

W

May 13,1999

TO: Distribution

FROM: W/Assistant Inspector General for Auditing

SUBJECT: Final Report on Exemptions for Year 2000 Testing, Johnson Space Center
Audit Assignment A9900800
Report Number IG-99-025

The subject final report is provided for your use. Please refer to the Results in Brief for the overall audit results. We have incorporated your comments into the final report, as appropriate, and included them in their entirety as an appendix to our report. Our evaluation of your comments is included in the body of the report. The corrective actions taken or planned for recommendations 1 through 4 were responsive. Please provide us with the documented procedures that you used to implement the recommendations. All of the recommendations are undispositioned and will remain open pending receipt of documented procedures.

If you have questions concerning the report, please contact Mr. David L. Gandrud, Program Director, Information Technology Program Audits, at (650) 604-2672, or Ms. Bessie J. Cox, Auditor-in-Charge, at (281) 483-5271. We appreciate the courtesies extended to the audit staff. The final report distribution is in Appendix F.

[Original signed by]

Russell A. Rau

Enclosure

cc:

B/Chief Financial Officer

G/General Counsel

M/Associate Administrator for Space Flight

JM/Director, Management Assessment Division

bcc:

AO/Audit Liaison Representative

ARC/204-11/D. Gandrud, Program Director, Information Technology Program Audits

JSC/BD/Audit Liaison Representative

JSC/W-JS/B. Cox, Auditor

AIGA, IG, Reading (w/o Encl.) Chrons

**AUDIT
REPORT**

**EXEMPTIONS FOR YEAR 2000 TESTING,
JOHNSON SPACE CENTER**

MAY 13, 1999



National Aeronautics and
Space Administration

OFFICE OF INSPECTOR GENERAL

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Acronyms

CIO	Chief Information Officer
FMD	Financial Management Division
IT	Information Technology
Y2K	Year 2000

NASA Office of Inspector General

IG-99-025
A9900800

May 13, 1999

Exemptions for Year 2000 Testing, Johnson Space Center

Introduction

The NASA Office of Inspector General is conducting an audit of the Year 2000 (Y2K) implementation phase. The overall objective of the audit is to determine whether NASA has effectively managed the implementation of Y2K compliant systems. See Appendix A for the specific audit objectives. Although not specifically related to the audit objectives, we identified a condition at the Johnson Space Center (Johnson) that may adversely affect the Agency's Y2K efforts. See Appendix B for audit reports on Y2K matters issued by the NASA Office of Inspector General.

Results in Brief

Johnson's Financial Management Division (FMD) had not requested an exemption from the NASA Y2K Agency Testing and Certification Guidelines and Requirements (NASA guidance) for the Center Financial System. In the absence of an exemption to the July 1998 guidance, the Johnson Chief Information Officer (CIO) has no basis on which to assess the adequacy of testing the FMD performed on the Center Financial System prior to issuance of the guidance. Accordingly, the Agency lacks assurance that the Center Financial System will meet the minimum requirements for Y2K compliance.

Background

In August 1996, NASA initiated the Y2K program to address the challenges imposed on Agency software, hardware, and firmware* systems by the new millennium. The Agency program is centrally managed by the NASA CIO, with decentralized execution of program requirements at each of the NASA Centers, Headquarters, and the Jet Propulsion Laboratory.

In January 1997, the Office of Management and Budget required all Federal agencies to adopt the General Accounting Office, five-phase model for implementing the Y2K program. Those phases (awareness, assessment, renovation, validation, and implementation) are defined in Appendix C.

On July 2, 1998, the NASA CIO issued the NASA guidance. The objectives of the guidance were to (1) provide general guidance and requirements for Y2K certification and testing and

*Firmware systems are the computer programs that are permanently stored in a hardware device.

(2) establish required minimal Y2K test criteria and certification processes for NASA inventory items.

Johnson planned to use the NASA guidance to ensure that all Johnson information technology (IT) systems would be certified Y2K compliant by March 31, 1999. The plan required Johnson organizations to perform tests commensurate with the risk level and the probability of problem occurrence for their respective IT systems.

The FMD is responsible for providing internal controls to safeguard assets, ensuring that bills are processed for goods and services, promoting the accuracy and reliability of financial data, and encouraging adherence to approved NASA financial management policies. FMD provides the following functions:

- Funding and internal controls
- Accounts payable
- Travel funding and claims
- Labor and payroll
- Accounts receivable
- Resources control and reimbursables
- Collections
- Cost accounting
- Property and accounting control

The FMD is responsible for assessing, renovating, validating, and implementing the Center Financial System to ensure Y2K compliance. The Center Financial System is a Johnson mission-critical system that includes 21 separate modules. See Appendix D for a list of the 21 modules. The modules provide the processing support needed by FMD to perform the above systems and functions.

Request for Exemption From NASA Guidance

Finding. The FMD completed its tests of the Center Financial System before NASA issued the July 1998 guidance, but had not submitted a request for exemption from the guidance. This condition occurred because the Johnson CIO had not established procedures to implement the exemption process. Without the exemption, the Johnson CIO lacks reasonable assurance that the Center Financial System will meet the minimum testing requirements for Y2K compliance.

NASA Guidance. The NASA guidance describes the process for testing and certifying inventory items for Y2K compliance. Specifically, it requires organizations to prepare test plans and procedures regarding the levels of testing, test criteria, and test procedures. The guidance requires organizations to document the test results in a test report or completed Y2K checklist for each inventory item tested.

The NASA guidance makes NASA Centers responsible for identifying items to be assessed, renovated, validated, and certified Y2K compliant. A NASA inventory item may be an IT system, non-IT system, application, hardware component, software component, firmware, or a commercial-off-the-shelf product. An inventory item may be a combination of custom software, hardware, and commercial-off-the-shelf products, or any component item.

The NASA guidance states that an exemption from required testing may be granted for inventory items for which testing had been completed before July 2, 1998, if the items meet the following criteria:

- The test approach for the inventory item met the minimal test requirements and criteria established in the guidance, commensurate with the level of risk of the inventory item.
- Processes followed for the inventory item testing met the intent of the guidance through comparable test and certification processes.

The Center CIO Representative and Center Y2K Project Manager must assess an organization's request for exemption. If approved, the Center CIO must then report the approval action to the NASA Y2K Program Manager.

Johnson Y2K Actions for the Center Financial System. During the initial assessment and subsequent reassessment of IT systems, Johnson identified the Center Financial System as a mission-critical inventory item. FMD personnel began assessing the system in January 1997; completed renovation and validation testing in April 1998 and May 1998, respectively; and implemented the system in June 1998.

The FMD prepared a Y2K test plan in January 1997, before NASA issued its testing guidance. Accordingly, the plan did not reference the required test levels, test criteria, and test procedures. As a "reasonableness check" on the adequacy of Y2K tests previously performed, FMD personnel completed a Y2K checklist taken from the then draft NASA guidance, for each of the 21 modules that made up the Center Financial System. However, neither the contractor personnel who performed the testing nor a Johnson manager could support the results of the checklist reviews. Without documentation supporting the answers on the checklists, we could not determine the adequacy of Y2K testing performed or whether it met NASA requirements. Similarly, NASA management has no assurance that sufficient testing was performed.

Since Johnson completed testing of the Center Financial System before NASA issued its guidance, FMD personnel should have requested an exemption from the guidance if prior testing satisfied the intent of the guidance. FMD personnel made no such request because Johnson had not established procedures for requesting exemptions. Without such procedures, FMD personnel were unaware of the need to request an exemption or of possible shortcomings in the testing performed.

Recommendations, Management's Comments, and Evaluation of Response

The Director, Johnson Space Center should:

- 1. Establish procedures for processing exemptions of IT inventory items for which testing was completed before July 2, 1998.**
- 2. Require Johnson organizations to submit exemption requests for all systems for which testing was completed before July 2, 1998.**
- 3. Approve only those exemption requests that satisfy the minimum testing and documentation requirements set forth in the NASA guidance.**
- 4. Require organizations to perform validation testing required by the NASA Y2K Agency Testing and Certification Guidelines and Requirements for any inventory item that (1) had been tested before the guidance was issued, and (2) did not meet minimum testing requirements set forth in the NASA guidance.**

Management's Comments. Concur. Management stated that the recommendations either had been implemented or will be implemented. The complete text of management's response is in Appendix E.

Management took exception to the report statement "In the absence of an exemption to the July 1998 guidance, the Johnson Chief Information Officer (CIO) has no basis on which to assess the adequacy of testing the FMD performed on the Center Financial System prior to issuance of the guidance."

Management cited the following reasons for believing that remediation of the Center Financial System was successful.

- Two formal Y2K reviews, chaired by the Johnson CIO, had covered the Center Financial System remediation effort and the results of that effort.
- The Johnson Program Management Council had conducted two Y2K reviews.
- Officials involved in the Y2K issue had held numerous discussions regarding remediation of the Center Financial System.
- The Y2K working group held frequent discussions regarding remediation of the Center Financial System.
- Johnson had successfully used the remediated software for the last 9 months.

Evaluation of Response. Management's comments are fully responsive to the recommendations. The actions planned and taken should ensure that all Johnson systems that completed testing before NASA issued its guidance in July 1998 will meet minimum Y2K testing requirements.

We maintain that until Johnson establishes and implements an exemption process, the Johnson CIO has no basis on which to assess the adequacy of pre-July 1998 testing that FMD personnel had performed on the Center Financial System. Although Johnson officials had formally reviewed and discussed remediation actions for the Center Financial System, available documentation showed no evidence that FMD had met the minimum testing requirements stated in the NASA guidance.

Appendix A. Objectives, Scope, and Methodology

Objectives

Our overall objective in this ongoing audit is to determine whether NASA has effectively managed the implementation of Y2K compliant systems. Specifically, we are evaluating the adequacy of:

- acceptance testing;
- contingency and disaster recovery planning;
- the validation process for information received from data exchanges; and
- change/version control over renovated systems migrating into the production environment.

As part of the overall objective, we assessed the adequacy of the testing performed on Johnson's Center Financial System to determine whether the system had been fully tested and was Y2K compliant. Implementation of Y2K compliant systems and their components requires extensive testing to ensure that all converted or replaced system components perform adequately in an operational environment.

Scope and Methodology

During the audit, we:

- Reviewed available documentation, dated January 1997 through March 1999, at Johnson, that supported validation testing for 4 mission-critical systems and 31 non-mission-critical systems. (Johnson has a total of about 400 mission-critical and non-mission-critical systems.) The Center Financial System was the only system we reviewed at Johnson for which testing had been completed before the Agency issued the July 2, 1998, guidance.
- Interviewed Y2K representatives at NASA Headquarters and Johnson to determine the processes and procedures used for ensuring Y2K compliance.

Management Controls Reviewed

We reviewed initial Y2K guidance and the related processes and procedures Johnson used to test and implement IT systems. In addition, we tested those controls to verify that the controls were working as described. Based on work done on this continuing audit, we found one deficiency, as noted in the finding.

Appendix A

Audit Field Work

We performed the audit field work for this report from November 1998 through February 1999. We conducted the audit in accordance with generally accepted government auditing standards.

Appendix B. Summary of Prior Coverage

The NASA Office of Inspector General has issued two reports relating to Y2K compliance. These reports are summarized below.

“Year 2000 Date Conversion – Assessment Phase,” IG-98-040, September 30, 1998.

Some NASA Centers did not have documented support for Y2K cost estimates reported to OMB and did not prepare estimates using a consistent methodology. Also, documentation did not always exist to support the manner in which Center assessments and decisions for Y2K compliance were conducted. The audit showed that NASA Centers also needed to improve the sharing of information on the status of Y2K compliance associated with commercial off-the-shelf products. We made three recommendations to assist NASA in addressing the Y2K date conversion problem. Management concurred with the two recommendations concerning documentation for Y2K assessments and the sharing of information on commercial off-the-shelf products. Management did not concur with the recommendation concerning guidance for Y2K cost estimates, stating that adequate guidance on cost estimation had been provided to NASA Centers. We reaffirmed our position on this recommendation and requested additional comments in the final report.

“Year 2000 Program Oversight of NASA Production Contractors,” IG-99-004, December 17, 1998.

NASA lacks reasonable assurance that its production contractors will provide Year 2000-compliant data to support the Agency’s key financial and program management activities. This condition occurred because NASA had not asked the Defense Contract Audit Agency and the Defense Contract Management Command to conduct Y2K reviews at NASA’s major contractor locations. As a result, NASA risks using noncompliant data that may adversely affect the Agency’s control, budgeting, program management, and cost accounting activities. We made two recommendations to NASA relating to the Y2K status of its major contractors. Management concurred with the intent of the recommendations and issued a letter to the Defense Contract Audit Agency requesting data on Y2K coverage at the Agency’s major contractors. In addition, NASA issued a letter to its Center Procurement Officers instructing them to monitor Y2K problems identified by the Defense Contract Audit Agency.

Appendix C. Definitions of Five-Phase Model for Y2K

<u>Awareness</u>	<ul style="list-style-type: none">• Define the Y2K problem and gain executive-level support and sponsorship.• Establish a Y2K program team and develop an overall strategy.• Ensure that everyone in the organization is fully aware of the activity.
<u>Assessment</u>	<ul style="list-style-type: none">• Assess the Y2K impact on the Enterprise.• Identify core business areas and processes, inventory and analyze systems supporting the core business areas, and prioritize their conversion or replacement.• Develop contingency plans to handle data exchange issues, lack of data, and bad data.• Identify and secure the necessary resources.
<u>Renovation</u>	<ul style="list-style-type: none">• Convert, replace, or eliminate selected platforms, applications, databases, and utilities.• Modify interfaces.
<u>Validation</u>	<ul style="list-style-type: none">• Test, verify, and validate converted or replaced platforms, applications, databases, and utilities.• Test the performance, functionality, and integration of converted or replaced platforms, applications, databases, utilities, and interfaces in an operational environment.
<u>Implementation</u>	<ul style="list-style-type: none">• Implement converted or replaced platforms, applications, databases, utilities, and interfaces.• Implement data exchange contingency plans, if necessary.

Appendix D. Modules Included in the Center Financial System

Basic Accounting System, Modules 1 through 4—System used to maintain detail and summary history files for the fiscal year.

Cash Management System—Automated system used to approve and process vendor invoices for payment.

Central Budget System—System that allows budget planning and provides budget status.

Civil Service Labor Distribution System—System that processes all Johnson employee labor distribution data on a biweekly frequency in a batch mode and that provides labor cost to the Interactive Basic Accounting System database by Primary Work Code.

Contractor Cost Accrual System—Financially structured database that permits both budget analysts and cost accountants to report cost and workforce information on selected contracts and purchase orders.

Financial and Contractual Status—System that reports contract performance and other information regarding the procurement and financial impacts for business agreements as a result of Johnson operations.

Financial Management Division Forms—System used for printing reimbursable billings.

Interactive Basic Accounting System, Modules 1 through 5—Primary Johnson online interactive system used by FMD to enter and retrieve all types of funding.

Interactive Consolidated Financial Accounting System—Single, integrated, and consolidated source for financial analysis and reporting at all stages of the Johnson budget execution cycle, from program authorization to fund disbursement.

Job Order Cost System—Application developed for cost and workforce accumulation to enable monthly recording and tracking of contract cost and workforce performance.

NASA Personnel/Payroll System—Local code for selected reports only, including the Employee Leave and Earnings Statement.

Resource Information Management System—Database driven reporting system used primarily to maintain property records and to report specific data in funding allocations and payroll/labor data.

Appendix D

Subauthorization System—System that provides NASA Headquarters and Johnson management with information on subauthorizations with other NASA centers.

UNYSIS Interactive Consolidated Financial Accounting System—Simple download program between the Unisys systems and the **Interactive Consolidated Financial Accounting System** database.

Appendix E. Management's Response

National Aeronautics and
Space Administration
Office of the Administrator
Washington, DC 20546-0001



APR 16 1999

TO: W/Inspector General

FROM: AO/Chief Information Officer

SUBJECT: NASA Response to Draft Report on Exemptions for Year 2000 Testing,
Johnson Space Center, Audit Assignment A9900800

This responds to your draft report on Exemptions for Year 2000 Testing, Johnson Space Center (JSC) under Audit Assignment Number A9900800.

NASA concurs with and either has implemented, or will implement, the four report recommendations. NASA does, however, take exception with the opinion stated in the draft report, "In the absence of an exemption to the July 1998 guidance, the JSC Chief Information Officer (CIO) has no basis on which to assess the adequacy of testing the FMD performed on the Center Financial System prior to issuance of the guidance."

NASA and the JSC CIO have more than adequate justification for their conviction that the remediation of the Center Financial System was successful. These include:

- Two Formal Y2K Reviews chaired by the JSC CIO that covered the Center Financial System remediation effort and the results of that effort.
- Two JSC Program Management Council Y2K reviews.
- Numerous one-on-one conversations between the JSC CIO/JSC Y2K Project Manager and the JSC Chief Financial Officer (CFO)/Deputy CFO/CFO Y2K Project Manager/CFO contractor staff regarding the remediation of the Center Financial System.
- Frequent discussions regarding the remediation of the Center Financial System by the JSC Y2K Working Group.
- The remediated software has been used successfully for the past 9 months.

The JSC Y2K Project Manager and the JSC CIO will require organizations to perform validation testing required by the NASA Y2K Agency Testing and Certification Guidelines and Requirements for any inventory item that (1) had been tested before the guidance was issued, and (2) did not meet minimum testing requirements set forth in the NASA guidance.

The draft audit report lists four specific recommendations:

“The Director, Johnson Space Center should:

1. Establish procedures for processing exemptions of IT inventory items for which testing was completed before July 2, 1998.
2. Require Johnson organizations to submit exemption requests for all systems for which testing was completed before July 2, 1998.
3. Approve only those exemption requests that satisfy the minimum testing and documentation requirements set forth in the NASA guidance.
4. Require organizations to perform validation testing required by the NASA Y2K Agency Testing and Certification Guidelines and Requirements for any inventory item that (1) had been tested before the guidance was issued, and (2) did not meet minimum testing requirements set forth in the NASA guidance.”

The JSC CIO has established procedures for processing exemptions of information technology (IT) inventory items for which testing was completed before July 2, 1998. These procedures require JSC organizations to submit exemption requests for all systems for which testing was completed before July 2, 1998. Based on this, NASA considers the first two recommendations closed.

The JSC Y2K Project Manager and the JSC CIO will approve only those exemption requests (waiver requests) that satisfy the minimum testing and documentation requirements set forth in the referenced NASA guidance.

We consider this action closed with this response.



Lee Holcomb

cc:

AO/A. Norris
AO/C. Simonson
M/S. Fishkind
JM/H. Robbins
JSC/J. Garman
JSC/J. Jurgensen

Appendix F. Report Distribution

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Appendix F cont'd

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George C. Marshall Space Flight Center
John C. Stennis Space Center

Non-NASA Federal Organizations and Individuals

Assistant to the President for Science and Technology Policy
Assistant to the President and Chair, President's Council on Y2K Conversion
Deputy Associate Director, Energy and Science Division, Office of Management and Budget
Budget Examiner, Energy Science Division, Office of Management and Budget
Associate Director, National Security and International Affairs Division,
General Accounting Office
Professional Assistant, Senate Subcommittee on Science, Technology, and Space

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House Subcommittee on National Security, Veterans Affairs, and International Relations
House Committee on Science
House Subcommittee on Space and Aeronautics

Congressional Member

Honorable Pete Sessions, U.S. House of Representatives

Major Contributors to this Report

David L. Gandrud, Program Director, Information Technology Program Audits

Esther A. Judd, Program Manager

Bessie J. Cox, Auditor-in-Charge

Barbara J. Smith, Program Assistant

Nancy Cipolla, Report Process Manager