
Office of Inspector General

Audit Report

*FAA Oversight of Power Systems
in the National Airspace System*

Federal Aviation Administration

Report Number: AS-FA-7-009

Date Issued: April 14, 1997



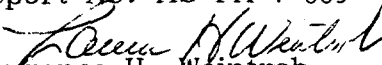


Memorandum

U.S. Department of
Transportation
Office of the Secretary
of Transportation
Office of Inspector General

Subject: INFORMATION: Report on FAA Oversight of
Power Systems in the National Airspace System
Report No. AS-FA-7-009

Date: APR 14 1997

From: 
Lawrence H. Weintrob
Assistant Inspector General for Auditing

Reply To
Attn Of: Stefani: x60500

To: Barry L. Valentine
Acting Federal Aviation Administrator

I am providing this report for your information and use. The audit results were discussed with the Director of the National Airspace System (NAS) Transition and Implementation Office within Airway Facilities Service at an exit conference on March 26, 1997. We considered her comments in preparing this report. During the audit, the Federal Aviation Administration (FAA) initiated several internal studies addressing power system vulnerabilities. FAA identified the same problems and deficiencies we identified. FAA also established action plans to correct the deficiencies. During the audit, action items were either completed or target dates for resolution were established. Accordingly, we are not making any recommendations in this report. A synopsis of the report follows this memorandum.

Since the report does not contain any recommendations, no response is required in accordance with Department of Transportation Order 8000.1C. I appreciate the cooperation and assistance your staff extended to the audit team. If you have any questions or require additional information regarding this report, please call me at x61992 or Alexis M. Stefani at x60500.

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U.S. Department of
Transportation

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FAA Oversight of Power Systems in the National Airspace System

Federal Aviation Administration

Report No. AS-FA-7-009

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Objective

The audit objective was to evaluate the effectiveness of FAA's oversight of National Airspace System (NAS) power systems.

Conclusion

FAA did not have adequate oversight over NAS power systems. This occurred because FAA did not have centralized management over power systems and did not have an accurate power system inventory. However, FAA has taken steps to identify and correct deficiencies concerning its oversight of power systems.

Monetary Impact

The report does not have a monetary impact.

Recommendations

We did not make any recommendations.

Management Position

Since we did not make recommendations, management is not required to respond to the report under Department of Transportation Order 8000.1C.

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I. INTRODUCTION

Background

The Federal Aviation Administration (FAA) relies on power systems to operate National Airspace System (NAS) facilities. A power system is comprised of primary power, backup power, and bonding, grounding, shielding, and lightning protection. FAA obtains primary and backup power from a variety of sources. At most FAA facilities, commercial power companies provide primary power. In case of a power failure, backup power is provided by engine generators, battery systems, or uninterruptible power systems which combine battery systems and engine generators. In September 1995, approximately 14,800 of FAA's 18,000 reportable facilities were supported by backup power.

As part of ongoing efforts to improve the NAS, FAA included a Capital Investment Plan project for Power Systems Sustained Support. This project was intended to provide power support for FAA facilities by replacing engine generators, providing improved lightning protection, installing battery backup systems where needed, and replacing deteriorated power supplies. In both Fiscal Years (FY) 1995 and 1996, FAA budgeted approximately \$5 million for these improvements. In FY 1997, FAA increased the budget for these improvements to \$15 million.

Another project to improve FAA's power systems is the Air Route Traffic Control Center (ARTCC) Critical/Essential Power System (ACEPS). The project is replacing the electrical power system that was over 25 years old and furnishing new power equipment and back-up power systems in 21 ARTCCs and 3 Terminal Radar Approach Control facilities. The cost of acquiring and installing ACEPS is approximately \$370 million and installation will be completed during FY 1997. In its Special Investigation Report on Air Traffic Control Equipment Outages, the National Transportation Safety Board (NTSB) concluded the ACEPS program should improve ARTCC electrical power systems, reducing the incidence of power failures once installation is completed.

Backup power systems are also acquired as part of other FAA projects. Engine generators and battery systems, for example, are acquired to replace underground fuel storage tanks under the NAS Facilities Occupational Safety and Health and Environmental Compliance Program.

Objectives, Scope And Methodology

Our revised audit objective was to evaluate the effectiveness of FAA's oversight of NAS power systems. When the audit began, our objectives were to determine whether acquisitions of power systems were timely, economical, adequately met environmental requirements, and effectively supported NAS implementation plans. On October 31, 1995, Congress passed the 1996 Department of Transportation Appropriations Act which directed FAA to develop and implement a new acquisition management system that addressed the unique needs of the agency. Subsequently, on April 1, 1996, FAA implemented a new acquisition management system that superseded existing acquisition policies and procedures. These actions, several internal studies and the fact that power systems are a part of all system acquisitions, significantly changed our audit approach and objective.

The audit was conducted between June 1995 and December 1996 at FAA Headquarters and in FAA's Southern, Great Lakes, and Western Pacific Regions. We analyzed FAA policies and procedures and reviewed program files to evaluate available information on power systems. We obtained and reviewed four internal FAA reports analyzing recent problems with power systems. We also reviewed the NTSB Special Investigation Report on Air Traffic Control Equipment Outages, dated January 23, 1996. Further, we held discussions with FAA officials responsible for power systems. The audit was performed in accordance with Government Auditing Standards prescribed by the Comptroller General of the United States and included such tests as we considered necessary.

Management Controls

We evaluated FAA's organizational structure and inventory system for the power system program. Part II of this report identifies weaknesses identified and FAA's corrective actions taken during the audit.

Prior Audit Coverage

Neither the Office of Inspector General (OIG) nor General Accounting Office has conducted any prior audits on the oversight of power systems in FAA. However, the OIG Office of Inspections and Evaluations issued two reports, one responding to

five Hotline complaints alleging waste and mismanagement in the ACEPS project and the second responding to a Congressional inquiry on the ACEPS project. No recommendations were made in these reports.

II. RESULTS OF AUDIT

FAA did not have adequate oversight over NAS power systems. This occurred because FAA did not have centralized management over power systems and did not have an accurate power system inventory. However, FAA has taken steps to identify and correct deficiencies concerning its oversight of power systems.

Fragmented Responsibility

The responsibility for power systems was not centralized within one organization. The responsibility was fragmented between four offices and no office was assigned primary responsibility for power systems. These offices included Operational Support Services and the NAS Transition and Implementation Service which report to the Associate Administrator for Air Traffic Services and the Office of Communication, Navigation, and Surveillance Systems and the Office of System Architecture and Program Evaluation which report to the Associate Administrator for Research and Acquisitions.

As a result of fragmented responsibility, 21 separate offices issued 71 orders, 7 standards, and 29 specifications addressing power issues. Because of FAA reorganizations, some of these offices have been abolished. Also, the information contained in some orders and specifications was outdated and did not apply to new technologies. For example, FAA Order 6950.2C, Electrical Power Policy Implementation at National Airspace System Facilities, dated November 16, 1987, has not been updated to reflect appropriate power requirements for current solid state computerized equipment.

Further, without a centralized management structure, requirements for developing engine generators were not consistent. For example, FAA estimates it has 128 different engine generator configurations in 27 different sizes from 51 different manufacturers. The lack of standard equipment increased support and maintenance costs.

Lack of An Accurate Power System Inventory

FAA did not have accurate and reliable data to identify its power system equipment or needs. FAA's Standby Power System Database (SPSD), governed by FAA Order 6980.17A, did not contain up to date information on engine generators. Regional

and sector offices developed local databases but no nationwide inventory exists. This hampered FAA's ability to identify critical information needed to modify or replace existing equipment. As a result, FAA's engine generators remained in service beyond their useful life of 15 years. According to FAA, of its 3,000 generators, more than 88 percent are more than 20 years old and 50 percent are more than 30 years old. Some generators are no longer reliable or economical to support because of age and required maintenance. Many replacement parts for engine generators installed in the 1950's and 1960's are no longer manufactured. According to FAA, in some cases, it was forced to utilize the costly processes of remanufacturing and reverse engineering to obtain replacement parts.

In September 1995, FAA entered into a 5-year \$87 million national engine generator contract. All FAA engine generators must be purchased through this contract. This contract will be used to replace generators and acquire generators for new equipment. FAA plans to replace 150 aging engine generators annually. The use of a single contract should simplify maintenance and support requirements.

Recent Actions

In November 1995, FAA released the "NAS Facility Power Follow-on Team Report". The follow-on team was chartered in March 1995 to ensure action was initiated to correct the problems identified in a November 1994 study. The team was tasked to complete three major initiatives: (1) baseline the system facility requirements and incorporate new technologies as appropriate; (2) identify and address resource requirements for both ongoing and new NAS facilities power systems; and (3) complete nine specific tasks identified by two preliminary reviews. The report contained nine action items identified by the team and steps have been taken to implement all of the action items. For example, to eliminate fragmentation of the power systems management structure, FAA created a Power Systems Management Division within Airway Facilities Service. Also, FAA redesigned the SPSD to correct inaccurate information on engine generators.

Also during our audit, FAA appointed an external blue ribbon panel of power system experts from industry and other Government agencies to investigate recurring power interruptions which disrupted ARTCC service. The blue ribbon team's primary focus was to assess vulnerability to power interruptions by

(1) examining the capability of existing power systems to provide continuous power, (2) reviewing day-to-day procedures for electrical power management, (3) reviewing procedures for introduction and transition of new power systems and components, (4) assessing adequacy of training and technical expertise, and (5) reviewing the design of the new ACEPS. The team issued a report in November 1995 that identified deficiencies in the old power systems and deficiencies in the design, installation, testing, and operator training for ACEPS. A monthly status report entitled "ARTCC Action Items" is compiled to track progress in implementing a wide range of ARTCC recommendations including 23 recommendations to improve power systems. As of December 15, 1996, 11 of the 23 recommendations were considered closed. The remaining 12 open recommendations have milestone dates for resolution and are assigned to offices of primary interest.

Conclusion

FAA has identified weaknesses in the power system program and has taken steps to correct them. Acquisitions of new and replacement power systems are centralized, the database on power equipment has been redesigned to collect more accurate data, and problems in installation have been addressed. Therefore, we have not included any recommendations in this report.

CONTRIBUTORS TO THIS REPORT

The following is a list of auditors who contributed to the report.

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