD

Report No. D-2000-107 **March 23, 2000**
(Project No. D1999-D000CK-096, Previously 9CK-5014)

Navy Acquisition of Air Membrane Dehydrators

Executive Summary

Introduction. This audit was requested by Congressman Tom Allen, on behalf of a constituent, regarding two allegations that the Supervisor of Shipbuilding, Refurbishment, and Repair, Newport News, Virginia, violated Federal Acquisition Regulations and DoD guidance when awarding contracts for air membrane dehydrators. Specifically, the allegations stated that the Navy selected a competing supplier of dehydrators on an "unadvertised sole-source basis," and that the dehydrators purchased were "not qualified by the usual Navy standards."

Objectives. The overall audit objective was to determine whether the Navy complied with applicable Federal Acquisition Regulations and DoD guidance when contracting for air membrane dehydrators. Specifically, we determined whether air membrane dehydrators were appropriately procured on a sole source basis, and were qualified by Navy standards. See Appendix A for a discussion of the audit scope and methodology.

Results. The Navy properly procured air membrane dehydrators for the carrier fleet and was justified in using other than full and open competition. In addition, the air membrane dehydrators were qualified by Navy standards and included adequate shock, vibration, and endurance testing. However, the Navy did not always use the designated Life Cycle Manager to test, qualify, and approve dehydrators installed on Navy aircraft carriers. See Part I for a discussion of audit results. See Appendix A for details on the management control program, and see Appendix B for a discussion of the allegations.

Recommendation. We recommend that the Commander, Naval Sea Systems Command, issue a message to the fleet re-stating the approval process for installation of new equipment and advising them of Life Cycle Manager responsibilities.

Management Comments. The Deputy Assistant Secretary of the Navy, Planning, Programming, and Resources partially concurred with the draft recommendation on guidance regarding the approval process for alterations. The Commander, Naval Sea Systems Command, will issue a message to the fleet re-stating the approval process for installation of new equipment and advising them of the process for delegation of Life Cycle Manager responsibility. A discussion of management comments is in the Finding section of the report and the complete text is in the Management Comments section.

Audit Response. The management comments were responsive. As a result of those comments, we clarified the draft finding and recommendation.

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Background

The audit was conducted in response to a request by Congressman Tom Allen on behalf of Howell Laboratories, Incorporated. Howell Laboratories, Incorporated, alleged that the Navy inappropriately selected a competing supplier of low-pressure air membrane dehydrators on an "unadvertised sole-source basis," and the dehydrators purchased were "not qualified by the usual Navy standards."

Development of Air Membrane Dehydrators. In 1992 the Navy, the David Taylor Research Group, Newport News Shipbuilding and Drydock Company Reparability and Maintainability group, and the Titus Company (Titus), the only known manufacturer of low-pressure air membrane dehydrators (hereafter referred to as dehydrators), developed the dehydrators to replace the inefficient desiccant dehydrators being used by the carrier fleet.

Dehydrator Acquisitions. The Navy procured 92 dehydrators for 13 aircraft carriers between February 1994 and July 1998 valued at about $3.4 million. The dehydrators consisted of a frame, monitoring gauges, and one to eight canisters containing the air membranes. Each aircraft carrier has from 6 to 12 dehydrators. The Navy procured the 92 dehydrators for use in the propulsion control air system and the ship service and electronic air systems.

Dehydrator Installations. Between April 1994 and April 1998 the Navy installed dehydrators for the propulsion control air system on all seven active *Nimitz*-Class nuclear-powered aircraft carriers, U.S.S. *Enterprise*, and the three conventional carriers. The Navy installed dehydrators for the ship service and electronic air systems on those ships between October 1995 and April 1998. The Navy scheduled dehydrator installations for the propulsion control air system and the ship service and electronic air systems for the last two *Nimitz*-Class carriers requiring dehydrators between January 1995 and July 1998 as new construction equipment.

Objectives

The overall audit objective was to determine whether the Navy complied with applicable Federal Acquisition Regulations and DoD guidance when contracting for air membrane dehydrators. In addition, we determined whether air membrane dehydrators were appropriately procured on a sole-source basis and were qualified by Navy standards. We also reviewed the adequacy of the management control program as it applied to the audit objectives. See Appendix A for a discussion of the audit scope and methodology and the review of the management control program.

Testing, Qualifying, and Approving Dehydrators

The Navy did not always use the designated Life Cycle Manager (LCM) to test, qualify, and approve dehydrators installed on Navy aircraft carriers. This occurred because the Naval Sea Systems Command (NAVSEA) did not provide adequate guidance to the Navy fleet-level managers on the designated lines of approval authority during installation of new equipment. As a result, the LCM did not have assurances that dehydrators and other compressed air components had been tested, qualified, and approved prior to installation. In this instance, failure to comply with prescribed procedures did not compromise the qualification process.

Life Cycle Management

The Navy properly qualified the air membrane dehydrators by usual Navy standards and the qualification process included adequate shock, vibration, performance, and endurance testing. However, Navy fleet-level managers did not always use the designated LCM to test, qualify, and approve dehydrators installed on Navy aircraft carriers.

Transfer of LCM Authority. NAVSEA issued an operating agreement on May 29, 1996, transferring the LCM responsibility from NAVSEA Fluid Systems Group to the Naval Surface Warfare Center, Carderock Division, Ship Systems Engineering Station Philadelphia (Carderock Philadelphia). As LCM, Carderock Philadelphia was responsible for all life cycle engineering management issues for all compressed air components.

However, three different activities tested and qualified the dehydrators after the operating agreement was issued. NAVSEA tested and qualified dehydrators in July 1996 and October 1997. The Planning and Engineering for Repairs and Alterations, Carriers, office qualified a dehydrator in December 1996, and AERO NAV Laboratories, Inc., conducted shock testing on a dehydrator in February 1998.

Approval Authority. Although the NAVSEA operating agreement designated a specific LCM for testing, qualifying, and approving the dehydrators; fleet-level managers were not notified of this requirement until Change 3 of the Joint Fleet Maintenance Manual was issued on September 10, 1999. Inadequate controls over the approval process allowed activities to complete testing and qualifying procedures without always obtaining the appropriate approval from the designated LCM.

The LCM did not have assurance that the dehydrators had been properly tested and qualified prior to installation. The LCM was only able to provide the test, qualification, and approval documentation for the first dehydrator model. The Supervisor of Shipbuilding, Refurbishment, and Repair, Newport News, Virginia, provided the documentation to us during the audit that was submitted by other testing, qualifying, and approving activities for all subsequent models. As life cycle engineering manager, however, the LCM should have assurance that all compressed air components are properly tested, qualified, and approved prior to installation on Navy vessels. When the LCM is bypassed, the risk of incomplete testing and inadequate qualification procedures is increased.

Recommendation, and Management Comments

Revised Recommendation. As a result of management comments, we revised the draft recommendation to clarify that the fleet needs to be made aware of the approval process for installation of new equipment.

We recommend that the Commander, Naval Sea Systems Command, issue a message to the fleet re-stating the approval process for installation of new equipment and advising them of Life Cycle Manager responsibilities.

Management Comments. The Deputy Assistant Secretary of the Navy, Planning, Programming, and Resources partially concurred with the draft recommendation, stating that guidance regarding the approval process for alterations now exists and proposing that the corrective action to address the audit finding be a reminder to the fleet of what the proper procedure is. We agree. The Commander, Naval Sea Systems Command, will issue a message to the fleet re-stating the approval process for installation of new equipment and advising them of the delegation of Life Cycle Manager responsibility. This action will be completed by May 19, 2000.

Appendix A. Audit Process

Scope and Methodology

Work Performed: The audit focused on the Navy procurement of 92 low-pressure air membrane dehydrators for 13 Navy aircraft carriers valued at about $3.4 million. We interviewed personnel and reviewed contract actions that occurred between April 1994 and July 1999, to determine if the Navy and Newport News Shipbuilding and Drydock Company properly procured and qualified the air membrane dehydrators.

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

> **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 DoDs acquisition processes. (00-DoD-2.4)

General Accounting Office High Risk Area. The General Accounting Office (GAO) has identified several high-risk areas in the Department of Defense. This report provides coverage of the Defense Contract Management high-risk area.

Use of Computer-Processed Data. We did not use computer-processed data to perform this audit.

Audit Type, Dates, and Standards. We performed this program audit from May 1999 through December 1999, 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 management controls considered necessary.

Contacts During the Audit. We visited or contacted individuals and organizations within the DoD. Further details are available upon request.

Management Control Program

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

Scope and Review of Management Control Program. We reviewed the adequacy of Navy management controls over the acquisition of air membrane dehydrators for the carrier fleet. Specifically, we reviewed the Navy management controls over acquisition and qualification procedures. We reviewed management's self-evaluation applicable to those controls.

Adequacy of Management Controls. Navy management controls over the acquisition of air membrane dehydrators for the carrier fleet were inadequate until procedural guidance was issued in 1999, but the weaknesses are no longer material.

Adequacy of Management's Self-Evaluation. We identified no continuing material weaknesses and did not review the self evaluation process.

Prior Coverage

No prior coverage has been conducted on the acquisition of dehydrators during the last 5 years.

Appendix B. Summary of Allegations and Audit Results

The allegations made to Congressman Tom Allen by Howell Laboratories, Incorporated, and our audit results, are discussed below.

Allegation 1. The Navy and Newport News Shipbuilding and Drydock Company inappropriately selected a competing supplier of dehydrators on an unadvertised sole-source basis.

Audit Results. The allegation was not substantiated. We determined that the Navy properly procured dehydrators for the carrier fleet. Of the 92 air membrane dehydrators the Navy procured from Titus, 62 were procured prior to the availability of another source, 24 were procured as contractor-furnished equipment, and 6 were procured under full and open competition.

Other Than Full and Open Competition. The Navy procurement of the 62 dehydrators by "other than full and open competition" was justified. The Navy procured two types of dehydrators for use in the propulsion plant control air and ship service and electronic dry air systems. The 62 dehydrators were procured when Titus was the only manufacturer. Howell Laboratories, Incorporated, a second supplier, was not qualified for propulsion plant control air and ship service and electronic air systems dehydrators until November 1996, and May 1997, respectively. The Navy procured dehydrators after a second supplier was available as contractor-furnished equipment or through full and open competition.

However, the Navy inappropriately cited "unusual and compelling urgency" as justification for using other than full and open competition. Also the procurement and installation of the dehydrators did not occur until months after the procurement request. The Navy should have used "only one responsible source" as the justification for procuring the dehydrators.

Contractor Furnished Equipment. The Navy procured 24 dehydrators as contractor furnished equipment. Of the 24 dehydrators, 14 were procured under new construction contracts and 10 under existing contracts with Newport News Shipbuilding and Drydock Company. The Navy requested that aircraft carriers under construction at Newport News Shipbuilding and Drydock Company be delivered with the dehydrators already installed.

Open Competition. The Navy procured 6 dehydrators under full and open competition. The Fleet Industrial Supply Center, Puget Sound, Washington, competitively awarded Titus a contract for 6 dehydrators for CV-63 in June 1997. Howell Laboratories, Incorporated, submitted a proposal; however, Titus received the award based on lowest price and technical competence.

Allegation 2. The Navy dehydrators purchased by Newport News Shipbuilding and Drydock Company were not qualified by the usual Navy standards.

Audit Results. The allegation was not substantiated. We determined that the Navy properly qualified the Titus dehydrators by usual Navy standards and the qualification process included adequate shock, vibration, and endurance testing. See Part I for additional information on the qualification of Titus dehydrators.

The Naval Sea System Command, Fluid Systems Group (Code 03Y4) directed testing of the first Titus dehydrator. The Mechanical Systems Branch (Code 822), Power Systems Department, Carderock Division, Naval Surface Warfare Center performed the testing. The positive results were reported in April 1994, and operational performance tests were conducted prior to and after shock and vibration testing. Based on the reported results the Navy found the unit to be suitable for shipboard use.

Additional Titus dehydrator models were qualified between July 1996 and February 1998. The Naval Sea Systems Command qualified dehydrators in July 1996, and October 1997. The Planning and Engineering for Repairs and Alterations, Carriers, office, qualified a dehydrator in December 1996, and AERO NAV Laboratories, Inc., conducted shock testing in February 1998.

Appendix C. Report Distribution

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Honorable Tom Allen, U.S. House of Representatives

Department of the Navy Comments

DEPARTMENT OF THE NAVY
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22 FEB 2000

MEMORANDUM FOR THE DEPARTMENT OF DEFENSE ASSISTANT INSPECTOR GENERAL FOR AUDITING

SUBJECT: DEPARTMENT OF DEFENSE INSPECTOR GENERAL DRAFT AUDIT REPORT: NAVY ACQUISITION OF AIR MEMBRANE DEHYDRATORS (Project No.9CK-5014)

REFERENCE: (a) DODIG Draft Audit Report of December 22, 1999

ENCLOSURE: (1) Department of the Navy Comments

Enclosure (1) contains the Navy response to reference (a). We concur with the report's finding that the Life Cycle Manager was not requested to provide technical review/approval of all models of membrane dehydrators procured for aircraft carrier use. However, we only partially concur with the recommendation because guidance regarding the approval process for alterations already exists. We have suggested an alternative action that would be more appropriate.

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

Copy to:
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DASN (SHIPS)
NAVSEA (00N3)

DEPARTMENT OF THE NAVY RESPONSE
TO
DODIG DRAFT REPORT ON
NAVAL ACQUISITION OF AIR MEMBRANE DEHYDRATORS
PROJECT NUMBER 9CK-5014

I. General Comment on Report and Findings

Concur with the findings. The report is accurate from the standpoint that the Life Cycle Manager (LCM) was not requested to provide technical review/approval of all models of membrane dehydrators procured for carrier use. While the fleet level manager worked closely with the LCM to develop and obtain approval of the initial air membrane dehydrator prior to submitting the alteration request, that same relationship did not carry over to the development of the four additional dehydrators.

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

The following comments are offered to clarify information contained in the report:

Comment #1: Report Introduction, Background Section, page 1, Development of Air Membrane Dehydrators paragraph.

Permea manufactures the membrane, in question. Other membranes, by other manufacturers, were investigated, but only the Permea membrane was able to meet Navy requirements. The Titus Company uses Permea membranes to fabricate the membrane dehydrator to Navy requirements.

Comment #2: Report Finding, Testing, Qualifying, and Approving Dehydrators Section, page 2, paragraph 1.

The last sentence indicated that activities, other than the LCM, are permitted to approve the technical adequacy of dehydrators. Technical Authority for recommending approval of dehydrators rests solely with the LCM.

Comment #3: Report Finding, Life Cycle Management Sub-Section, page 2, paragraph 2.

The qualification of the membrane and dehydrator unit also included performance testing.

Enclosure (1)

Comment #4: Report Finding, Life Cycle Management Sub-Section, page 2, paragraph 1:

The first sentence in the paragraph states, "The Navy properly qualified the air membrane dehydrators by usual Navy standards and the qualification process included adequate shock, vibration, and endurance testing." This statement is in conflict with that in the paragraph under "Testing, Qualifying, and Approving Dehydrators," which states "the LCM did not have assurance that dehydrators and other compressed air components had been tested, qualified and approved prior to installation." We recommend the words "in this case, findings indicate that" be added to the first sentence.

Comment #5: Report Finding, Life Cycle Management Sub-Section, Approval Authority paragraphs, pages 2 and 3:

Paragraph 5 on page 2 states that fleet-level managers were not aware the LCM responsibilities were transferred from headquarters to Ship System Engineering Station and therefore were not aware of the requirement to obtain LCM approval. Fleet level managers associated with the procurement and installation of the subject dehydrators had first hand experience with dehydrator LCMs both prior to (at NAVSEA) and after the transfer of responsibility to Ship System Engineering Station. Additionally, all fleet-level managers are aware of the requirement found in the Joint Fleet Maintenance Manual to obtain Systems Command approval of any alteration.

The last sentence in paragraph 1 on page 3 indicated that activities, other than the LCM, are permitted to approve the technical adequacy of dehydrators. Technical authority for recommending approval of dehydrators rests solely with the LCM.

Comment #6: Appendix B, Allegation 2, page 7, last paragraph:

The last sentence in the paragraph states that AERO NAV Laboratories, Inc. qualified a dehydrator in February 1998. That sentence should state that the AERO NAV Laboratories, Inc. conducted shock testing and provided a report stating that the shock requirements were met.

Enclosure (1)

Final Report Reference

III. Navy Response to Draft Report Recommendation

Recommendation: We recommend that the Commander, Naval Sea Systems Command, disseminate guidance to the Fleet-level managers directing that the Naval Sea Systems Command designated Life Cycle Manager be used for testing, qualifying, and approving dehydrators and other unqualified compressed air components prior to their installation on Navy vessels.

Navy Response: Partially concur. Guidance satisfying the intent of the recommendation is contained in the following documents:

(a) Joint Fleet Maintenance Manual, Change 3, Chapter IV dated September 10, 1999;
(b) NAVSEAINST 5400.1E, Change 10, NAVSEA Organization Manual dated August 9, 1999; and
(c) NAVSEAINST 5400.61B, Technical Authority Policy Between Engineering Directorate (SEA 05) and Program Managers dated July 27, 1999.

Since guidance regarding the approval process of alterations currently exists. We suggest the following action as an alternative recommendation:

That the Commander, Naval Sea Systems Command, issue a message to the Fleet re-stating the approval process for installation of new equipment and advising them of the delegation of LCM responsibility to specific field activities. Revised

This action will be completed by 19 May 2000.

Audit Team Members

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

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