



U.S. Department of Energy  
Office of Inspector General  
Office of Audit Services

# Audit Report

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## Office of Secure Transportation DC-9 Aircraft Refurbishment

DOE/IG-0815

May 2009



**Department of Energy**  
Washington, DC 20585

May 6, 2009

MEMORANDUM FOR THE SECRETARY

A handwritten signature in black ink, appearing to read "Greg Friedman".

FROM: Gregory H. Friedman  
Inspector General

SUBJECT: INFORMATION: Audit Report on "The Office of Secure Transportation DC-9 Aircraft Refurbishment"

BACKGROUND

The National Nuclear Security Administration's (NNSA) Office of Secure Transportation (OST) maintains a fleet of seven aircraft to transport sensitive items, equipment and security personnel. Based on increasing requirements for transporting components and security personnel, OST decided to add a heavy transport aircraft to meet the Department's weapons surety and emergency response missions. In 2004, as a replacement following the sale of a portion of its fleet, OST acquired a DC-9 cargo aircraft that had been excessed by the U.S. military. Prior to integrating the DC-9 into its fleet, NNSA ordered a refurbishment of the aircraft. This refurbishment project was to permit the aircraft to be certified to civil air standards so that it could transport passengers for site visits, training and other travel. The NNSA Service Center (Service Center) awarded a contract for the refurbishment of the aircraft in December 2004.

In recent years, the Office of Inspector General has addressed a number of issues relating to the Department's aircraft management activities and services. As part of our ongoing review process and because of the national security importance of its fleet of aircraft, we conducted this review to determine whether OST had an effective and efficient aviation management program.

RESULTS OF AUDIT

The Department had improved aspects of its aviation management program. Yet, our review revealed problems with OST's aircraft refurbishment process. In OST's most recent acquisition and refurbishment of the DC-9 aircraft, we found that cost increases of about \$1 million and four separate work stoppages associated with contract modifications could have been avoided. Specifically,

- NNSA entered into a firm-fixed-price contract for the refurbishment even though, at the time of the award, it could not determine the extent of work or full cost necessary to complete the project; and,



- Rather than using interim contracting instruments that could have permitted work to continue, officials suspended work for extended periods to negotiate changes to the original fixed-price contract as the extent of refurbishment work became known.

Knowledgeable Department officials informed us that although they advised the Service Center that a firm-fixed-price contract was inappropriate for this project, the Service Center determined that no other contracting option was possible. Prior to commencing the refurbishment, Departmental aviation management officials advised NNSA that because of the significant number of uncertainties with the project, they believed that a time and materials contract would provide the flexibility necessary to monitor costs and control performance. NNSA contracting officials, however, believed that the scope of work was sufficiently defined to proceed with a fixed-price instrument. They also believed that the refurbishment was a contract for a commercial item and concluded that the Federal Acquisition Regulation required a fixed-price contract for this project. However, as noted by aviation management officials and as confirmed by our review, fixed-price contracts are not specifically required for refurbishment projects such as this. In fact, other hybrid contracting options were available that would have allowed better control over projects with significant unknowns such as this particular effort.

The lengthy refurbishment process to get the aircraft modified and certified to civil air standards had a negative impact on OST's mission. Mission critical work by the OST was, in some cases, curtailed. Approximately four years after the project began the aircraft had not been certified to civil air standards, as originally planned. A contracting official stopped / started work on four occasions to negotiate contract modifications rather than using a non-definitized contracting arrangement that would have permitted work to continue during negotiations. Additional issues associated with the work stoppages and contract modifications increased project costs by approximately \$1 million.

#### Fixed-Price Contracting Considerations

The issues raised in this report address the sensitive topic of fixed-price contracting. We recognize that, in general, fixed-price contracts provide greater value to the Government and that they minimize the cost to the taxpayer for a wide variety of commercial items and other activities. Ensuring that the Department receives the best value from its contracting activities is, in fact, critical to achieving the goals of the recently enacted *American Recovery and Reinvestment Act of 2009*. However, fixed-price contracts are not the most effective procurement instrument in certain situations. For the DC-9 refurbishment effort, there were so many uncertainties that a fixed-price instrument was not in the Government's best interest. In our view, the refurbishment work effort should have been segmented in such a way as to recognize the uncertainties yet to rely, to the extent practical, on fixed-price principles. For example, contracting officials could have used fixed-price contracts to acquire components, services or items for which a scope of work could be adequately defined. For other portions of the work for which clearly defined specifications were not available at the outset, a non-definitized contracting

mechanism could have been used to bridge gaps between fixed-price segments and avoid the extensive delays associated with the multiple contract modification negotiations that occurred in this case.

### Response to IG Reports

In response to recommendations in our prior reports, the Department had taken steps to centralize certain functions within its aviation management program. It established the Office of Aviation Management to review aircraft operations, monitor costs and approve acquisitions and disposals of aircraft. These positive steps were responsive to our recommendations. However, with respect to aircraft acquisitions, additional action is necessary to strengthen management controls and improve efficiency and effectiveness of refurbishment efforts. Accordingly, we made recommendations in this report designed to address the remaining weaknesses. Addressing these recommendations is critical in light of future plans by OST to replace its entire fleet of DC-9 aircraft with 737s starting as early as Fiscal Year 2010. These plans will likely require additional refurbishment projects to bring these aircraft up to the specifications needed for OST to complete its unique mission. If fully implemented, our recommendations should help the Department avoid similar problems as it embarks on these additional planned refurbishment projects.

### MANAGEMENT REACTION

NNSA generally agreed with the report, concurred with our recommendations and agreed to take appropriate action. NNSA, however, continued to support its original contracting decision and did not agree with what it viewed as the report's presumption that the scope of the project was unknowable, thereby precluding development of more definitive specifications and the use of a fixed-price contract.

As noted by the aviation experts we consulted, the full scope of the work required for this refurbishment could not have been known until the aircraft was disassembled and fully inspected. Our findings and the opinion of these experts are consistent with an internal NNSA review of the refurbishment which concluded that the work required was not sufficiently defined prior to the contract being awarded.

Management's summarized comments and our responses are contained in the body of the report. Management's comments, in their entirety, are included as Appendix 3.

### Attachment

cc: Office of the Deputy Secretary  
Office of the Under Secretary of Energy  
Chief of Staff  
Assistant Deputy Administrator for Secure Transportation, NA-15  
Program Manager, Office of Secure Transportation (OST), Albuquerque  
Director, Office of Management, MA-1  
Director, Office of Aviation Management, MA-30

# **AUDIT REPORT ON THE OFFICE OF SECURE TRANSPORTATION DC-9 AIRCRAFT REFURBISHMENT**

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# AVIATION MANAGEMENT AT THE OFFICE OF SECURE TRANSPORTATION

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## Cost and Scope Uncertainties

The National Nuclear Security Administration (NNSA) entered into a fixed-price contract to refurbish a DC-9 aircraft that it acquired from the U.S. Navy even though it lacked sufficient information to develop the full cost and scope of the work necessary to complete the project. Because the fixed-price contract was based on an uncertain scope of work that was subject to change, time consuming modifications to the original contract had to be made as the extent of work necessary to refurbish the aircraft became known. According to aviation management officials, NNSA could have avoided many of the extensive disruptions and delays that plagued this project.

### Contract Uncertainties

The contract for the refurbishment of the DC-9 aircraft did not reflect the significant uncertainties that were known to exist at the time it was awarded. Normally, Federal procurement regulations indicate that firm-fixed-price contracts should be awarded when the scope of a project is well-defined and total costs can be reasonably established. In the case of this refurbishment, an initial independent cost study estimated that the project would cost \$3.25 million. However, the limited scope of the cost study was not sufficient to ascertain the full extent of the refurbishment. Officials knew, in advance of the award, that the scope of the refurbishment project was uncertain and NNSA's Office of Secure Transportation (OST) had estimated that the total cost could be as much as \$4.5 million. Despite the uncertainties and the assumption that the cost could be much higher, NNSA concluded that the scope of work was sufficiently defined and awarded a firm-fixed-price contract to an aircraft refurbishment contractor for \$2.4 million.

When the full extent of repairs and modifications became known as the aircraft was disassembled and inspected, officials were required to make a number of modifications to the original contract. Aviation management officials told us that they recognized the full extent of refurbishment could not be known until work began on components such as replacement of engines, upgrades to the interior,

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removal of the auxiliary fuel system, corrosion elimination and sheet metal replacement. In spite of that knowledge, however, NNSA elected to use a contracting method that was based on a specifically defined scope of work. As a consequence, when an issue that fell outside the work scope surfaced during the project, modifications to the contract had to be negotiated. Instead of using a non-definitized work scope contract modification that would have permitted work to continue during negotiations, NNSA chose to stop the refurbishment effort on four separate occasions. Only after the new scope of work and additional costs were approved was the refurbishment contractor permitted to resume work.

#### Alternative Contracting Methods Available

According to aviation officials within the Office of Aviation Management (OAM) and OST who were experienced with aircraft refurbishments, modifications to the contract and the corresponding delays would not have been necessary with a time and materials type of contract. Based on our conversations with OAM and OST officials, we learned that they had advised the Service Center that a firm-fixed-price contract was inappropriate for this project. OAM indicated that a time and materials contract could have allowed NNSA to challenge every task being accomplished on the aircraft. According to OST, once each task and parts order is approved under a time and materials contract, work can begin immediately. If the cost of a part or a service appears too high, it can be negotiated on the spot. With a time and materials contract or the use of a non-definitized contract modification, OST indicated that it could have avoided the approximately eight months of delays that were encountered just in processing the four contract modifications. Additionally, disruptions in the flow of work from stopping and re-starting work likely resulted in additional delays.

#### **Consideration of Other Contracting Methods**

Cost increases and delays associated with the refurbishment of the DC-9 occurred, in part, because officials at the NNSA Service Center did not fully evaluate available contracting methods or heed the advice of the Department's aviation experts.

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Although officials in the Service Center believed that a fixed-price contract was their only option, other contract types or a combination of different types of contracts are allowed under the Federal Acquisition Regulation (FAR) when a reasonable basis for firm pricing does not exist. Additionally, while officials knowledgeable of aircraft refurbishment projects believed and specifically advised NNSA that a time and materials contract would better ensure the success of this project, the Service Center believed that it did not have any other alternatives.

### Contracting Options

Service Center officials based their opinion that a fixed-price contract was necessary on the FAR, which states that contracts for commercial items should be fixed-price. According to the FAR, a firm-fixed-price contract is suitable for acquiring commercial items when prices can be established at the outset, such as when there have been prior purchases of similar items or when uncertainties can be identified and reasonable estimates of their cost impact can be made. Firm-fixed-price contracts are tailored toward instances where there is a specific, defined scope of work and a benchmark to establish that the price is reasonable. In this case it turned out that a firm-fixed-price contract type was not optimum for the numerous unknowns associated with an aircraft refurbishment effort, as evidenced by the award of four modifications to the original contract for the DC-9 refurbishment.

In this case, the contract in question was for a refurbishment, not the purchase of a commercially available item, and other options were available. Because it was a refurbishment, prices could not be reasonably estimated at the time of the award. Only after the project was started, panels and components were removed, and the interior structure of the aircraft was exposed could uncertainties be resolved, additional components and/or repairs be identified and cost estimates made. In situations such as this, Department of Energy contracting officials outside of NNSA indicated that the FAR is flexible with respect to contract types. Time and



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materials or hybrid contracts are allowed, instruments which would have provided OST with the opportunity to issue small, controllable and measureable task orders for specific pieces of the refurbishment effort and thus avoid the lengthy contract modification process. Even with a fixed-price contract, officials could have used available contracting flexibilities to avoid work stoppages during negotiations for contract modifications.

#### Expert Opinions

Despite recommendations to the contrary, NNSA believed that the FAR did not allow for other options. Officials from OAM and OST understood that there were too many uncertainties for a firm-fixed-price contract and concluded that a time and materials contract would have been more appropriate. The Service Center, however, did not follow OAM and OST's advice and relied on its interpretation that the FAR did not allow for anything other than a firm-fixed-price contract.

#### **Excessive Cost and Delays, Unmet Mission Requirements**

The lengthy process adopted by NNSA to refurbish the DC-9 aircraft resulted in additional costs and excessive delays, and negatively affected OST's ability to carry out its mission. Officials at both OST and OAM agreed that significant time and money could have been saved if contracting flexibilities available to NNSA had been used. Although the total amounts of actual excessive costs and delays in time for this contract are difficult to quantify, the Technical Representative at OST that was in charge of this project estimated that approximately \$1 million could have been saved by using a time and materials contract. For example, an OST official told us that a time and materials contract would have allowed them to negotiate individual tasks for each phase of the refurbishment and save approximately \$583,000. OST added that during the period when the fourth modification was being negotiated it incurred storage costs of \$50,000 for the aircraft, and costs of \$400,000 for storing aircraft components and moving the component inventory to and from the hangar. In addition, because the DC-9 was critical to NNSA's mission, delays in completing the project resulted in the

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acquisition of additional charter services to meet some of its critical missions. OST also indicated that some mission needs were not met at all.

As of the date of this report, total costs have more than doubled, the duration of the project has approximately tripled, and the project has yet to meet its original civil air standards requirement for transporting passengers. The original estimate for this contract was \$3.25 million in costs and six to eight months to complete, including four months for the refurbishment contractor to complete its work. However, actual costs of this project totaled approximately \$6.8 million, including approximately \$6 million for the refurbishment contractor. The refurbishment contractor ultimately took about 21 months to perform its work. Additionally, almost four years after this refurbishment project began, the DC-9 has yet to be certified to civil air standards for transporting passengers as was originally intended because it lacks a hardened cockpit door. The OST official responsible for this refurbishment told us that the aircraft is now capable of meeting 90 percent of the originally specified requirements. As such, the additional costs to install the door would be excessive and would delay the project even further. Officials at OAM believed that the installation of the hardened cockpit door would complete the refurbishment project and allow OST to better utilize its entire fleet for the intended mission. A final decision on whether or not to install the door had not yet been made by the time our audit report was published.

## **RECOMMENDATIONS**

The issues cited in this report point to weaknesses that should be addressed in light of future plans by OST to replace its entire fleet of DC-9 aircraft with 737s starting as early as Fiscal Year 2010. These plans will likely require additional refurbishment projects to bring these aircraft up to the specifications needed for OST to complete its unique mission. The use of proper contracting methods should help minimize the costs and duration of these projects. Accordingly, for future aircraft acquisitions and refurbishments we recommend that the Senior Procurement Executive, NNSA ensure that:

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1. Uncertainties are minimized for all types of contracts and to the maximum extent practicable, the full scope of work necessary to complete a project is developed before a firm-fixed-price contract is awarded;
  2. All available contracting options are considered in instances where project requirements cannot be defined with an acceptable degree of certainty or sufficient information is not available to award a firm-fixed-price contract; and,
  3. Advice and recommendations from the OAM are obtained as part of the contract award process.

## **MANAGEMENT REACTION**

Management generally concurred with the report and agreed to implement the recommendations. In commenting on our official draft report, the NNSA Associate Administrator for Management and Administration stated that NNSA continued to support the original determination that the refurbishment project was commercial work, and as such, a fixed-price contract was required. In addition, NNSA did not agree with the presumption that the scope of the project was unknowable, precluding the development of a more definitive specification and the use of a fixed-price contract. Management's comments, in their entirety, are included as Appendix 3 of this report.

## **AUDITOR COMMENTS**

Management's comments are responsive to our report. As noted by the aviation experts we consulted, the full scope of the work required for this refurbishment could not have been known until the aircraft was disassembled and fully inspected. Our findings and the opinion of these experts are consistent with an internal NNSA review of the refurbishment which concluded that the work required was not sufficiently defined prior to the contract being awarded. Contrary to NNSA's assertion, we do not believe the extent of the work required could not have been known; only that it was not known or developed prior to awarding a fixed-price contract designed to accomplish the entire refurbishment. While we agree that a fixed-price contract was one option for this project, it was not the only option, and in this case, it turned out not to be the most efficient vehicle available.

## Appendix 1

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### OBJECTIVE

The objective of our audit was to determine whether the Office of Secure Transportation (OST) had an effective and efficient aviation management program

### SCOPE

This review was performed between June 2008 and December 2008 at Headquarters and at the Office of Secure Transportation, Albuquerque, New Mexico.

### METHODOLOGY

To accomplish the audit objective, we:

- Reviewed Federal, Department of Energy (Department) and site specific aviation related policies and procedures;
- Interviewed key personnel at this site;
- Assessed the selected site's compliance with the applicable federal guidance, internal aviation policies and Departmental contracts;
- Reviewed the acquisition and refurbishment process of a new aircraft that occurred in 2003;
- Reviewed internal audit reports and findings provided by the Office of Aviation Management (OAM) for the Fiscal Years 2004 through 2007; and,
- Interviewed key personnel in the OAM.

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. Because our review was limited, it would not necessarily have disclosed all internal deficiencies that may have existed at the time of our audit. During the audit, we assessed the Department's compliance

with the Government Performance and Results Act of 1993 and found that the Department had established specific performance measures. We did not rely on computer processed data. We held our exit conference with NNSA representatives on April 9, 2009.

### PRIOR OFFICE OF INSPECTOR GENERAL REPORTS

The Office of Inspector General (OIG) has previously reported on management of the Department of Energy's (Department) aviation program.

- *The U. S. Department of Energy's Aircraft Activities (DOE/IG-0435, January 1999).* A review of the Department's aircraft activities was requested by the Secretary. The OIG noted a need for increased Departmental management oversight of aviation activities. Independent reviews of the continuing need for aircraft were only performed on a limited basis, operating costs at the Albuquerque Operations Office (Albuquerque) were significantly higher than other locations, Headquarters did not validate mission needs when acquiring aircrafts, and information reported to General Services Administration significantly understated the Department's use of aircraft rentals and charters.
- *Aircraft and Air Service Management Programs (DOE/IG-0437, January 1999).* An audit was conducted to determine whether costs to operate Albuquerque's aircraft were excessive and if individual aircraft in the fleet were justified. The OIG found that costs to operate aircraft at Albuquerque were excessive because of the number of personnel employed by the air service contractor. In addition, the retention of one aircraft by Albuquerque that was used to transport passengers between Albuquerque, NM and Amarillo, TX was not justified.
- *Audit of Aircraft Management at the Bonneville Power Administration (CR-B-94-06, September 1994).* An audit was conducted to determine whether the Bonneville Power Administration (Bonneville) established and implemented policies, procedures, and controls to manage their aircraft activities efficiently, effectively, economically, safely, and in accordance with applicable laws and regulations. The OIG found that Bonneville could satisfy its workload with five rather than six helicopters and one rather than two airplanes. The OIG recommended that Bonneville dispose of one helicopter and one airplane.




**Department of Energy**  
**National Nuclear Security Administration**  
Washington, DC 20585



April 29, 2009

MEMORANDUM FOR: Rickey R. Hass  
Deputy Inspector General  
for Audit Services

FROM: Michael C. Kane   
Associate Administrator  
For Management and Administration

SUBJECT: Comments to Draft Report on Aviation Management;  
Project No. A08TG060; IDRMS No. 2009-01087

The National Nuclear Security Administration (NNSA) appreciates the opportunity to review the Inspector General's (IG) draft Report, "Management Controls over the Department's Aviation Management Program - Office of Secure Transportation." We understand that this audit was conducted to determine whether the Office of Secure Transportation (OST) had an effective and efficient aviation management program.

NNSA generally agrees with the report with the following exceptions:

1. NNSA supports the Contracting Officer's determination that the refurbishment of the DC-9 aircraft was "commercial work."
2. The Agency supports the Contracting Officer's original determination to contract for the refurbishment services on a fixed-price basis. The fact that the work turned out to be more complex than originally thought does not negate the validity of the decision.
3. The Agency does not agree with the presumption that the scope of the refurbishment was unknowable precluding development of a more definitive specification and the use of a fixed-price contract type.

NNSA agrees with the recommendations and will take appropriate action. We will provide detailed corrections to the recommendations during the Management Decision process.

Should you have any questions about this response, please contact the Cathy Tullis, Acting Director, Policy and Internal Controls Management, at 202-586-3857.

cc: David Boyd, Senior Procurement Executive  
Joseph Waddell, Head of Contracting Activity  
Jeffrey Harrell, Acting Associate Deputy Administrator for Secure Transportation  
Karen Boardman, Director, Service Center

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