**Increased Validation and Oversight of
Year 2000 Minicomputer Conversion Efforts
Are Needed To Strengthen Testing and To
Avoid Further Delays**

August 1999

Reference Number: 199920054

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MEMORANDUM FOR COMMISSIONER ROSSOTTI

FROM: Pamela J. Gardiner
                      Deputy Inspector General for Audit

SUBJECT: Final Audit Report – Increased Validation and Oversight of
                      Year 2000 Minicomputer Conversion Efforts Are Needed To
                      Strengthen Testing and To Avoid Further Delays

This report presents the results of our review of the Internal Revenue Service's (IRS) efforts to prepare its minicomputer systems (Tier II) for the Century Date Change. The objective of this review was to assess the IRS' conversion efforts and to determine whether conversion efforts will ensure that minicomputer systems will be operational in the next century.

In summary, we found that minicomputer conversion risk continues to be high. One-third of the systems missed the initial January 31, 1999, completion goal. In addition, systems testing did not consistently address critical Year 2000 processing issues and formal contingency planning procedures are needed for systems that were not compliant by March 31, 1999.

We recommended that the IRS properly classify the risk for each Tier II system that did not meet the January 1999 target date. In addition, the Century Date Change Project Office representatives should independently validate testing performed on each system and conversion dates for systems that did not make the January target. The project office should also validate contingency procedures for all systems that were not compliant by March 31, 1999.

In your response to the report, you agreed to the recommendations presented. Your comments have been incorporated into the report where appropriate, and the full text of the comments is included as an appendix.

Copies of this report are also being sent to the IRS managers who are affected by the report recommendations. Please contact me at (202) 622-6510 if you have questions, or your staff may call Scott Wilson, Associate Inspector General for Audit (Information Systems Programs), at (202) 622-8510.

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Minicomputer Conversion Efforts Are Needed
To Strengthen Testing and To Avoid Further Delays**

Table of Contents

Executive Summary

One of the most critical issues the Internal Revenue Service (IRS) faces this year is the need to make its computer systems Year 2000 (Y2K) compliant. The IRS is a $1.7 trillion financial services organization dependent on its computer systems to process tax returns, issue refunds, deposit payments, and provide employee access to timely and accurate taxpayer account data. Failure to identify, renovate, and test each of these systems calculations could result in catastrophic disruption to taxpayers and the government. Our review assessed the IRS' efforts to convert its minicomputer systems.

Results

The IRS has improved its management of the Y2K minicomputer (Tier II) conversion. The Century Date Change Project Office of the IRS Information Systems organization has taken actions to identify and convert minicomputer systems. This organization has (1) assigned responsibility for monitoring conversion of minicomputer systems, (2) identified sites where these systems are located, (3) provided guidance for converting systems, and (4) worked with site managers to develop schedules for converting production systems.

According to Information Systems management, the Tier II Program Office established a two-phased approach for tracking, monitoring, and validating the Y2K conversion effort. Phase I relied primarily on self-reporting by each system project office, while Phase II included validation activities such as independent audit and readiness verification.

The initial widespread use of self-reporting of critical conversion data, with minimal on-line validation, has resulted in weaknesses in systems testing and unmet target dates. We found the following areas where improvements are necessary.

Minicomputer Conversion Risk Continues to be High

Of the 66 minicomputer systems being monitored, at least 22 did not meet the January 31, 1999, conversion goal. Twelve of these 22 systems are considered mission critical systems. Rather than properly classifying these systems to indicate missed conversion dates, the IRS changed many of the completion dates to classify the systems as merely having minimal or moderate risk. Conversion delays were evident weeks before they were included in tracking reports. The IRS has scheduled five of the systems for conversion in either September or October 1999.

Systems Testing Did Not Consistently Address Critical Year 2000 Processing Issues

Testing of systems using year 2000 dates is critical to ensure they will remain operational into the next century. The Tier II Program Office requires testing of each system. Thorough testing, as required by the program office guidelines, was not conducted on three of the six systems we evaluated. Weaknesses included not setting system clocks ahead to year 2000 dates and not testing transactions through the complete system.

Formal Contingency Planning Procedures Are Needed for Systems That Were Not Compliant by March 31, 1999

The Office of Management and Budget (OMB) required formal contingency planning for systems that were not compliant before the end of March 1999. The purpose of contingency planning is to address the possibility that some elements of the system may not be Y2K compliant by the scheduled target date. Our audit testing, which was completed in February, identified seven systems, including two key national systems, that were not scheduled to meet this time frame and were not covered by contingency plans. Plans need to be developed to address the possibility that these systems will not be made compliant before the century date change.

Summary of Recommendations

We recommend the following:

- The IRS properly classifies the risk for each minicomputer system that did not meet the January 1999 target date.

- The Century Date Change Project Office representatives independently validate:

    - Conversion dates for systems that did not make the January target.

    - Testing performed on each mission critical minicomputer system.

    - Contingency procedures for all systems that were not compliant by March 31, 1999.

Management's Response

IRS management provided a detailed response to our report. The Tier II Program Office has identified and classified all systems applications that were not Year 2000 compliant by January 31, 1999, on the Year 2000 Risk Assessment Dashboard Report. The IRS is providing additional oversight to all of these projects. The program office will implement an Independent Audit and Readiness Verification process to validate the actions taken to renovate application systems. Through the verification process, the

program office will validate the results of the integrated testing performed by application owners for Tier II systems.

The Century Date Change Project Office requested contingency plans for two key systems that were not Year 2000 compliant by March 31, 1999. The project office will continue to monitor the conversion progress and issue contingency plans as necessary.

Objective and Scope

*Our objective was to assess
IRS conversion efforts and to
determine whether conversion
efforts will ensure that
minicomputer systems will
maintain business continuity
beyond the year 2000.*

The objective of this review was to assess the Internal
Revenue Service' (IRS') conversion efforts and to
determine whether conversion efforts will ensure that
minicomputer systems will be operational in the next
century. We initiated this review as part of the Treasury
Inspector General for Tax Administration's Office of
Audit[1] Year 2000 (Y2K) strategy. We performed this
review from September 1998 to February 1999 in
accordance with *Government Auditing Standards*.

We conducted testing in the Century Date Change
Project Office, the Tier II Systems Software Branch in
the Information Systems Technical Services Division,
and the Information Systems project offices of the
minicomputer systems included in our review. We also
conducted testing in the Austin, Charlotte, and
Las Vegas Development Centers, Cincinnati Service
Center, and Memphis Service Center/Tennessee
Computing Center, where various system programmers
were located.

*We reviewed milestone
schedules, systems testing, site
conversion plans, and
contingency planning.*

We designed and conducted tests to provide an overall
assessment of IRS conversion efforts and to determine
whether conversion efforts ensure the minicomputer
systems will be operational in the next century. Our
testing was designed to answer three questions:

- Are the schedules for testing, upgrading, and
transmitting programs realistic and attainable?

- Will testing of the selected mission critical
minicomputer systems ensure their continued
operation into the year 2000?

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[1] The IRS Restructuring and Reform Act of 1998 established a new
Treasury Inspector General for Tax Administration (TIGTA)
effective January 18, 1999, replacing the IRS Inspection Service.
The response to this report was handled through TIGTA.

Contingency plans address the possibility that some components or elements may not be Y2K compliant by the scheduled target date.

- Will conversion of selected mission critical systems occur in all applicable sites, and are there contingency plans for systems that will not meet required deadlines?

At the beginning of our review, we conducted a preliminary risk assessment of 47 minicomputer systems to identify those systems with significant taxpayer impact that may be at risk of not being Y2K compliant. Because of this assessment, we performed a detailed evaluation of the conversion efforts of six application systems.

Four of the six systems we focused on were mission critical.

Four[2] of the six systems were categorized as mission critical by the IRS. We included the remaining two systems[3] because they directly affect taxpayer accounts.

Our initial analysis of these systems identified some concerns with meeting the interval, referred to as milestone, completion dates. Therefore, we selected nine additional systems, seven of which were categorized as mission critical by the IRS. We interviewed individuals managing the conversion of each system to assess their progress toward Y2K compliance. We also reviewed contingency planning for systems that will not meet the January 31, 1999, deadline.

The detailed objective, scope, and methodology of the review can be found in Appendix I. Please refer to Appendix II for a list of the major contributors to this report and Appendix III for the report distribution list. Appendix IV details management's response to the report. Appendix V identifies the systems, along with a description of their purposes, that were included in our review.

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[2] Batch Block Tracking System (BBTS), Electronic Management System (EMS), Totally Automated Personnel System (TAPS), and Telephone Routing Interactive System (TRIS).

[3] Insolvency Interface Program 1 (IIP1) and Insolvency Interface Program 2 (IIP2).

Background

Tier II includes critical systems that support tax processing.

The century date change is one of the most critical problems facing organizations today. To ensure its systems will operate into the next century (referred to as being Y2K compliant), the IRS must evaluate all computer systems and applications. The majority of the IRS tax processing occurs on mainframe computers. However, there is a significant amount of mission critical processing at the minicomputer level (Tier II). For example, this category includes a system that tracks tax returns through processing, systems that support electronic filing of tax returns, and a system that enables taxpayers to use the telephone to contact the IRS for tax information. The IRS needs assurance these mission critical systems are adequately prepared for the century date change.

The Century Date Change Project Office was established to ensure all current and future IRS systems are Y2K compliant before January 1, 2000. Applications were to be converted, tested, and implemented, and commercial products were to be upgraded by January 31, 1999. Toward this end, Information Systems created the Tier II Program Office to provide program management and to facilitate timely integration of Y2K compliant applications and commercial products on compliant computers.

Currently, 66 Tier II systems are being monitored for compliance--27 are considered key national systems.

The Tier II Program Office identified 66 systems to monitor for Y2K compliance. These are listed on the February 19, 1999, Tier II Risk Assessment Dashboard, a report used to manage the conversion progress. As our review progressed, the program office classified these systems into two categories -- "Key National Tier II Systems" and "Other National Tier II Systems." Systems were categorized by their level of criticality. In the February 19, 1999, report, there were 27 systems listed as Key Systems and 39 listed as Other Systems.

The Tier II Program Office obtained target dates for five critical testing and implementation milestones in order

to monitor the minicomputer conversion progress. These five milestones are:

Unit testing includes testing of individual software programs, and testing to ensure these programs work with commercial products in a compliant environment.

- Establish testing environments.
- Conduct unit testing.
- Conduct integration testing.
- Upgrade production platforms.
- Transmit application into production.

Results

Information Systems has taken actions to make the minicomputer systems Y2K compliant. However, additional validation efforts are needed to ensure systems meet critical time frames for conversion. In addition, contingency planning efforts need to be validated for all systems that did not meet the Office of Management and Budget (OMB) deadline of March 31, 1999.

Planning and Coordinating Efforts Have Been Strengthened

Improvements have been made in the coordination of the Tier II effort.

In a report titled *Review of the Service's Efforts to Prepare Its Tier II Infrastructure for the Year 2000* (Reference Number 091206, dated November 20, 1998), we noted that the planning and coordinating of the minicomputer conversion efforts needed to be improved. During the current review, we identified progress in this area. For example, the Tier II Program Office and the Century Date Change Project Office have made significant progress in identifying and assigning responsibility for monitoring the minicomputer system conversion. The Tier II Program Office issued conversion guidelines to the various systems project offices, and the managers in these offices received and understood these guidelines.

Most application components for the systems reviewed were recorded on the IRS computer hardware and software inventory system. In addition, the IRS is currently ensuring that commercial products used to run minicomputer systems are Y2K compliant. Sites where these systems are located have been identified, and site managers have been involved in developing schedules for upgrading the systems at their locations.

End-to-end testing verifies that systems function together in a Y2K environment.

According to Information Systems management, the Tier II Program Office has established a two-phased approach for tracking, monitoring, and validating the Y2K conversion effort. Phase I, tracking and monitoring, relied on self-reporting of critical conversion data, including completion dates. Phase II activities included (1) 100 percent validation of software program code, (2) end-to-end testing, (3) contingency planning, and (4) independent audit and readiness verification. The code validation, end-to-end testing, and contingency planning are currently being conducted. The independent audit and readiness verification has not yet begun.

Use of self-reporting without validation resulted in unmet milestone dates and weaknesses in testing.

The IRS has, thus far, conducted very little on-line validation of milestone dates or the adequacy of work performed to meet these dates. This use of self-reporting without on-line validation has resulted in unmet target conversion dates and weaknesses in systems testing.

Minicomputer Conversion Risk Continues to be High

The Century Date Change Project Office established January 31, 1999, as the target date for systems to be Y2K compliant. One-third of the minicomputer systems were not compliant by the target date. Project guidelines for classifying systems that missed critical milestone dates at a high risk level are not being followed. In addition, officials responsible for system conversion were reluctant to report delays in their

conversion progress. Reluctance to identify and address conversion delays early has resulted in a significant risk for Y2K conversion problems involving minicomputer systems.

One-Third of Tier II Systems Did Not Meet the January 31, 1999, Target

Twelve of twenty-seven mission critical Tier II systems did not meet the January 31, 1999, target compliance goal.

The Tier II Risk Assessment Dashboard is a report used to manage the conversion progress. This report is given to the Commissioner at least monthly. The February 19, 1999, report showed that 22 of the 66 (33 percent) systems being monitored had not been converted by the January 31, 1999, completion goal established by the Century Date Change Project Office. The percentage of key minicomputer systems that did not meet this goal is even higher at 44 percent (12 of 27).

Missed Milestone Dates Were Changed

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The dashboard report includes critical milestone dates and an overall status for each system--red, yellow, or green. Although Information Systems management has indicated that the report evolves over time and its purpose is to track exceptions, there are certain rules listed on the report that should be followed. For example, systems are supposed to be classified as red if they have a critical milestone either past due or 15 percent or more behind schedule. This indicates that the systems may be in trouble and need additional oversight. Yellow indicates moderate risk and is given when milestones are more than 5 percent and less than 15 percent behind schedule. Green indicates no current risks or delays and is given when the milestones are less than 5 percent behind schedule.

Systems are not being classified as red even though critical milestones are missed.

In some cases, rather than properly classifying these systems as red, the Tier II Program Office, in conjunction with the various system project offices, changed the milestone dates. Information Systems

management informed us that requirements to change these dates included an updated plan with executive signatures, and, in some cases, an approved waiver. We did not validate whether these requirements were met during our review.

We compared the December 18, 1998, dashboard report to the February 19, 1999, report to determine whether milestone date changes had been made. Six[4] of the 12 mission critical systems that missed the January 31, 1999, target date had changes to their milestone dates during this period. All were originally scheduled to meet the target date before this milestone change. After the change, two of the six systems were in yellow status and four systems were in green status. There were no systems in red status.

Conversion Delays Were Evident Weeks Prior To Being Reported

Our initial testing and discussions regarding 15 systems (selected when we began our review) identified 2 systems, Totally Automated Personnel System (TAPS) and Electronic Management System (EMS), that would not (and eventually did not) meet the January 1999 target date.

TAPS In our September 1998 discussions with TAPS personnel, we were told there would not be a Y2K compliant version operating in all production sites by January 1999 because they were moving to a new architecture. They indicated that one system would be compliant in one site by that date, and they believed that would enable them to meet the requirement. They also indicated approval from the Century Date Change

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[4] Compliance Research Information System (CRIS), Totally Automated Personnel System (TAPS), Electronic Management System (EMS), Interim Revenue Accounting Control System (IRACS), Problem Resolution Management Information System (PROMIS), and Trust Fund Recovery Program (TFRP).

Project Office for this plan, but had no documentation of the approval.

Delays in TAPS and EMS conversion were evident much earlier than reported in the Tier II dashboard.

There have been delays in testing TAPS for Y2K compliance and in moving to the new architecture. Due to these delays, the systems owner has decided to make the earlier system and architecture Y2K compliant. These delays were apparent in time to be noted on dashboard reports prepared in early December. However, dashboard reports did not indicate these delays until January 15, 1999.

EMS In mid-November 1998, we discussed with EMS personnel their ability to meet the January 1999 target. They mentioned problems involving one of the targeted database versions due to limitations it created in processing volumes of tax returns. They also stated they would probably need to obtain a waiver. However, dashboard reports did not indicate these delays until January 22, 1999. An earlier dashboard report actually indicated these milestones were complete.

Recommendations

To address conversion delays and inaccuracies in reported milestone dates, we recommend the following:

1. All systems that missed the January 31, 1999, target date are at risk and need additional oversight. The Tier II Program Office should classify each of these systems as either yellow or red on the dashboard report.

2. The Century Date Change Project Office should independently validate milestone dates for systems that did not make the January target.

Management's Response: The Tier II Program Office has identified and classified all systems applications that were not Year 2000 compliant by January 31, 1999, on the Year 2000 Risk Assessment Dashboard Report. Management will provide additional oversight for those applications that did not meet the initial due date. By default, these are classified as yellow or red on the

report. In addition, the program office will implement an Independent Audit and Readiness Verification process to validate the actions taken to renovate the application systems.

Systems Testing Did Not Consistently Address Critical Year 2000 Processing Issues

Testing is critical to the success of the conversion efforts.

Testing system processing capability (using Y2K compliant code and commercial products) is critical to ensuring success of the conversion effort. The critical milestone that addresses this is called integration testing. Information Systems personnel did not plan to conduct a full functionality integration test for three[5] of the six systems that we evaluated. Each of these three is critical – EMS processes incoming electronically filed returns, TAPS handles employee timekeeping for payroll purposes, and the Telephone Routing Interactive System (TRIS) handles incoming taxpayer telephone calls.

Full functionality integration testing was not conducted for three of the six systems reviewed.

Integration testing as defined by the Tier II Program Office occurs when the application system is tested with other application systems, other tiers, and other users outside the IRS to ensure that they operate together as required and meet the stated requirements. The systems acceptability testing process can serve as a component of the integration test. Systems acceptability tests verify system documentation and test applications software and interfaces. For application systems that do not use this process, the application system and all its interfaces and configurations must be tested in its entirety, in accordance with the *Procedures for Testing Year 2000 (Y2K) Changes, Version 1.1*, dated February 13, 1998. This activity is finished when all integration tests have

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[5] Electronic Management System (EMS), Totally Automated Personnel System (TAPS), and Telephone Routing Interactive System (TRIS).

been successfully completed in all environments. Each of the three systems had a different reason for not meeting these requirements.

TRIS The personnel testing this system did not test all parts of the system using year 2000 dates. Their integration testing was focused on how the system would process requests for information during the 1999 tax filing season, and did not include testing all parts of their processing with required year 2000 dates. For example, they did not use year 2000 dates to test the portions of the system that handle incoming taxpayer calls. The system clock was set to the year 2000 only for very limited testing. In addition, certain accounts on the IRS main tax processing computer system, necessary for Y2K testing, were not available at the time they conducted the test.

Information Systems personnel responsible for converting this system told us they believed their testing was adequate. They have reported the testing as complete on the risk assessment dashboard report.

Weaknesses in testing included not using year 2000 dates, performing limited functionality testing, and not setting system clocks forward.

TAPS The IRS used contractors to conduct the integration testing. The testing consumed considerable time because the system had not previously undergone system acceptability testing. IRS personnel responsible for the testing stated that they did not plan to test using year 2000 dates or set the system clocks to the year 2000. They were unable to do this testing because of tight deadlines and delays in obtaining the revised code and in starting the testing. We discussed this issue with the Information Systems personnel responsible for converting this system and they were unaware that the year 2000 testing was not being conducted.

In addition, TAPS integration testing was conducted on one platform (Sun) while the system is currently running on another platform (Pyramid). The initial plans were to convert the system to the Sun platform before the year 2000. Due to conversion delays, the system will have to continue to run on the current platform beyond the year 2000. Therefore, additional testing will be necessary to

ensure the upgraded programs will run on this platform beyond the year 2000.

EMS We observed the integration testing for this system. Similar to TRIS, this system is composed of various processes on different computers and involves significant levels of contractor support. The test was conducted as thoroughly as possible; however, one critical component could not be made Y2K compliant at the time of the testing. Therefore, this component could not be included in the test and integration testing was conducted around it. Additional testing will be necessary to ensure this component will work with the rest of the system.

Because our observations indicated problems with integration testing, we believe there is a need for enhanced oversight in this critical area. Without sufficient systems testing, problems could result in delayed end-to-end testing and potential processing problems in the year 2000.

Recommendation

Validation is needed to ensure thorough testing is performed.

3. We recommend that a Century Date Change Project Office representative ensure that complete integration tests are performed for each Tier II mission critical system.

Management's Response: The Tier II Program Office, through the Independent Audit and Readiness Verification process, will validate the results of the integrated testing of all Tier II mission critical systems.

Formal Contingency Planning Procedures Are Needed for Systems That Were Not Compliant by March 31, 1999

OMB requires formal contingency plans for systems that will not be compliant by March 1999.

On January 20, 1998, OMB issued a memorandum (M-98-02) that provides guidance on contingency planning. This memorandum states, "Recognizing that not all systems may achieve the March 1999 target, we expect agencies to make explicit triage decisions as they prioritize their work … agencies must have contingency plans for those systems that are not expected to have completed implementation by March 1999."

The IRS has begun contingency planning efforts to ensure that it can continue to handle the information that these systems process if the system fails. However, the IRS has structured these efforts according to business process rather than on a system-by-system basis. This has resulted in seven minicomputer systems that will not meet the March 31, 1999, deadline and are not covered by current contingency plans. Two of these systems, Compliance Research Information System and TAPS, are considered mission critical by the IRS.

Recommendation

4. The Century Date Change Project Office needs to ensure that formal contingency planning procedures cover all systems that did not meet the March 31, 1999, OMB target.

<u>Management's Response</u>: The Century Date Change Project Office will continue to monitor the conversion progress and if a risk assessment results in a need for a contingency plan, one will be issued. The Century Date Change Project Office requested contingency plans for two systems that were not Year 2000 compliant by March 31, 1999. The Project Office suspended one of these requests when the system met its compliance requirements. The other request is still outstanding, and a memorandum was sent to the business owners to alert them that they have no contingency plan.

Conclusion

IRS has made significant efforts to ensure its minicomputer systems are compliant. However, there have been delays in the conversion of some mission critical systems and testing has been weak. Self-reporting mechanisms are being used to monitor and manage the conversion effort.

Increased oversight and validation is necessary, especially for the mission critical systems, to ensure that possible conversion delays are identified and addressed early, completion dates are reported accurately, and testing is thorough. Without increased oversight, conversion of these systems before the year 2000 is at risk.

Detailed Objective, Scope, and Methodology

The overall objective of this review was to assess the Internal Revenue Service' (IRS') conversion efforts and to determine whether conversion efforts will ensure that minicomputer systems will be operational in the next century.

To accomplish our overall objective, we conducted a preliminary risk assessment of 47 minicomputer systems to identify those systems with significant taxpayer impact that may be at risk of not being Y2K compliant. We then conducted the following tests:

I. We evaluated whether the schedules established by the systems owners for testing, upgrading, and transmitting programs are realistic and attainable.

   A. Determined whether the program office identified all mission critical minicomputer application systems and included them in its overall testing schedules.

      1. Identified 44 systems from review of the Century Date Change Project Office's systems inventory listing and 23 additional systems through review of workpapers from a previous audit, *Review of the Service's Efforts to Prepare its Tier II Infrastructure for the Year 2000*, that were running on minicomputer systems in the districts, service centers, computing centers, and development centers.

      2. Compared those systems to the Year 2000 (Y2K) dashboard report prepared by the Tier II Program Office to identify minicomputer systems that the program office is not monitoring.

      3. Compared the 66 systems controlled on the Y2K dashboard report to the minicomputer systems shown on the Century Date Change Project Office systems inventory listing to identify systems that the Tier II Program Office is not monitoring.

      4. For the 23 unmonitored systems identified through review of the previous audit workpapers, contacted the systems administrators and determined whether any were legitimate, continuing systems.

B. Evaluated guidance given to systems owners on measuring their conversion progress to determine whether it provides accurate input for reporting to the Commissioner and other executives.

C. For the 15 systems selected for testing, we:

1. Determined progress towards completion by January 31, 1999, and the number of delays that occurred in the planned schedule for completion.

2. Verified the accuracy of reports provided periodically to the Commissioner and other Y2K executives on the progress of the Tier II effort.

3. Interviewed programmers for these systems and determined what obstacles they face in making the code Y2K compliant.

4. Determined whether all systems' interfaces and telecommunication infrastructure components have been identified and documented, and whether they are being made Y2K compliant.

II. We determined whether testing of six mission critical systems conducted by program office personnel, Systems Acceptance Testing (SAT) personnel, and systems owners will ensure that the systems will be operational into the year 2000. (These were 6 of the 15 systems mentioned in Objective I. C.)

A. For the six systems, compared the components listed on the computer hardware and software inventory system with programs currently running on the computer system to determine if all programs are being recorded and tracked on the inventory system.

1. Obtained a download of the components from the inventory system Applications Program Registry (APR) for these systems (see Appendix V):
   - Batch Block Tracking System (BBTS)
   - Electronic Management System (EMS)
   - Telephone Routing Interactive System (TRIS)

   Note: We were unable to conduct this test for the other three systems because reliable data for these systems were not available at the test site.

2. Obtained a download of programs running on a production platform for those systems.

3. Compared the two downloads to identify any components not being tracked on the inventory system for Y2K conversion.

B. Determined whether the project office ensured that the commercial products used to run the application software are Y2K compliant.

   1. Executed the "packageinfo" command on a production platform to obtain a list of commercial products running for BBTS, EMS, and TRIS.

   2. Obtained and reviewed available Commercial-Off-The-Shelf (COTS) Year 2000 Impact Analysis Reports, any supporting documentation showing vendor contacts, and all completed COTS Compliance Forms for the six systems.

   3. Identified any commercial products not evaluated for Y2K compliance.

C. Evaluated integration test plans for the systems in II.A.1 to determine whether they conform to IRS standards and address all processes that the application systems perform. (BBTS and TRIS did not have complete test plans.)

   1. Reviewed the test plan to determine whether it describes the hardware and software used for the test, the pre-determined test results, the data creation and output review techniques, and the systems' interfaces.

   2. Determined whether the plan includes tests covering major subsystems/components identified through our match of the inventory system download and the output from the script program.

   3. If the systems project office performs its own Y2K testing, determined whether proper separation of duties existed between the individuals who perform the software component tests and the individuals who perform the integration tests.

   4. Identified the types of tests included in the plans and determined whether these tests require the execution of program code.

   5. Determined if the integration test plan included production simulation tests or stress tests. If not, asked the systems project office how they planned to measure the impact that the Y2K changes will have on systems capacity.

   6. Determined whether test scripts/scenarios, test data, and expected results have been developed for the tests listed in the plan. On a sample basis, determined if the test scripts/scenarios verify that the application handles the following year 2000 dates: 2000-02-29, 2000-02-30, 2000-03-01, 2000-04-01. Determined whether live test data would be used.

D. For the systems in II.A.1, determined whether the integration test was conducted in accordance with IRS standards.

1. When possible, observed the final integration test and identified the exact version of the commercial products loaded on the test platform. Determined whether Information Systems (IS) personnel had loaded the target operating and database management systems prescribed by the Tier II Program Office and a Y2K compliant version of the other commercial products.

2. Determined if the system clock was set to January 1, 2000, and if all application software components and interfaces were loaded onto the test platform. If the project had not loaded all software components and interfaces, we determined whether a simulated interface approach was used for the components being tested.

3. Determined whether testers record all program crashes, compare actual to expected test results, and issue problem reports if the expected results are not achieved.

III. We evaluated whether selected mission critical systems will be converted in all applicable sites, and whether adequate contingency plans exist for those that will not meet required deadlines.

A. Determined whether project offices for the selected systems have a methodology to acquire and distribute Y2K compliant commercial products to the production sites.

1. If the project's approach was to acquire upgrades on behalf of the production sites, we reviewed documentation (requisitions, requests to the Treasury Multi-user Contract Acquisition Contracting Officer Technical Representative, etc.) confirming that upgraded commercial products were ordered and obtained expected delivery dates and product distribution lists/instructions.

2. If the project's approach was to require the local IS function to obtain commercial product upgrades, obtained all documentation showing the instructions given to and agreements reached with the local IS site manager. Determined if the project office has assurance that the local IS function ordered the products and if the project knew the expected delivery dates.

3. Determined whether the expected delivery dates identified above were before the date the project office established for upgrading the production platforms.

B. Determined whether adequate contingency plans were developed for those systems not Y2K compliant by January 31, 1999.

1. Reviewed the revised Work Breakdown Structure and Milestone Concurrence Forms and identified three Tier II systems (and two subsystems) that will not meet the deadline. Determined if the Tier II Program Office met with systems owners and obtained documentation of agreements that were reached. These systems are:

   - Automated Substitute for Return (ASFR)

   - Examination Returns Control System (ERCS)

   - Travel Reimbursement and Accounting System (TRAS)

2. Determined the reasons for not meeting the deadline and evaluated whether these reasons could apply to other projects. If so, determined whether the Tier II Program Office contacted the other projects and discussed the impact of these problems.

3. For the systems identified in III.B.1 above, contacted the project office and determined if they have contingency plans for not participating in the end-to-end test. Also, determined if the systems owner had contingency plans for conducting business without the system being operational.

4. Reviewed contingency planning efforts to determine whether they will effectively address problems resulting from the systems not being converted.

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Management's Response to the Draft Report

DEPARTMENT OF THE TREASURY
INTERNAL REVENUE SERVICE
WASHINGTON, D.C. 20224

OFFICE OF TREASURY
INSPECTOR GENERAL
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FOR TAX ADMINISTRATION

COMMISSIONER

June 30, 1999

MEMORANDUM FOR TREASURY INSPECTOR GENERAL
FOR TAX ADMINISTRATION

FROM: Charles O. Rossotti
               Commissioner of Internal Revenue

SUBJECT: Management Response to Draft Audit Report - Increased
               Validation and Oversight of Year 2000 Minicomputer Conversion
               Efforts Are Needed To Strengthen Testing To Avoid Further
               Delays

The Information Systems (IS) organization has completed its review of the subject Draft
Audit Report. Their management response is attached.

The Year 2000 (Y2K) Program is a top Internal Revenue Service (IRS) priority. The
IRS has made significant progress in preparing for the Year 2000. As of March 1999,
nearly all of our 141 mission critical systems were made Y2K compliant and placed
back into production for the 1999 Filing Season. The conversion of minicomputer
systems to Y2K compliance is a key element to our success.

The Year 2000 Dashboard Report is used to track milestones for systems that did not
meet our self-imposed January 31, 1999 deadline for Y2K compliance. As a result of
IS' risk assessment, contingency plans were developed for systems which were at risk.
Information Systems is independently validating reported integration test results, and
the conversion status of mission critical minicomputer systems. Identified risks of
appropriate severity are raised to the Combined Program Management for Century
Date Change and Filing Season Executive Steering Committee, which I chair, to ensure
that all necessary actions are being taken.

If you have any questions, please call me at (202) 622-9511, or have a member of your
staff call David Junkins, Director, Office of Information Resources Management, at
(202) 283-4060 or Barry Herrmann, Chief, Office of IS Program Oversight, at
(202) 283-7698, as appropriate.

Attachment

cc: Assistant Inspector General for Audit
    Director, Audit Projects

**Management Response to Draft Audit Report - Increased Validation and Oversight
of Year 2000 Minicomputer Conversion Efforts Are Needed to Strengthen Testing
and To Avoid Further Delays**

Introduction

The Internal Revenue Service (IRS) uses a Tier II Risk Assessment Dashboard Report
(Dashboard Report) to track all Tier II systems not yet Year 2000 (Y2k) compliant. The
Dashboard Report records dates for each of the critical milestones and assigns an
overall status for the system, which is given as a color: red, yellow, or green. Systems
are classified as yellow if they are more than 5 percent and less than 15 percent behind
schedule. If they are more than 15 percent behind schedule or if they have a critical
milestone past due, they are classified as red. This indicates that the system may be in
trouble and need additional oversight. In addition, the Dashboard Report has included
indicators for systems that would be delayed beyond January 1999. Systems were
allowed to adjust milestone dates as long as the end date did not exceed January 1999.
A waiver was required for any systems requesting an end date beyond January 1999.
Milestones continue to be tracked against the most current end date with the
appropriate color status indicator.

The IRS changed completion dates when there was sufficient justification. When an
Application System Project (ASP) development organization reported that they would
not be able to make a completion milestone, the Tier II Program Office (T2PO) always
required the request for date change to be accompanied by a memorandum from the
director of the requesting organization justifying this change. If the new date was
before January 31, 1999, the T2PO honored the request and made the appropriate
change on the dashboard report. If the date fell after January 31, 1999, the ASP was
placed on the Risk Assessment Chart and monitored with increased scrutiny for
exposure to the Combined Program Management for Century Date Change and Filing
Season Executive Steering Committee (ESC). Once an ASP completion date
exceeded January 31, 1999, the delay was noted in the "Delayed" column on the
Dashboard report to ensure that it would receive the appropriate oversight.

The T2PO relied on a self-reporting process to track systems during the initial phase of
its work. Oversight was provided on a weekly basis to collect data and provide
guidance toward completion of the necessary work. As this initial phase neared the
January 1999 completion date, the T2PO began to develop a process to validate the
work done by system and operational owners. This second phase is referred to as the
Independent Audit and Readiness Verification (IA&RV) process. The IA&RV effort will
use sampling to verify the work that was previously tracked on a self-reporting basis.

1

**Management Response to Draft Audit Report - Increased Validation and Oversight
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The T2PO has started the IA&RV phase of the management plan and the planning
phase has been underway since March 1999. The planning phase focuses on the
validation of reported Year 2000 (Y2k) compliance at both the ASP development and
production sites. The analysis of Tier II platforms began on May 28, 1999. The first
validation of an ASP began on May 24, 1999 with good results. The ASP Automated
Criminal Investigation (ACI) validated that it did produce an application in accordance
with Century Date Change (CDC) Project Office and T2PO guidance. A pilot for the
operational site reviews is scheduled for June 21, 1999.

Testing of the functionality of each system that has Y2k compliant Commercial
Off-the-Shelf (COTS) products and code is critical to ensuring the success of the
conversion effort. The T2PO has issued guidance to system owners regarding the
procedures to be used in completing an Integration Test. This process could be
implemented during completion of the milestone 4 (Upgrade Production Environment)
process or as part of End-to-End testing. In any case, the integration testing is to be
completed no later than October 1, 1999. The T2PO will validate the actions that have
been taken to renovate the application systems, in particular the integration testing
performed by the application owners.

Concerning the Totally Automated Personnel System (TAPS) testing, TIGTA only
reported on the Product Assurance (PA) effort as reported on the SUN platform. The
systems owners' programmers have conducted a successful test with the system clock
set to year 2000 on the Pyramid platform. During the End-to-End tests, PA is planning
to do the 2000 date checks on the SUN and the programmers will do a similar End-to-
End test on the Pyramids.

Contingency planning efforts are underway to handle the business functionality that
systems perform. These efforts are functionality based rather than systems based. As
a result, seven Tier II systems are not covered by these efforts. However, only two of
these seven systems, Telephone Routing Interactive System (TRIS) and Totally
Automated Personnel System (TAPS), are considered by the IRS to be
mission-critical.

A contingency plan had been requested for TRIS. Subsequently, that request was
suspended by the CDC Project Office when TRIS met its Y2k compliance requirements.
In addition the business owners have incorporated procedures to address TRIS
business functions through contingency plans CS 300, CS 301, and CS 302. The
TAPS system has a current request for a contingency plan and a memorandum was
sent to the business owners to alert them that they have no business contingency plan

2

Attachment

Management Response to Draft Audit Report - Increased Validation and Oversight
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and To Avoid Further Delays

in place. This alerts the business owners to assess their processes and determine their
need for a business contingency plan.

<u>**Recommendation #1**</u>

All systems that missed the January 31, 1999, target date are at risk and need
additional oversight. The Tier II Program Office should classify each of these systems
as either red or yellow on the dashboard report.

<u>**Assessment of Cause**</u>

The Year 2000 Risk Assessment Dashboard Report records dates for each of the
critical milestones and assigns an overall status for the system, which is given as a
color: red, yellow, or green. Although the Office of Management and Budget (OMB)
established a March 31, 1999 deadline for government-wide year 2000 compliance, the
Year 2000 Risk Assessment Dashboard Report included indicators for systems that
would be delayed beyond January 1999, the IRS's self-imposed deadline. Systems
were allowed to adjust milestone dates as long as the end date did not exceed January
1999. A waiver was required for any system requesting an end date beyond January
1999. Milestones continue to be tracked against the current end date with the
appropriate color status indicator. Systems are classified as yellow if they are more
than 5 percent and less than 15 percent behind schedule. If they are more than
5 percent behind schedule or if they have a critical milestone past due, they are
classified as red. This indicates that the system may be in trouble and need additional
oversight.

<u>**Corrective Action #1**</u>

The Tier II Program Office (T2PO) has identified and classified all Tier II systems
applications that were not Year 2000 (Y2k) compliant by January 31, 1999 on the Year
2000 Risk Assessment Dashboard Report. The T2PO assessment of Tier II systems
applications was completed approximately two weeks (February 14, 1999) after the
January 31, 1999 compliance due date.

The current Year 2000 Risk Assessment Dashboard Report only contains applications
which are not Y2k compliant. By default, all projects are in a yellow or red status and
are subjected to additional oversight. However, the color of the "Overall Milestone
Status" and the individual milestones are based on progress toward the revised
scheduled completion date of the remediation work.

3

Attachment

**Management Response to Draft Audit Report - Increased Validation and Oversight
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Implementation Date of Corrective Action #1

Completed: February 14, 1999   Proposed: _____
The T2PO has identified and classified all
systems applications that were not Y2k
compliant by January 31, 1999 on the Year 2000
Risk Assessment Dashboard Report.

Responsible Official for Corrective Action #1

Chief Information Officer IS
Deputy Chief Information Officer (Systems) IS
Director, Century Date Change Project Office IS:CD
Director, Tier II Program Office IS:S:TS:T

Corrective Action #1 Monitoring Plan

No monitoring plan required

Recommendation #2

The Century Date Change Project Office should independently validate milestone dates
for systems that did not make the January target.

Assessment of Cause

The Tier II Program Office (T2PO) relied on a self-reporting process to track systems
during the initial phase of our work. Oversight was provided on a weekly basis to collect
data and provide guidance toward completion of the necessary work. As this initial
phase neared the January 1999 completion date, the T2PO developed a process to
validate the work done by system and operational owners. This second phase is
referred to as the Independent Audit and Readiness Verification (IA&RV) process. The
IA&RV uses sampling to verify the work that was previously tracked on a self-reporting
basis. The T2PO has started the IA&RV phase of the management plan and the
planning phase has been underway since March 1999. The planning phase focuses on
the validation of reported Year 2000 (Y2k) compliance at both the Application Systems
Project (ASP) development and production sites.

4

Attachment

Management Response to Draft Audit Report - Increased Validation and Oversight of Year 2000 Minicomputer Conversion Efforts Are Needed to Strengthen Testing and To Avoid Further Delays

Corrective Action #2

The T2PO will implement an IA&RV process. The IA&RV process will validate the actions that have been taken, identified by milestones, to renovate the application systems. Particular attention will be paid to those applications that have been delayed beyond January 31, 1999.

Implementation Date of Corrective Action #2

Completed: _____

Proposed: <u>December 1, 1999</u>
T2PO will use IA&RV to
validate actions taken to
renovate application systems.

Responsible Official for Corrective Action #2

Chief Information Officer IS
Deputy Chief Information Officer (Systems) IS
Director, Century Date Change Project Office IS:CD
Director, Tier II Program Office IS:S:TS:T

Corrective Action #2 Monitoring Plan

The IA&RV process calls for the development of recommendations and follow up actions. An audit report will be produced describing the findings and necessary corrective actions. The T2PO will provide the responsible executive with a copy of the report and will monitor completion of the recommendations.

Recommendation #3

We recommend that the Century Date Change Project Office representative ensure that complete integration tests are performed for each Tier II mission critical system.

Assessment of Cause

Testing of the functionality of each system (COTS products and code) that will be running in the year 2000 is critical to ensuring success of the conversion effort. The Tier II Program Office (T2PO) has issued guidance to system owners regarding the procedures to be used in completing an integration test. This process could be implemented during completion of the milestone 4 (Source Code Compliance) process

5

Management Response to Draft Audit Report - Increased Validation and Oversight of Year 2000 Minicomputer Conversion Efforts Are Needed to Strengthen Testing and To Avoid Further Delays

or as part of End-to-End testing. In any case, the integration testing is to be complete by October 1, 1999. The T2PO is in the process of implementing an Independent Audit and Readiness Verification (IA&RV) procedure. Part of the IA&RV process will be to validate the actions that have been taken to renovate the application systems. The T2PO will pay particular attention to the integration testing performed by the application owners.

Corrective Action #3

The T2PO, through the IA&RV procedure process, will validate the results of the integrated testing performed by application owners for Tier II mission critical systems.

Implementation Date of Corrective Action #3

Completed:_____   **Proposed: October 1, 1999**
                                     T2PO will complete IA&RV
                                     validation of the results of the
                                     integration testing of Tier II
                                     mission critical systems

Responsible Official for Corrective Action #3
Chief Information Officer IS
Deputy Chief Information Officer (Systems) IS
Director, Century Date Change Project Office IS:CD
Director, Tier II Program Office IS:S:TS:T

Corrective Action #3 Monitoring Plan

The IA&RV process calls for the development of recommendations and follow up actions. An audit report will be produced describing the findings and necessary corrective actions. The T2PO will provide the responsible executive with a copy of the report and will monitor completion of the recommendations.

Recommendation #4

The Century Date Change (CDC) Project Office needs to ensure that formal contingency planning procedures cover all systems that did not meet the March 31, 1999, Office of Management and Budget (OMB) target.

6

Management Response to Draft Audit Report - Increased Validation and Oversight of Year 2000 Minicomputer Conversion Efforts Are Needed to Strengthen Testing and To Avoid Further Delays

Assessment of Cause

Contingency planning efforts are underway to handle the business functionality that systems perform. These efforts were functionality based rather than systems based. As a result, seven Tier II systems are not covered by these efforts. However, only two of these seven systems, Telephone Routing Interactive System (TRIS) and Totally Automated Personnel System (TAPS), are considered by the IRS to be mission-critical.

The CDC PO has a process to evaluate late systems and request contingency plans. All systems and business processes were analyzed and a risk assessment performed to determine if a contingency plan was required. Another process is not needed.

Corrective Action #4

The CDC PO will continue to monitor the conversion progress and if a risk assessment results in a need for a contingency plan, one will be issued.

The IRS Contingency Planning Procedures, per the Century Date Change Contingency Management Plan (CMP) Version 5, cover all IRS systems, including those that did not meet the OMB March 31, 1999 target. Following the General Accounting Office (GAO) model, plans are based on business processes and not on computer systems. All 35 business contingency plans have been completed. All information systems were analyzed and a risk assessment performed to determine if a contingency plan was required. Risk ratings were assigned to each system. Twelve systems were identified

as having a risk assessment score of "1" (highest risk). Eleven of these systems have taken steps to ensure they remain on schedule or have submitted a contingency plan.

A contingency plan had been requested for TRIS. Subsequently, that request was suspended by the CDC Project Office when TRIS met its Y2k compliance requirements. In addition the business owners have incorporated procedures to address TRIS business functions through contingency plans CS 300, CS 301, and CS 302.

The TAPS system has a current request for a contingency plan and a memorandum was sent to the business owners to alert them that they have no business contingency plan in place. This alerts the business owners to assess their processes and determine their need for a business contingency plan.

A request to a system owner for a contingency plan generates an alert to the impacted business area, suggesting a review of their current Business Continuity & Contingency

7

**Management Response to Draft Audit Report - Increased Validation and Oversight
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Plan(s). The business area is advised to ensure all failure scenarios and triggers
associated with the system are identified and that the existing contingency plan is
sufficient. For those critical systems that were deemed not to be at risk, no plan was
required.

Implementation Date of Corrective Action #4

Completed:_____   Proposed: November 1, 1999
                                           CDC PO will continue to monitor
                                           the conversion progress and if a risk
                                           assessment results in a need for a
                                           contingency plan, one will be
                                           issued.

Responsible Official:

Chief Information Officer IS
Deputy Chief Information Officer (Systems) IS
Director, Century Date Change Project Office IS:CD

Corrective Action #4 Monitoring Plan

The CDC Project Office will continue to evaluate Tier II Systems and waivers received
to determine the need for a contingency plan.

8

Minicomputer Systems Included in the Review

System	Purpose	Classified as Mission Critical by Century Date Change Project Office	Type of Testing We Performed (see legend below)
Automated Insolvency System/ Insolvency Input Program (AIS/IIP)	AIS and IIP are local systems that control cases in bankruptcy. AIS provides inventory and status control and generates proofs of claim. IIP inputs case control data to the Internal Revenue Service' (IRS) computer system from court records.	No	B
Automated Non-Master File (ANMF)	This system supports accounting for assessments, liabilities, payments, and credits for transactions not compatible with IRS normal processing.	Yes	B
Automated Offers in Compromise (AOIC)	This system supports revenue officers and customer service representatives by tracking offers in compromise and producing reports, letters, and documents.	Yes	B
Automated Substitute for Return (ASFR)	ASFR uses information returns data to create and adjust tax assessments for taxpayers who have substantial reported income and do not file an income tax return. It generates tax computations, statutory notices, and other correspondence.	Yes	B, C
Batch Block Tracking System (BBTS)	BBTS establishes control over incoming submissions using estimates created as mailbags are weighed. BBTS uses numbers assigned in receipt and control to track returns and other submissions through service center processing.	Yes	A, B

Type of Testing We Performed--Legend
A--Review of integration testing performed on the system.
B--Evaluation of the accuracy of the system's milestone dates.
C--Review of contingency planning for functionality provided by the system.

System	Purpose	Classified as Mission Critical by Century Date Change Project Office	Type of Testing We Performed (see legend below)
Compliance Research Information System (CRIS)	These are the databases and applications required to support the Compliance Research function in the identification and measurement of noncompliance and in the development of treatment strategies to deal with identified areas of noncompliance.	Yes	B, C
Electronic Management System (EMS)	This system enables communication between computers and provides security and data management support for electronic commerce, including electronic filing of tax returns. It serves as the principal interface between IRS and users outside the IRS.	Yes	A, B
EP/EO Determination System (EDS)	EDS supports examiners in making determinations regarding either the status of an employee retirement plan or the exempt status of an organization. It also tracks and monitors applications for exempt status and controls inventory levels.	No	B
Exam Return Control System (ERCS)	This system provides the capability to assign returns to individual examiners. It tracks time spent on cases, monitors statutes, and provides exam case information to management.	Yes	C
Insolvency Interface Program (IIP1)	This program analyzes data and automates the transfer of data between AIS and a major IRS tax processing system. This program performs basic research and transaction code inputs of bankruptcy processing.	No	A, B

Type of Testing We Performed--Legend
A--Review of integration testing performed on the system.
B--Evaluation of the accuracy of the system's milestone dates.
C--Review of contingency planning for functionality provided by the system.

**Increased Validation and Oversight of Year 2000
Minicomputer Conversion Efforts Are Needed
To Strengthen Testing and To Avoid Further Delays**

System	Purpose	Classified as Mission Critical by Century Date Change Project Office	Type of Testing We Performed (see legend below)
Insolvency Interface Program (IIP2)	This program analyzes data and automates the transfer of data between AIS and IDRS. This program automates the analysis and processing of tax accounts when a bankruptcy discharge has been granted.	No	A, B
Integrated Case Processing 1.5 (ICP 1.5)	ICP enables customer service representatives to serve taxpayers by providing access to multiple systems from a single workstation.	Yes	B
Interim Revenue Accounting Control System (IRACS)	This system performs summary-level revenue operations and revenue tracking functions using a mixture of electronic and manual interfaces to business systems.	Yes	B
Problem Resolution Management Information System (PROMIS)	This is a computerized inventory control and report system developed to support Problem Resolution caseworkers. The system produces inventory and other management information reports to support program management.	Yes	B
Telephone Filing (TELEFILE)	This system allows taxpayers to file simple Employer's Quarterly Federal Tax Returns (Form 941) and Income Tax Returns for Single and Joint Filers With No Dependents (Form 1040 EZ) through an automated telephone application.	Yes	B

Type of Testing We Performed--Legend
A--Review of integration testing performed on the system.
B--Evaluation of the accuracy of the system's milestone dates.
C--Review of contingency planning for functionality provided by the system.

System	Purpose	Classified as Mission Critical by Century Date Change Project Office	Type of Testing We Performed (see legend below)
Totally Automated Personnel System (TAPS)	This system handles various personnel transactions, including automated personnel actions, automated vacancy announcement, and single-entry timekeeping (which are forwarded for payroll purposes).	Yes	A, B, C
Trust Fund Recovery Program (TFRP)	TFRP is a system that computes the amount of trust fund recovery penalty to be assessed against responsible officials in defunct corporations and generates forms and other correspondence.	Yes	B
Travel Reimbursement and Accounting System (TRAS)	This system accepts user input of travel advance and voucher data, enables managerial approval of travel documents, and forwards approved documents to the IRS administrative accounting system for processing and payment.	No	C
Telephone Routing Interactive System (TRIS)	TRIS is a set of automated telephone applications that provides call routing and tax assistance to taxpayers contacting Customer Service sites. Services include unassisted refund inquiries, installment agreements, and account summaries.	Yes	A, B

Type of Testing We Performed--Legend
A--Review of integration testing performed on the system.
B--Evaluation of the accuracy of the system's milestone dates.
C--Review of contingency planning for functionality provided by the system.