Audit Report

OFFICE OF THE INSPECTOR GENERAL

NAVY AND AIR FORCE AIRCRAFT FUEL CELLS

Report No. 94-050 March 10, 1994

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Department of Defense

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Acronym

EFC	Engineered Fabrics Corporation

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DEPARTMENT OF DEFENSE
400 ARMY NAVY DRIVE
ARLINGTON, VIRGINIA 22202

March 10, 1994

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

SUBJECT: Audit Report on Navy and Air Force Aircraft Fuel Cells
(Report No. 94-050)

We are providing this audit report for your review and comments. The audit was performed in response to a DoD Hotline complaint regarding DoD procurement of aircraft fuel cells. This report is the fourth and final in a series of reports relating to foreign- and U.S.-manufactured aircraft fuel cells procured by DoD. We considered your comments in preparing the final report.

DoD Directive 7650.3 requires that all audit recommendations be resolved promptly. We revised one draft recommendation based on management comments. See the "Response Requirements Per Recommendation" section at the end of the finding for the unresolved recommendations and the specific requirements for your comments. The potential monetary benefits in this report cannot be quantified, and none are claimed. We request the Commander, Warner Robins Air Logistics Center, provide comments to the recommendations by May 10, 1994.

The courtesies extended to the audit staff are appreciated. If you have any questions about this audit, please contact Mr. Salvatore D. Guli, Program Director, at (703) 692-3025 (DSN 222-3025) or Mr. Ronald W. Hodges, Project Manager, at (703) 692-3178 (DSN 222-3178). Appendix G lists the distribution of this report. 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. 94-050 **March 10, 1994**
(Project No. 2CF-8014.01)

NAVY AND AIR FORCE AIRCRAFT FUEL CELLS

EXECUTIVE SUMMARY

Introduction. This audit was performed in response to a DoD Hotline complaint regarding DoD procurement of aircraft fuel cells. The complainant alleged that foreign-manufactured fuel cells were of better quality and had a longer useful life than domestically manufactured fuel cells. The complainant also alleged that domestic manufacturers were attempting to eliminate foreign competition to enable domestic manufacturers to dictate prices. This report was based on our evaluation of the quality and pricing of foreign and domestic fuel cells procured by DoD for two types of Navy and Air Force helicopters. We evaluated the quality and pricing of Army helicopter fuel cells in Inspector General, DoD, Report No. 94-001, "Aircraft Fuel Cell Procurements," October 13, 1993. See Prior Audits and Other Reviews, Part I, for a summary of our evaluation.

Objectives. The audit objectives were to determine whether DoD acquisition strategies for aircraft fuel cells resulted in fair and reasonable prices, whether DoD received quality fuel cells for the prices paid, and whether internal controls were in place to ensure that DoD obtained quality fuel cells at a fair price. To answer the allegations, we examined Navy and Air Force H-3 and H-53 helicopter fuel cells.

Audit Results. The allegations concerning quality and pricing of foreign and domestic fuel cells procured by DoD were generally unsubstantiated. Navy and Air Force H-3 and H-53 helicopter foreign and domestic fuel cells had no significant quality problems or price differences. Appendix A discusses the results of the audit related to the allegations.

Storage activity officials at Warner Robins Air Logistics Center, Air Force Materiel Command, Robins Air Force Base, Georgia (Warner Robins), inappropriately coded unused H-3 helicopter fuel cells as unserviceable and stored the unused fuel cells with other failed fuel cells that were awaiting repair. Failure to maintain visibility of unused (serviceable) items that require routine maintenance to extend the item shelf life could cause Warner Robins to make unnecessary purchases and repairs to an unknown number of the 3,582 shelf-life items, valued at $59.7 million (Part II).

Internal Controls. We did not review applicable internal controls because we did not identify any problems related to quality and pricing of Navy and Air Force fuel cells. See Part I for a discussion of internal controls.

Potential Benefits of Audit. Implementation of the recommendations will result in improvements in the management of shelf-life items. Although monetary benefits could be realized by preventing unnecessary repairs or new procurements, we were unable to quantify the amount because of our limited audit scope. Appendix E summarizes the potential benefits resulting from the audit.

Summary of Recommendations. We recommended that Warner Robins officials revise Warner Robins Distribution and Supply Operating Instruction 67-27, "Shelf-Life Procedures," requiring storage activity officials to put all serviceable type II nonconsumable shelf-life items in a condition status that requires suspended action when the item shelf life expires. We also recommended that Warner Robins maintenance personnel perform inspections and routine maintenance as needed to extend the expired shelf life of stored items and, when economically feasible, perform these tasks on-site.

Management Comments. The Air Force agreed to put all serviceable type II nonconsumable shelf-life items in condition code J (suspended, in stock) when the item shelf life expires. The Air Force stated that Defense Logistics Agency officials who manage the warehouse activity at Warner Robins opposed on-site performance of inspections and routine maintenance. A summary of the Air Force comments is in Part II of this report. The complete text of the Air Force comments is in Part IV.

Audit Response. We consider the Air Force comments responsive. Based on Air Force comments, we revised our recommendation on performing on-site inspections and routine maintenance on expired shelf-life items. We request that the Commander, Warner Robins Air Logistics Center, provide additional comments on the recommendations by May 10, 1994.

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

Part I - Introduction

Background

The audit was initiated in response to a DoD Hotline allegation that foreign-manufactured aircraft fuel cells were of better quality and had a longer useful life than U.S.-manufactured fuel cells. The complainant also alleged that domestic manufacturers were attempting to eliminate foreign competition to enable domestic manufacturers to dictate prices to DoD. This report is the fourth and final in a series of reports discussing foreign- and U.S.-manufactured aircraft fuel cells procured by DoD. It is the second report that addresses the DoD Hotline allegations on helicopter fuel cells. This report discusses the Navy and the Air Force H-3 and H-53 helicopter fuel cell programs. Inspector General, DoD, Report No. 94-001, "Report on Aircraft Fuel Cell Procurements," October 13, 1993, covers Army CH-47D and AH-64 helicopter fuel cells. (See Prior Audits and Other Reviews, page 5.)

Navy Helicopters. The Navy maintains 135 H-3 helicopters that, depending on the model, contain four or five fuel cells each. The Navy H-53 helicopter contains two or four fuel cells, depending on the helicopter model. As of October 1993, the Navy maintained a total of 231 H-53 helicopters.

Air Force Helicopters. The Air Force H-3 helicopter contains four internal fuel cells: two forward and two aft. In 1988, the Air Force began phasing out the H-3 helicopter. As of April 1993, nine H-3 helicopters remained in the active Air Force inventory. The H-53 helicopter contains two main fuel cells. As of July 1993, the Air Force had 47 H-53 helicopters in its active inventory.

Fuel Cells. A fuel cell is a flexible bladder shaped to fit a designated cavity in an aircraft and designed to hold aircraft fuel. Fuel cells are designed to be removable and repairable. The three main types of aircraft fuel cells are bladder; self-sealing; and crash-resistant, self-sealing. Self-sealing fuel cells are designed to seal themselves when punctured by hostile fire. A crash-resistant, self-sealing fuel cell contains the self-sealing feature and, within certain tolerances, should not leak or burst if the helicopter crashes.

Qualified U.S. Fuel Cell Manufacturers. Currently, only two domestic sources are qualified to manufacture aircraft fuel cells for DoD: American Fuel Cell and Coated Fabrics Company and Engineered Fabrics Corporation (EFC). Firestone Operating Divisions and Uniroyal manufactured fuel cells for DoD before American Fuel Cell and Coated Fabrics Company purchased the two companies in 1983 and 1991, respectively. Goodyear Aerospace Corporation also manufactured fuel cells for DoD before being purchased by Loral Corporation in March 1987. In April 1989, K & F Industries subsequently purchased the Loral Engineered Fabrics Division, which is now referred to as EFC. Since April 1989, EFC sold 223 H-3 and 321 H-53 helicopter fuel cells to the Navy, either directly or through Sikorsky Aircraft, United Technologies, prime manufacturer of the H-3 helicopter.

Qualified Foreign Fuel Cell Manufacturers. Only two foreign sources are currently qualified to manufacture aircraft fuel cells for DoD: Sekur-Pirelli, an Italian-based subsidiary of the Pirelli Group, and FPT, a British fuel

cell manufacturer. Beginning in FY 1989, the Air Force awarded Sekur-Pirelli five contracts for 83 H-3 helicopter self-sealing fuel cells. In FY 1991, the Air Force awarded Sekur-Pirelli a contract to manufacture the first H-53 helicopter crash-resistant fuel cells. Agusta, an Italian defense contractor, provided the Navy with 320 Sekur-Pirelli fuel cells to be used on the H-3 helicopter during the Navy H-3 service life extension program. FPT is qualified to manufacture fuel cells for the V-22 Osprey, a Navy helicopter still in the developmental phase. (See Other Matters of Interest, page 7.)

Objectives

The objectives of the audit were to determine whether DoD acquisition strategies for aircraft fuel cells resulted in fair and reasonable prices, whether DoD received quality fuel cells for the prices paid, and whether internal controls were in place to ensure that DoD obtained quality fuel cells at a fair price. To answer the allegations, we reviewed Navy and Air Force H-3 and H-53 helicopter fuel cells. Appendix A shows the specific DoD Hotline allegations and our response to each allegation. Part II discusses additional results of the audit.

Scope and Methodology

Audit Methodology. To satisfy our audit objectives, we compared the quality and price of fuel cells that were purchased from both domestic and foreign sources. We reviewed management policies and practices related to the acquisition, quality, and maintenance of fuel cells. We interviewed Navy, Air Force, and contractor personnel.

Fuel Cell Quality. At the Naval Aviation Depot, Pensacola, Florida, we evaluated 98 unserviceable H-3 and 11 unserviceable H-53 helicopter fuel cells. Uniroyal manufactured 4 of the H-53 helicopter fuel cells and EFC manufactured the remaining 98 H-3 and 7 H-53 helicopter fuel cells. We evaluated 142 unserviceable H-3 helicopter fuel cells at the Warner Robins Air Logistics Center (Warner Robins), Robins Air Force Base, Georgia, to compare the quality of domestic- and foreign-manufactured fuel cells. Of the 142 H-3 helicopter fuel cells, 18 were manufactured by Sekur-Pirelli. The remaining 124 fuel cells were manufactured by EFC. We reviewed quality deficiency reports on Navy H-3 and H-53 helicopter fuel cells submitted from 1987 to 1993 and on Air Force H-3 helicopter fuel cells submitted from 1987 to 1992.

We queried the Navy Maintenance Material Management data base to obtain and review maintenance actions on 84 H-3 and 27 H-53 helicopter fuel cells removed from and replaced in helicopters from April 1990 to March 1993. We also reviewed a 12-month maintenance action summary on the Air Force H-3 helicopter fuel cells. In addition, we reviewed records of repairs made by the Naval Aviation Depot, Pensacola, on 44 H-3 and 74 H-53 helicopter fuel cells from May 1991 to June 1993.

Fuel Cell Pricing. The Air Force H-3 and H-53 helicopter fuel cells were the only fuel cells purchased by DoD where direct price comparisons could be made between foreign and domestic manufacturers. We reviewed eight contracts for H-3 helicopter fuel cells issued by Warner Robins from FYs 1985 through 1993 to compare the fuel cell prices of domestic and foreign manufacturers. The 8 contracts were for 162 H-3 helicopter fuel cells valued at $839,812. EFC (Loral at the time) was awarded 3 contracts for 79 fuel cells valued at $394,512 and Sekur-Pirelli was awarded 5 contracts for 83 fuel cells valued at $445,300. We also compared the price proposed by EFC and Sekur-Pirelli on contract F09603-91-C-0624 for H-53 helicopter fuel cells.

Use of Technical Experts. We obtained the assistance of a Navy engineer, who is a recognized technical expert on helicopter fuel cells, to evaluate the quality of H-3 and H-53 helicopter fuel cells. The Navy engineer also assisted in our evaluation of technical reports relating to fuel cells.

Audit Period, Standards, and Locations. This economy and efficiency audit was conducted from April through August 1993 in accordance with auditing standards issued by the Comptroller General of the United States, as implemented by the Inspector General, DoD. Accordingly, the audit included such tests of internal controls as were considered necessary. Appendix F lists the organizations visited or contacted.

Use of Computer-Processed Data. We reviewed computer-processed records of maintenance actions from the Navy Maintenance Material Management data base and the Air Force Cost and Performance Analysis data base to identify quality problems with fuel cells. We did not evaluate the reliability of the computer-processed data because we used the data primarily as an indicator of fuel cell quality problems. The indication of quality problems was then verified by visual inspection of the fuel cells and examination of related technical documentation of the problem. The reliability of the computer-processed data would not affect the audit results.

Internal Controls. We did not review the Navy and Air Force implementation of the Federal Managers' Financial Integrity Act because we did not identify any problems concerning quality and pricing of Navy and Air Force fuel cells. In the course of our audit, no material internal control weaknesses were disclosed that related to the quality or pricing of Navy and Air Force H-3 and H-53 helicopter fuel cells, as defined by Public Law 97-255, Office of Management and Budget Circular A-123, and DoD Directive 5010.38.

Prior Audits and Other Reviews

General Accounting Office. National Security and International Affairs Division 90-214 (OSD Case No. 8379), "F-15 Fuel Cells, the Air Force Needs Better Data for Informed Decisions," August 16, 1990. The report stated that the Air Force did not maintain adequate data on F-15 aircraft fuel cells to identify premature fuel cell failures, to establish repair and replacement policies based on the actual life of F-15 aircraft fuel cells, and to evaluate the advantages of an extended manufacturer's warranty. The report also stated that the Air Force did not have the data necessary to determine life-cycle cost advantages of using one fuel cell material over another.

The report recommended that the Air Force collect F-15 aircraft fuel cell data, such as useful life, failure rates, and maintenance costs, and that management use the data to assess the life-cycle cost of fuel cell materials and the merits of an extended warranty. The report also recommended that Air Force management use the data to revise the conditions under which fuel cells should be repaired or discarded.

The Air Force generally concurred with the recommendations and stated that the automated maintenance records being installed at Warner Robins and at the F-15 aircraft depot and base maintenance levels would track F-15 aircraft fuel cells by serial number, resulting in collection of failure data by part number. The information will also be used by management to make repair or replacement decisions and to determine whether an extended warranty would be feasible for the F-15 aircraft fuel cells.

We reviewed F-15 aircraft fuel cell maintenance records at Warner Robins to verify whether recommendations of the General Accounting Office report were properly implemented. The recommendations were not adequately implemented. Maintenance forms were incomplete, serial and part numbers of the fuel cells were not recorded, and instructions for completing the maintenance records were unclear. We requested that the Assistant Inspector General for Analysis and Followup, DoD, perform additional work to verify that the Air Force is properly implementing the recommendations.

Inspector General, DoD. Report No. 94-027, "DoD Compliance with Lobbying Restrictions Imposed by the Byrd Amendment," December 30, 1993. The audit addressed DoD compliance with the requirements imposed by the Byrd Amendment. The audit also evaluated a DoD Hotline allegation that a company violated the Byrd Amendment by not disclosing certain lobbying activities. The audit determined that many senior DoD officials were not familiar with the Byrd Amendment requirements and that DoD compliance with these contract requirements could be improved. The DoD Hotline allegation that a company violated the Byrd Amendment by not reporting the use of consultants to influence DoD officials and members and employees of Congress was not substantiated.

The Director of Defense Procurement did not agree that additional actions were needed to improve DoD compliance with the Byrd Amendment. The Army, the Navy, and the Defense Information Systems Agency agreed to make the recommended improvements.

Report No. 94-039, "Air Force Helicopter Fuel Cell Military Specification Testing," February 11, 1994. This report, the third in a series of reports on aircraft fuel cells procured by DoD, discusses the validity of complaints regarding qualification testing of H-3 and H-53 helicopter fuel cells manufactured by the Italian company, Sekur S.p.A., a member of the Pirelli Group (Sekur-Pirelli). The report stated that the Air Force inappropriately approved Sekur-Pirelli as a qualified source of H-3 helicopter self-sealing fuel cells. As a result, the Air Force awarded five contracts valued at $445,200 to Sekur-Pirelli with no assurance that the H-3 helicopter fuel cells met military specification requirements. The report also stated that the H-53 helicopter fuel cell testing and safety allegations were generally unfounded.

The report recommended the Air Force to redesignate the Sekur-Pirelli H-3 helicopter fuel cells as nonself-sealing and to impose restrictions on helicopters equipped with these fuel cells to non-hostile environments. The report also recommended that the Air Force include controls over the source approval process in the implementation of the internal management control program. The Air Force generally concurred with the recommendations.

Report No. 94-025, "Pricing of American Fuel Cell and Coated Fabrics Company Contracts," December 28, 1993. This report, the second in a series of reports related to aircraft fuel cells procured by DoD, concerns the pricing of fuel cells for the Navy F-14 aircraft. The report stated that the Navy did not obtain fair and reasonable prices on six negotiated contracts, valued at $1.8 million, awarded to American Fuel Cell and Coated Fabrics Company for F-14 aircraft fuel cells. As a result, American Fuel Cell and Coated Fabrics Company defectively priced the six contracts, and the Navy made overpayments in the amount of $474,599.

The Navy stated that defective pricing did not occur because the contracting officer did not rely on the contractor-submitted cost and pricing data to determine price reasonableness. However, the Navy agreed to request a voluntary refund from the contractor for the questioned overpayments. The Defense Contract Audit Agency performed the defective pricing audits based on oral and written statements from the contracting officer that he relied on the certified cost and pricing data. In response to the Navy's comments, we also recommended additional training for the cognizant Navy contracting officer and that the Navy reimburse the Defense Contract Audit Agency for the costs of performing six postaward audits.

Report No. 94-001, "Aircraft Fuel Cell Procurements," October 13, 1993. This report, the first in a series of reports concerning foreign- and U.S.-manufactured aircraft fuel cells procured by DoD, concerns crash-resistant, self-sealing fuel cells manufactured by domestic sources for the Army's CH-47D Chinook and AH-64 Apache helicopters. The report stated that Army CH-47D and AH-64 helicopter fuel cells experienced premature

failures due to systemic quality problems. In addition, the Army did not use the useful life of the fuel cells in acquisition and maintenance decisions to ensure quality fuel cells were received. The report also stated that the allegations on pricing were not substantiated.

The report recommended design and manufacturing changes on the fuel cells to improve the quality of the fuel cells. The report also recommended that expected useful life for CH-47D and AH-64 helicopter fuel cells be considered when making economic repair and replacement decisions and be used as an internal control objective to verify the quality of helicopter fuel cells. The Army generally concurred with the recommendations.

Report No. 92-140, "Competitive Bidding Practices on Contract F09603-91-C-0624," September 30, 1992, addressed the validity of a bid proposal made by Sekur-Pirelli. The report stated that Sekur-Pirelli did not offer a price below its expected cost to produce fuel cells for the Air Force H-53 helicopter. The report contained no recommendations.

Other Matters of Interest

V-22 Aircraft Fuel Cells. The Navy approved FPT as a qualified source to manufacture V-22 aircraft fuel cells. The "Buy American" restriction of the Berry Amendment prohibits DoD from purchasing foreign-manufactured fuel cells that contain layers of synthetic fabric. The Berry Amendment, which has been included in various forms in the DoD Appropriations Act every year since 1941, generally restricts DoD expenditure of funds to certain U.S.-manufactured goods. The Navy acknowledged the requirement of the Berry Amendment and provided an action plan to meet the provisions of the law (Appendix B).

Polyester Polyurethane Testing. The Navy is currently testing and developing a new polyester polyurethane material for future use in Navy aircraft fuel cells. The testing, scheduled to be completed in December 1993, will determine whether polyester polyurethane material will be qualified for use in the construction of fuel cells. The Navy provided the Office of Inspector General, DoD, assurance that a comparative life-cycle cost analysis would be performed between nitrile, the current material used, and polyester polyurethane before the new material is considered for acceptance (Appendix C).

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Part II - Finding and Recommendations

Coding Of Fuel Cells In Air Force Inventory

Inventory officials at Warner Robins coded unused H-3 helicopter fuel cells as unserviceable (condition code F, unserviceable, repair or overhaul) and stored the unused fuel cells with failed fuel cells that were awaiting repair. The unused H-3 helicopter fuel cells were coded as unserviceable because Warner Robins storage instructions directed that items requiring maintenance action to extend shelf life be assigned the same condition code as items requiring repair and overhaul. Accordingly, Warner Robins did not realize that its unserviceable inventory contained 42 unused serviceable H-3 helicopter fuel cells. Failure to maintain visibility of unused serviceable items that require routine inspection or maintenance to extend the item's shelf life could cause Warner Robins to make unnecessary purchases or repairs to shelf-life items. The Warner Robins inventory contains 3,582 shelf-life items, valued at $59.7 million, in condition code F. In addition, failure to perform routine maintenance as required could cause deterioration of otherwise serviceable items.

Background

Federal Condition Codes. The Defense Logistics Agency Customer Assistance Handbook assigns Federal condition codes to classify supply items in terms of readiness for issue or to identify actions needed or underway to change the status of the item. Items identified as serviceable, ready for issue, including new and unused items, are assigned condition code A. Condition code F, unserviceable, repair or overhaul, applies to economically repairable items that need to be repaired, overhauled, or reconditioned. Condition code J, suspended, in stock, is assigned to items suspended from issue and includes repairable items that require periodic inspection and routine maintenance to extend the shelf life.

Shelf-Life Codes. The Federal Supply Catalog uses shelf-life codes to indicate the assigned time an item may remain in storage before the item must be inspected or tested and either restored to serviceable condition or discarded. Generally, the Federal Supply Catalog classifies consumable items as type I, which means the item is discarded when the assigned shelf life expires. Repairable items are generally classified as type II, indicating that the item's assigned shelf life, when expired, may be extended through testing and restorative action. The following table shows the general condition and shelf-life codes that DoD storage personnel must use.

Federal Condition and Shelf-Life Codes

Condition Code	Status
A	Serviceable, ready for issue
E	Unserviceable, minor repair
F	Unserviceable, repair or overhaul
H	Condemned
J	Suspended, in stock
Shelf-Life Code	
Type I	Discarded when shelf life expires
Type II	Shelf life may be extended through testing and restorative action

General Guidelines for Assigning Condition Codes. DoD Manual 4140.27-M, "Shelf-Life Item Management Manual," provides general guidelines for assigning condition codes to items with an expired shelf life. The condition codes discussed in the manual clearly separate items that require repair or overhaul from items that do not. DoD Manual 4140.27-M states that when the shelf life of an item expires, the item should generally be assigned one of two condition codes. All type I consumable shelf-life items should be assigned condition code H. Type II nonconsumable shelf-life items should be assigned condition code J. However, for type II shelf-life items that need repair or overhaul, the DoD manual provides for the items to be assigned condition codes E or F.

Warner Robins Guidelines for Assigning Condition Codes. Warner Robins Distribution and Supply Operating Instruction 67-27, "Shelf-Life Procedures," (Operating Instruction 67-27) requires that all type II nonconsumable shelf-life items be assigned condition code F when the item's shelf life expires even though condition code J may be more appropriate. The item may only need routine inspection or maintenance to extend shelf life rather than repair or overhaul. An item can remain in condition code J for up to 90 days before the item manager must take some action to remove the item from condition code J. An item can remain in condition code F indefinitely.

Helicopter Fuel Cell Shelf Life. The H-3 helicopter fuel cells at Warner Robins are type II nonconsumable shelf-life items with a 2-year shelf life and are repairable at the depot level. The Air Force technical manual TO 00-85A-03-1, section IV, "Fuels, Oil and Water-Alcohol Cells," states that stored fuel cells should be inspected every 2 years and oiled as needed to preserve the inner cell wall. For fuel cells that previously contained fuel, the inner liner must be oiled if the cell will be without fuel for more than 72 hours. Warner Robins assigned a 2-year shelf-life to H-3 helicopter fuel cells as a method of notifying the item manager when the fuel cells are due for inspection.

Condition Codes For Expired Shelf-Life Items

Assignment of Condition Codes for Expired Shelf-Life Items. Operating Instruction 67-27 inappropriately required officials at the Warner Robins storage activity to assign serviceable items condition code F when the shelf life expired, even though the items did not require repair or overhaul. As a result, officials are assigning codes that do not accurately reflect the readiness-for-issue status of the items. The requirement to assign condition code F to serviceable items affects 220 Warner Robins-managed national stock numbers, representing 9,659 items, valued at $69 million, that were in the Warner Robins inventory at the end of FY 1993. Accordingly, Warner Robins did not realize that the Air Force inventory contained unused H-3 helicopter fuel cells and, as a result, Warner Robins unnecessarily contracted to repair unserviceable H-3 helicopter fuel cells. Warner Robins failure to maintain visibility of the serviceable H-3 helicopter fuel cells prevented inspection and routine oiling of the fuel cells, required when the 2-year shelf life expired.

Quality of Fuel Cells in Condition Code F. We obtained the technical assistance of a Navy engineer to evaluate the quality of all H-3 helicopter fuel cells stored at Warner Robins in condition code F. Of the 142 H-3 helicopter fuel cells evaluated, 42 (30 percent) were unused and had never contained fuel (Appendix D). Storage activity officials stated that they placed the unused fuel cells in condition code F when the 2-year shelf life expired, as required by Operating Instruction 67-27. Compliance with Operating Instruction 67-27 prevented inspection and preservation of the 42 unused H-3 helicopter fuel cells as required by Air Force Technical Manual TO 00-85A-03-1. According to the Navy engineer, the 42 unused H-3 helicopter fuel cells, valued at $199,000, needed to be inspected and, in some cases, oiled to extend the shelf life. When required, inspection and oiling are the appropriate actions taken for items in condition code J. Then the serviceable fuel cells can be returned to condition code A to accurately reflect their readiness for issue status.

Impact of Fuel Cells in Condition Code F. Operating Instruction 67-27, as written, prevents performance of routine maintenance required to extend shelf life and could result in unnecessary repairs of serviceable items or procurement of unused items to satisfy existing Air Force requirements. For example, Warner Robins incurred $1,700 in unnecessary repair costs because it did not realize that the Air Force inventory contained unused H-3 helicopter fuel cells. On March 22, 1993, Warner Robins awarded contract F09603-93-M-1594 to EFC to repair seven self-sealing H-3 helicopter fuel cells. Of the seven repairs made by EFC, two were not necessary because unused (serviceable) fuel cells were available in the Air Force inventory.

Assignment of Other Serviceable Items to Condition Code F. The Warner Robins requirement to assign serviceable items condition code F upon shelf-life expiration affects items other than H-3 helicopter fuel cells. Once serviceable items are assigned condition code F, the serviceable items cannot be differentiated from unserviceable items that require repair or overhaul to be

made serviceable. At the end of FY 1993, the Warner Robins inventory contained 3,582 type II nonconsumable shelf-life items, valued at $59.7 million, assigned condition code F that may not need repair or overhaul.

Conclusion

Warner Robins needs to revise Operating Instruction 67-27 for assigning condition codes to serviceable items with an expired shelf life. At a minimum, the operating instruction should help Warner Robins maintain visibility over serviceable items with an expired shelf life and ensure that inspection and routine maintenance requirements concerning the shelf-life assignment of each item are met. For example, Warner Robins should instruct officials at the storage activity to assign serviceable type II nonconsumable items to condition code J upon expiration of the item shelf life, thereby notifying Warner Robins personnel to initiate follow-up action within 90 days.

The follow-up action should include inspection and routine maintenance as required to extend the expired shelf life. For items that require minimal follow-up action, such as H-3 helicopter fuel cells, Warner Robins maintenance personnel should perform the specified actions at the storage activity. Inspection and maintenance at the storage activity would ensure timely followup and eliminate the cost of shipping items to the maintenance activity.

Recommendations, Management Comments, and Audit Response

We recommend that the Commander, Warner Robins Air Logistics Center, Air Force Materiel Command:

1. For aircraft fuel cells:

a. Revise Distribution and Supply Operating Instruction 67-27, "Shelf-Life Procedures," to require that storage activity officials assign all serviceable fuel cells to condition code J (suspended, in stock) when the item shelf life expires.

b. Initiate a review of fuel cells in condition code F (unserviceable, repair or overhaul), and reassign to condition code J those items that can be returned to serviceable condition with minimal effort.

c. Initiate on-site inspections and routine maintenance as needed on all fuel cells in condition code J to extend the expired shelf life, thereby restoring the items to condition code A (serviceable, ready for issue).

2. For other type II nonconsumable shelf-life items:

a. Revise Distribution and Supply Operating Instruction 67-27, "Shelf-Life Procedures," to require that storage activity officials assign all serviceable items to condition code J when the item shelf life expires.

b. Initiate a review of items in condition code F, and reassign to condition code J those items that can be returned to serviceable condition with minimal effort.

c. Initiate inspections and routine maintenance as needed on all items in condition code J to extend the expired shelf life, thereby restoring the items to condition code A. Coordinate with Defense Logistics Agency warehouse officials to perform the required inspections and routine maintenance on-site, when economically feasible.

Management Comments. The Air Force concurred with Recommendation 1. and stated that, effective immediately, fuel cells having an expired shelf life will be placed in condition code J. In addition, item managers are initiating action to inspect fuel cells in condition code F due to an expired shelf life and return the fuel cells to condition code A, if applicable. The Air Force also concurred with Recommendation 2., extending the procedures identified in Recommendation 1. to other nonconsumable shelf-life type II items. The Air Force stated that Defense Logistics Agency officials at Warner Robins who manage the warehouse expressed concern that limited funding may prevent Air Force item managers from initiating the action needed to remove the items from condition code J within 90 days, requiring the item manager to make multiple followups for disposition. In addition, Defense Logistics Agency officials opposed draft report Recommendation 2.c. to perform the inspections and routine maintenance on-site, stating that storage areas were inappropriate for this type of work and would disrupt warehousing operation.

Audit Response. The Air Force planned actions satisfy the intent of Recommendation 1. Although the Air Force concurred with Recommendation 2., the comments did not specify what actions would be taken. In addition, we do not fully agree with comments made by Defense Logistics Agency officials at Warner Robins on draft report Recommendation 2.c. The intent of the recommendation is to reduce costs by preventing unnecessary transfer of assets when Air Force maintenance personnel can reasonably perform the required tasks in the warehouse. We acknowledge that in some instances performing inspections and routine maintenance on-site may not be economically or logistically feasible. The Director, DoD Shelf-Life Programs at Headquarters, Defense Logistics Agency, agreed with the intent of the recommendation and assured us that the Defense Logistics Agency would work with the Air Force to implement the recommendation. Based on management comments, we revised draft report Recommendation 2.c. We request that the Air Force respond to the revised recommendation and provide additional comments on the recommendations, as specified in the chart on the following page, when responding to the final report.

Response Requirements Per Recommendation

Responses to the final report are required for the items indicated with an "X" in the chart below.

	Response Should Cover:			
Number	Concur/ Nonconcur	Proposed Action	Completion Date	Related Issues*
1.a.				X
1.b.			X	
1.c.			X	
2.a.		X	X	X
2.b.		X	X	
2.c.	X	X	X	

*Monetary benefits. The potential monetary benefits in this report could not be quantified, and none are claimed. However, we ask that your comments indicate the amount of any associated monetary benefits.

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Part III - Additional Information

Appendix A. Results of Review of Quality and Pricing Allegations

We responded to the quality and pricing allegations by focusing our audit on Navy and Air Force H-3 and H-53 helicopter fuel cells. The allegations and our responses are below.

Allegation 1. Foreign-manufactured fuel cells were of better quality and had a longer useful life than U.S.-manufactured fuel cells.

Audit Response. Allegation 1 was not substantiated. We were unable to adequately compare the quality of domestic- to foreign-manufactured fuel cells. The Navy and the Air Force currently use H-3 helicopter fuel cells manufactured by Sekur-Pirelli; however, the Sekur-Pirelli fuel cells were not in use long enough to make a fair assessment of quality. We could not evaluate Sekur-Pirelli fuel cells manufactured for the Air Force H-53 helicopter because the fuel cells were in the initial production phase at the time of our audit. Furthermore, the Navy has never purchased foreign-manufactured fuel cells for the H-53 helicopter. Review of unserviceable fuel cells, quality deficiency reports, and maintenance and repair records identified no significant quality problems with H-3 and H-53 helicopter fuel cells purchased by the Navy or the Air Force.

Allegation 2. Domestic fuel cell manufacturers were attempting to eliminate foreign competition, enabling domestic manufacturers to dictate prices to DoD.

Audit Response. Allegation 2 was not substantiated. The Air Force H-3 and H-53 helicopter fuel cells were the only fuel cells purchased by DoD where direct price comparisons could be made between foreign and domestic manufacturers. Eight contracts for H-3 helicopter fuel cells and two bid proposals were submitted in response to a solicitation for Air Force H-53 helicopter fuel cells. In two instances where both manufacturers provided the same type of fuel cells in similar quantities, the foreign manufacturer offered prices that were 8 to 10 percent lower than the domestic manufacturer.

Appendix B. Navy Proposed Action on V-22 Aircraft Fuel Cells

DEPARTMENT OF THE NAVY
PROGRAM EXECUTIVE OFFICER
AIR ASW ASSAULT AND SPECIAL MISSION PROGRAMS
1421 JEFFERSON DAVIS HWY
ARLINGTON VA 22243

IN REPLY REFER TO
4200
Ser PMA-275C3/4238
09 Sept 1993

From: Program Executive Officer (PMA-275A)
Air ASW, Assault and Special Mission Programs
To: Inspector General
Department of Defense
400 Army Navy Drive
Arlington, Virginia 22202-2884

Subj: V-22 EMD SPONSON FUEL CELLS

Ref: (a) *Inspector General Ltr of June 18, 1992, Audit of Aircraft Fuel Cell Procurement* (Project No. 2CF-8014)

1. Audit objectives stated in reference (a) were to determine whether DoD acquisition strategies for the procurement of aircraft fuel cells result in fair and reasonable prices, and whether DoD is receiving quality fuel cells for the prices paid. Also, to determine whether internal controls are in place to ensure that DoD obtains a quality fuel cell at a fair price.

2. A meeting was held with DODIG on 20 July 1993. At that time the DODIG requested the program offices' acknowledgement of the "Berry Amendment" and what course of action was planned.

3. On 1 September 1993, Bell-Boeing notified the Procuring Contracting Officer (PCO) of their intentions to award a subcontract to F.P.T. Industries, Limited of Portsmouth, England for V-22 sponson fuel cells under contract N00019-93-C-0006. It has been determined that the Berry Amendment provisions of the Department of Defense (DOD) Appropriations Act and DFARS 252.225-7012, which prohibit the DOD from expending funds for the acquisition of certain items from other than a United States domestic source, applied to the V-22 sponson fuel cells.

4. Since F.P.T. is nearly finished qualifying their product, the Berry Amendment will require the solicitation of a domestic source with a potential increase in program cost and increased weight.

5. A meeting is scheduled with Bell-Boeing in the near future to discuss available options.

RAY A. SCHLEICHER
By direction

Appendix C. Navy Proposed Action To Evaluate Material Used To Manufacture Aircraft Fuel Cells

DEPARTMENT OF THE NAVY
NAVAL AIR SYSTEMS COMMAND
NAVAL AIR SYSTEMS COMMAND HEADQUARTERS
1421 JEFFERSON DAVIS HWY
ARLINGTON VA 22243

IN REPLY REFER TO

13472
Ser AIR-53031F/7.33195
AUG -6 1993

From: Commander, Naval Air Systems Command
To: Inspector General
Department of Defense
400 Army Navy Drive
Arlington, Virginia 22202-2884

Subj: COMPARATIVE LIFE-CYCLE COST ANALYSES OF NAVY FUEL CELLS

Ref: (a) Inspector General ltr. of July 8, 1993
(b) MIL-T-6396E Internal Fuel Tank, Non-Self-Sealing

1. Reference (a) requested NAVAIR provide assurances that a comparative life-cycle cost analysis on fuel cells be performed on nitrile versus polyester polyurethane type construction materials. The current reference (b) fuel cell specification states that the life of the cells should match that of the aircraft application. The normal aircraft service life is 6,000 flight hours which equates to approximately 20 years.

2. Presently, NAVAIR, in conjunction with McDonnell Douglas and Northrop, is developing and currently testing a polyester polyurethane fuel cell material. Since the current reference (b) specification was tailored for nitrile type material, it was necessary to modify and/or add tests for polyester polyurethane type material. The intent of this program is to ensure that the polyester polyurethane material is as good as nitrile material with regard to service life, handling (installation/removal), performance and damage tolerance. Currently, the testing is being performed by two vendors, Amfuel and Engineered Fabrics. These material tests are scheduled to be completed by the end of 1993.

3. Based upon the results of these tests, the Navy will determine if polyester polyurethane material is substantially equivalent to nitrile and will be used for future application in our aircraft fuel cells. If the test results are positive we would conclude that the life cycle cost of polyurethane and nitrile cells would be similar based on their comparable acquisition costs.

4. POC NAVAIR, Mr. B. Wolfhard, ph. 703-692-3646.

R. Hume
R. Hume
By direction

Appendix D. Air Force H-3 Helicopter Fuel Cells in Condition Code F

Serial No.	Manufacturer	Date of Manufacture	Age From Date Of Manufacture To 1993 (years)	Findings	Repairable Yes	Repairable No	Repairable Unused[1]
0150	EFC[2]	1960	33	Paint Peeling, Dry Rot		X	
0021	EFC	1963	30	Clean, Oil Smell	X		
0074	EFC	1963	30	Paint Peeling, Oil Smell	X		
0934	EFC	1963	30	Stiff, Dry Rot, Peeling		X	
0105	EFC	1964	29	Stiff, Oiled, Clean	X		
0138	EFC	1964	29	Paint Peeling, Clean	X		
0114	EFC	1965	28	Collapsed, Separation		X	
0137	EFC	1965	28	Dirty, Possible Corrosion		X	
0177	EFC	1965	28	Corrosion, Oiled		X	
0186	EFC	1965	28	Dirty, Paint Peeling		X	
0197	EFC	1965	28	Peeling, Possible Dry Rot		X	
0203	EFC	1965	28	Dirty, Possible Corrosion		X	
0219	EFC	1966	27	Clean, No Oil	X		
0222	EFC	1966	27	Clean, Oil Smell	X		
0234	EFC	1966	27	Paint Peeling, Clean	X		
0235	EFC	1967	26	Dirty, Mildew	X		
0260	EFC	1967	26	Dirty, Corrosion, Oil	X		
0132	EFC	1968	25	Stiff, Clean, Cracking	X		
0259	EFC	1968	25	Dirty, Mildew	X		
0263	EFC	1968	25	Collapsed In Box		X	
0267	EFC	1968	25	Mildew, Some Oil	X		
0308	EFC	1968	25	Dirty, Fitting Corroded		X	
0156	EFC	1969	24	Paint Peeling, Oil Smell	X		
0362	EFC	1969	24	Dirty, Mildew, Oiled	X		
0397	EFC	1970	23	Collapsed, Corrosion		X	

See footnotes at end of appendix.

Serial No.	Manufacturer	Date of Manufacture	Age From Date Of Manufacture To 1993 (years)	Findings	Repairable Yes	Repairable No	Repairable Unused[1]
75-72409	EFC	1975	18	Paint Peeling, Mildew	X		
76-00690	EFC	1976	17	Dirty	X		
77-02470	EFC	1977	16	Clean, Oil In Sump	X		
77-02471	EFC	1977	16	Talc, Mildew Smell	X		
77-02472	EFC	1977	16	Slight Corrosion, Clean	X		
77-02473	EFC	1977	16	Clean	X		
0247	EFC	1978	15	Dirty, Some Oil	X		
02475	EFC	1978	15	Clean, Well Oiled	X		
02476	EFC	1978	15	Paint Cracking, No Oil	X		
78-02916	EFC	1978	15	Dirty, Possible Dry Rot		X	
78-02917	EFC	1978	15	Dirty, Corrosion	X		
78-02923	EFC	1978	15	Dry Rot, Corrosion		X	
78-02943	EFC	1978	15	Stiff, Peeling, Clean	X		
78-02947	EFC	1978	15	Clean, Well Oiled	X		
78-02951	EFC	1978	15	Clean, Mildew Inside	X		
78-02961	EFC	1978	15	Clean, Oiled	X		
78-02962	EFC	1978	15	Clean, Oiled	X		
78-02970	EFC	1978	15	Could Not See Inside	X		
78-03157	EFC	1978	15	Activation, Separation		X	
78-03158	EFC	1978	15	Corrosion, Separation		X	
78-03182	EFC	1978	15	Dirty	X		
78-03214	EFC	1978	15	Collapsed, Corrosion		X	
78-03217	EFC	1978	15	Collapsed, Corrosion		X	
78-03222	EFC	1978	15	Separation		X	
78-03225	EFC	1978	15	Clean, Dirt On Exterior	X		
78-03226	EFC	1978	15	Mildew, Oiled	X		
78-03230	EFC	1978	15	Clean, Oil In Sump	X		
78-03288	EFC	1978	15	Corrosion, Dirty, Mildew		X	

See footnotes at end of appendix.

Serial No.	Manufacturer	Date of Manufacture	Age From Date Of Manufacture To 1993 (years)	Findings	Repairable Yes	Repairable No	Repairable Unused[1]
78-03313	EFC	1978	15	Collapsed, Dirty		X	
78-03317	EFC	1978	15	Sump Patch Peeling		X	
78-03321	EFC	1978	15	Peeling, Separation		X	
78-03326	EFC	1978	15	Rubber Separation		X	
78-03327	EFC	1978	15	Activation, Collapsed		X	
78-03334	EFC	1978	15	Clean, Oiled	X		
78-03337	EFC	1978	15	Clean	X		
78-03356	EFC	1978	15	Collapsed, Corrosion		X	
79-01003	EFC	1979	14	Mildew, Possible Dry Rot		X	
79-01093	EFC	1979	14	Mildew	X		
79-01234	EFC	1979	14	Clean	X		
79-01235	EFC	1979	14	Several Holes Marked	X		
79-01236	EFC	1979	14	Clean	X		
79-02046	EFC	1979	14	Dirty, Oiled	X		
79-02140	EFC	1979	14	Corrosion, Activation		X	
80-01752	EFC	1980	13	Dirty	X		
80-01755	EFC	1980	13	Dirty, Corrosion		X	
80-01756	EFC	1980	13	Dirty, Corrosion	X		
83-04290	EFC	1983	10	Dirty	X		
86-24161	EFC	1986	7	Clean, Severely Squashed		X	
86-24171	EFC	1986	7	Dirty, Oiled	X		
86-24172	EFC	1986	7	Deteriorated, Squashed		X	
86-24177	EFC	1986	7	Could Not See Inside		X	
86-24179	EFC	1986	7	Expired Shelf Life			X[3]
86-24182	EFC	1986	7	Squashed, Oiled	X		
86-24184	EFC	1986	7	Clean, Oiled	X		
86-24188	EFC	1986	7	82C18 Repair Cement	X		
86-24190	EFC	1986	7	Cut Up, Stiff		X	

See footnotes at end of appendix.

Serial No.	Manufacturer	Date of Manufacture	Age From Date Of Manufacture To 1993 (years)	Findings	Repairable Yes	Repairable No	Unused[1]
86-24191	EFC	1986	7	Clean, Oiled	X		
86-24204	EFC	1986	7	Expired Shelf Life			X[3]
86-24210	EFC	1986	7	Collapsed In Box	X		
86-24223	EFC	1986	7	Paint Peeling, Clean	X		
86-24233	EFC	1986	7	Dirty, 82C18 Cement	X		
86-24237	EFC	1986	7	Clean, Oiled	X		
86-24246	EFC	1986	7	Dirty	X		
86-24452	EFC	1986	7	Stiff, Dirty		X	
88-06558	EFC	1988	5	Dirty		X	
88-06561	EFC	1988	5	Dirty, Mildew	X		
88-06562	EFC	1988	5	Dusty, Oiled	X		
88-06650	EFC	1988	5	Expired Shelf Life			X[3]
88-06651	EFC	1988	5	Expired Shelf Life			X[3]
89-00027	EFC	1989	4	Expired Shelf Life			X[3]
89-20032	EFC	1989	4	Expired Shelf Life			X[3]
89-20002	EFC	1989	4	Expired Shelf Life			X[3]
89-20003	EFC	1989	4	Expired Shelf Life			X[3]
89-20008	EFC	1989	4	Expired Shelf Life			X[3]
89-20009	EFC	1989	4	Expired Shelf Life			X[3]
89-20010	EFC	1989	4	Expired Shelf Life			X[3]
89-20012	EFC	1989	4	Expired Shelf Life			X[3]
89-20015	EFC	1989	4	Expired Shelf Life			X[3]
89-20016	EFC	1989	4	Expired Shelf Life			X[3]
89-20019	EFC	1989	4	Expired Shelf Life			X[3]
89-20020	EFC	1989	4	Expired Shelf Life			X[3]
89-20021	EFC	1989	4	Expired Shelf Life			X[3]
89-20022	EFC	1989	4	Expired Shelf Life			X[3]

See footnotes at end of appendix.

Serial No.	Manufacturer	Date of Manufacture	Age From Date Of Manufacture To 1993 (years)	Findings	Repairable Yes	Repairable No	Repairable Unused[1]
89-20024	EFC	1989	4	Expired Shelf Life			X[3]
89-20026	EFC	1989	4	Expired Shelf Life			X[3]
89-20028	EFC	1989	4	Expired Shelf Life			X[3]
89-20029	EFC	1989	4	Expired Shelf Life			X[3]
89-20030	EFC	1989	4	Expired Shelf Life			X[3]
89-20031	EFC	1989	4	Expired Shelf Life			X[3]
89-20034	EFC	1989	4	Expired Shelf Life			X[3]
89-20038	EFC	1989	4	Expired Shelf Life			X[3]
89-20039	EFC	1989	4	Expired Shelf Life			X[3]
89-20040	EFC	1989	4	Expired Shelf Life			X[3]
89-20041	EFC	1989	4	Expired Shelf Life			X[3]
89-20045	EFC	1989	4	Corrosion, Dirty	X		
89-20046	EFC	1989	4	Expired Shelf Life			X[3]
89-20047	EFC	1989	4	Expired Shelf Life			X[3]
89-20049	EFC	1989	4	Expired Shelf Life			X[3]
89-20078	EFC	1989	4	Expired Shelf Life			X[3]
1	Pirelli	1989	4	Fitting Corrosion			X[4]
1	Pirelli	1989	4	Expired Shelf Life			X[3]
2	Pirelli	1989	4	Corrosion In Hoses			X[4]
2	Pirelli	1989	4	Slight Corrosion			X[4]
00003	Pirelli	1990	3	Expired Shelf Life			X[3]
00004	Pirelli	1990	3	Expired Shelf Life			X[3]
00004	Pirelli	1990	3	Expired Shelf Life			X[3]
00005	Pirelli	1990	3	Possible Corrosion			X[4]
00005	Pirelli	1990	3	Expired Shelf Life			X[3]
00005	Pirelli	1990	3	Flaws And Corrosion			X[4]
00006	Pirelli	1990	3	Pits In Fitting			X[4]

See footnotes at end of appendix.

Serial No.	Manufacturer	Date of Manufacture	Age From Date Of Manufacture To 1993 (years)	Findings	Repairable Yes	Repairable No	Unused[1]
00006	Pirelli	1990	3	Expired Shelf Life			X[3]
00008	Pirelli	1990	3	Fitting Corrosion			X[4]
00009	Pirelli	1990	3	Casting Flaws			X[4]
00010	Pirelli	1990	3	Expired Shelf Life			X[3]
00012	Pirelli	1990	3	Expired Shelf Life			X[3]
00016	Pirelli	1990	3	Fitting Corrosion			X[4]
0003	Pirelli	1990	3	Expired Shelf Life			X[3]
Total					57	34	51

Total Number of Fuel Cells Evaluated 142

[1]As determined by Navy technical expert.
[2]EFC was previously owned by Goodyear Aerospace Corporation and Loral Corporation.
[3]Fuel cell was never used and required only inspection and possible oiling before being returned to serviceable condition. Total of 42 fuel cells in this category.
[4]Items required minor repairs. Total of nine fuel cells in this category.

Appendix E. Summary of Potential Benefits Resulting From Audit

Recommendation Reference	Description of Benefit	Amount and/or Type of Benefit
1.a.	Economy and Efficiency. Maintains visibility of serviceable aircraft fuel cells with an expired shelf life, preventing unnecessary procurements and repairs of such items.	Undeterminable.*
1.b.	Economy and Efficiency. Reassigns to condition code A (serviceable), those aircraft fuel cells inappropriately coded as unserviceable.	Nonmonetary.
1.c.	Economy and Efficiency. Provides timely and efficient inspection and routine maintenance of serviceable aircraft fuel cells as required upon shelf-life expiration.	Nonmonetary.
2.a.	Economy and Efficiency. Maintains visibility of serviceable type II nonconsumable items with an expired shelf life, preventing unnecessary procurements and repairs of such items.	Undeterminable.*
2.b.	Economy and Efficiency. Reassigns to condition code A (serviceable), those items inappropriately coded as unserviceable.	Nonmonetary.

*Sufficient data were not available to quantify the unnecessary procurements and repairs that could be prevented.

Appendix E. Summary of Potential Benefits Resulting From Audit

Recommendation Reference	Description of Benefit	Amount and/or Type of Benefit
2.c.	Economy and Efficiency. Provides timely and efficient inspection and routine maintenance of serviceable, nonconsumable, type II shelf-life items as required upon shelf-life expiration.	Nonmonetary.

Appendix F. Organizations Visited or Contacted

Office of the Secretary of Defense

Under Secretary of Defense for Acquisition, Washington, DC
Director of Defense Procurement, Washington, DC
Assistant Secretary of Defense (Production and Logistics), Washington, DC

Department of the Navy

Naval Air Systems Command, Arlington, VA
V-22 Program Office, Air Anti-Submarine Warfare, Assault and Special Mission Programs, Arlington, VA
Materials Engineering Division, Production Support Department, Naval Aviation Depot, Pensacola, FL
Repair Shop, Dynamic Components Department, Naval Aviation Depot, Pensacola, FL
Repairable Components Branch, Supply Operations Department, Naval Air Station, Pensacola, FL

Department of the Air Force

Rotary Wing Division, Special Operations Forces Management Directorate, Warner Robins Air Logistics Center, Robins Air Force Base, GA
F-15 System Program Office, Aircraft Systems Branch, Warner Robins Air Logistics Center, Robins Air Force Base, GA
Supply Policy Branch, Supply Systems Division, Air Force Materiel Command, Wright-Patterson Air Force Base, OH
Technical Infrastructure Division, Engineering Directorate, Air Force Materiel Command, Wright-Patterson Air Force Base, OH
Maintenance Information Systems Branch, Air Combat Command, Langley Air Force Base, VA

Defense Organizations

Materiel Management Directorate, DoD Shelf-Life Programs, Defense Logistics Agency, Alexandria, VA
Inventory Integrity Division, Defense Distribution Depot, Robins Air Force Base, GA
Storage Warehouse Section, Defense Distribution Depot, Pensacola, FL

Non-Defense Organizations

General Accounting Office, Washington, DC
Engineered Fabrics Corporation, Rockmart, GA

Appendix G. Report Distribution

Office of the Secretary of Defense

Under Secretary of Defense (Acquisition and Technology)
Director of Defense Procurement
Comptroller of the Department of Defense
Deputy Under Secretary of Defense (Logistics)

Department of the Army

Secretary of the Army
Auditor General, Department of the Army

Department of the Navy

Secretary of the Navy
Assistant Secretary of the Navy (Research, Development, and Acquisition)
Assistant Secretary of the Navy (Financial Management)
Comptroller of the Navy
Commander, Naval Air Systems Command
Commander, Naval Supply Systems Command
  Commander, Naval Aviation Depot, Pensacola
Auditor General, Naval Audit Service

Department of the Air Force

Secretary of the Air Force
Assistant Secretary of the Air Force (Financial Management and Comptroller)
Commander, Air Force Materiel Command
  Commander, Warner Robins Air Logistics Center
Auditor General, Air Force Audit Agency

Defense Organizations

Director, Defense Logistics Agency
  Deputy Director, Materiel Management

Non-Defense Federal Organizations and Individuals

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

Chairman and Ranking Minority Member of Each of the Following Congressional Committees and Subcommittees:
- Senate Committee on Appropriation
- 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 Operations
- House Subcommittee on Legislation and National Security, Committee on Government Operations

Senator John Glenn, U.S. Senate
Congressman George Darden, U.S. House of Representatives
Congressman David L. Hobson, U.S. House of Representatives

Part IV - Management Comments

Department of the Air Force Comments

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE

24 JAN 1991

MEMORANDUM FOR ASSISTANT INSPECTOR GENERAL FOR AUDITING, OFFICE OF THE INSPECTOR GENERAL, DEPARTMENT OF DEFENSE

FROM: AF/LG

SUBJECT: DOD/IG Draft Audit Report, Navy and Air Force Aircraft Fuel Cells, (Project No. 2 CF-8014.01) - INFORMATION MEMORANDUM

This is in reply to your request for Air Force comments on the subject report. We concur with the subject report's findings; our comments are attached.

Point of contact is Major Teresa Dicks, AF/LGMY, 7-9178.

JOHN M. NOWAK, Lt Gen, USAF
DCS/Logistics

Attachment:
Audit Comments

TITLE: DOD/IG Audit, Navy and Air Force Aircraft Fuel Cells (Project No. 2 CF-8014.01)

Recommendation 1: For aircraft fuel cells:

a. Revise Distribution and Supply Operating Instruction (DSOI) 67-27, "Shelf-Life Procedures," to require that storage activity officials assign all serviceable fuel cells to condition code J (suspended, in stock) when the item shelf-life expires.

b. Initiate a review of fuel cells in condition code F (unserviceable, repair or overhaul), and reassign to condition code J those items that can be returned to serviceable condition with minimal effort.

c. Initiate on-site inspections and routine maintenance as needed on all fuel cells in condition code J to extend the expired shelf-life, thereby restoring the items to condition code A (serviceable).

Corrective Action: Concur with recommendation 1. DSOI 67-27, "Shelf-Life Procedures," was rescinded by WR ALC/DSMD. Effective immediately, fuel cells having an expired shelf-life will be placed in condition code J. Item managers are initiating action to have items tested/inspected, and returned to serviceable condition. WR ALC/LUH is currently working closely with DLA/DDWG-D to review fuel cells in condition code F due to shelf-life expiration to determine asset serviceability. New items with an expired shelf-life will be reinspected and returned to condition code A if applicable. Unserviceable items, not economically feasible to repair, will be condemned. These changes will bring management of fuel cells in compliance with DOD 4140.27-M (Shelf-Life Item Management Manual).

Recommendation 2: For other type II nonconsumable shelf-life items:

a. Revise Distribution and Supply Operating Instruction 67-27, "Shelf-Life Procedures," to require that storage activity officials assign all serviceable items to condition code J when the item shelf-life expires.

b. Initiate a review of items in condition code F, and reassign to condition code J those items that can be returned to serviceable condition with minimal effort.

c. Initiate on-site inspections and routine maintenance, as needed, on all items in condition code J to extend the expired shelf-life, thereby restoring the items to condition code A. Revised

Corrective Action: Concur with recommendation 2 to extend the procedures identified in recommendation 1 to other nonconsumable shelf-life type II items. DLA/DDWG-V emphasizes the requirement that the item manager take action to have their items tested/inspected within 90 days of the assets being placed in condition code J. However, DLA/DDWG-V is concerned limited funding available to item managers may result in assets remaining in condition code J for periods exceeding 90 days necessitating multiple follow-ups by the item manager for disposition. DLA/DDWG-V nonconcurs with the recommendation that inspections and routine maintenance be conducted on-site. Storage areas are inappropriate for this type of work and would disrupt warehousing operation. Assets should be inducted/moved to local maintenance activities or shipped off-base, as required.

Audit Team Members

Paul J. Granetto	Director, Contract Management Directorate
Salvatore D. Guli	Audit Program Director
Ronald W. Hodges	Audit Project Manager
Myra M. Frank	Senior Auditor
Dora Y. Lee	Auditor
Jasper J. Sciuto	Auditor
Lorin T. Pfeil	Auditor
Michelle A. Catullo	Auditor
Sandra S. Hammer	Materials Engineer, Naval Aviation Depot
Ana M. Myrie	Administrative Support

INTERNET DOCUMENT INFORMATION FORM

A . Report Title: Navy and Air Force Aircraft Fuel Cells

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Inspector General, Department of Defense
400 Army Navy Drive (Room 801)
Arlington, VA 22202-2884

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