

**Review of Phase 4 Year 2000
Conversion and Testing**

Reference No. 090403

Date: October 14, 1998

October 14, 1998

MEMORANDUM FOR COMMISSIONER ROSSOTTI

FROM: Gary D. Bell
Chief Inspector

SUBJECT: Final Internal Audit Report—Review of Phase 4 Year
2000 Conversion and Testing

Attached is the final Internal Audit report, which includes an Executive Summary of the results of the review. Our report addresses the need for better documentation of Year 2000 testing activities and greater consideration of the impact Year 2000 programming changes will have on hardware capacity and system performance. Management's response was not available for inclusion in the report at the time the final report was issued. We were informed that management is developing actions to address our concerns and will provide us with a written description of their proposed corrective actions at a later date.

I would be pleased to furnish any additional information if needed.

Attachment

NOTE: Response dated November 18, 1998 has been attached to this report.

**Review of Phase 4 Year 2000
Conversion and Testing**

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Review of Phase 4 Year 2000 Conversion and Testing

Executive Summary

Based on prior Internal Audit recommendations,¹ Service management has initiated actions to improve the Service's Year 2000 certification efforts and improve the accuracy of the Service's Applications Program Registry (APR) data. The Service is also working toward being classified as a Capability Maturity Model Level 2 organization to institutionalize effective management processes for software projects, which will allow for repetition of successful practices developed on earlier projects. We recognize these efforts are not yet completed.

Our results emphasize the need for the Service to continue with its efforts to improve the accuracy of the APR. The Service also needs to ensure Service developers and testers document test activities as well as contractors, and the Service needs to give greater consideration to how Year 2000 programming changes will affect hardware capacity and system performance on Tier 2 and Tier 3 systems.

The overall objective of this audit was to perform an assessment of Phase 4 of the Service's Year 2000 conversion and testing efforts.

Results

In addition to the three specific findings of this audit, we noted that the Century Date Change (CDC) Project Office has not established any controls to verify the accuracy of Year 2000 compliance certifications. Since these are not validated, the CDC Project Office is unable to fully assess the risk that exists for programs that are not actually Year 2000 compliant.

APR inaccuracies remain a recurring issue.

At the end of our audit fieldwork, efforts to link components tracked on the APR with a standardized project name and phase had not yet been completed. In addition, as previously reported, conversion and testing dates on the APR did not accurately reflect the status of Phase 4 Year 2000 conversion activities.

The Product Assurance Division cannot effectively monitor the status of project conversion and testing efforts, follow up on projects falling behind schedule, accurately report the status of conversion and testing, or make sound project and configuration management decisions when inaccuracies exist on the APR.

¹ *Review of the Service's Year 2000 Conversion and Testing for Phase III*, report number 083605, June 24, 1998.

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Service developers and testers do not always clearly and completely document test activities.

Project files prepared by contractors were complete, cross-referenced, and easy to follow, unlike those prepared by Service developers and testers. The Service's project files did not always reflect testing for invalid conditions or the reasons why invalid testing was not performed.

Insufficient documentation of programming and testing activities can delay Year 2000 project certification and hinder the Service's efforts to be classified as a Capability Maturity Model Level 2 organization. Given the significance of the Year 2000 programming efforts, testing for invalid conditions should be performed to identify and avert any potential system errors or failures.

Greater consideration needs to be given to how Year 2000 programming changes will affect hardware capacity and system performance.

The Service does not have a corporate plan in place to address the capacity management and performance evaluation issues that may arise due to Year 2000 conversions. Quarterly assessments of Year 2000 capacity and performance issues will be done for Tier 1 systems; however, adequate oversight consideration is not being given to how Year 2000 programming changes will affect hardware capacity and system performance of Tier 2 systems. In addition, no capacity or performance evaluations have been completed for systems that will be running Year 2000 compliant applications software on Tier 3 hardware, such as the Integrated Collection System (ICS) which supports over 10,000 workstations.

If capacity and performance evaluations of major Tier 2 and Tier 3 systems are not performed, the potential exists that system timeliness could be impaired or that additional hardware capacity could be needed.

Summary Recommendations

This report makes seven recommendations for the Service to ensure it can effectively meet its century date change needs. In summary, they are:

- The Product Assurance Division should monitor organizational efforts to re-certify the data on the APR. (*SEE page 4*)
- Service developers and testers should document and cross-reference programming and testing activities and prepare data to test for invalid conditions or document why such tests are not required. (*SEE page 6*)
- The Service needs to proactively consider and evaluate potential capacity and performance issues in preparing for its Year 2000 systems environment. (*SEE page 9*)

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Management Response: Management's response was not available for inclusion in the report at the time the final report was issued. We were informed that management is developing actions to address our concerns and will provide us with a written description of their proposed corrective actions at a later date.

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Objective and Scope

This audit was initiated as part of Internal Audit's continual emphasis on century date change issues.

This audit was initiated as part of Internal Audit's continual emphasis on century date change issues. The overall objective was to perform an assessment of Phase 4 of the Service's Year 2000 conversion and testing efforts; however, the scope of this audit did not include tests to assess code review activities for Information Systems components.

We conducted this audit at the National Office from March through June 1998. Audit work was performed in accordance with generally accepted government auditing standards. Attachment I contains the detailed objective and scope of our audit.

Management's response was not available for inclusion in the report at the time the final report was issued. We were informed that management is developing actions to address our concerns and will provide us with a written description of their proposed corrective actions at a later date.

Background

Many tax processing and collection functions of the Service are date driven.

The Year 2000 century change is one of the most critical problems facing many organizations' data processing efforts. To maximize system processing capabilities and to preserve data storage space, many date fields in system programs and applications have been limited to a two-digit year representation (i.e., 97 for 1997). The Service uses this form of two-digit year representation for its programs and applications. As a result, the Service's existing date routines will not be able to recognize the changes required by the Year 2000. This problem is extremely critical to the Service, as many of its tax processing and collection functions are date driven. Additionally, numerous other Service

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operations, including law enforcement, personnel, and procurement, are also highly date driven.

Results

Based on prior Internal Audit recommendations, Service management has initiated actions to improve the Service's Year 2000 certification efforts, and improve the accuracy of the Service's Applications Program Registry (APR) data. The Service is also pursuing Capability Maturity Model (CMM) Level 2 classification. To achieve this, basic project management processes must be established for software managers to track system functionality. We recognize these efforts are underway and are not yet completed. Our continued appraisal of these conditions during Phase 4 emphasizes the need for completion of planned actions in these areas and has identified other issues to help the Service accomplish necessary actions for Year 2000 functionality.

We recognize that efforts to address prior Internal Audit recommendations are underway.

To assess conversion activities for Phase 4 non-Information Systems (non-IS) components, we selected a judgmental sample of 100 non-IS components from the APR. We reviewed the components to evaluate their compliance with the Service's Year 2000 standards. Our audit did not indicate there were programming problems with Phase 4 non-IS programs; however, we noted there is no control set up to verify the accuracy of Year 2000 compliance certifications.

There is no validation of compliance and testing certifications.

The Century Date Change (CDC) Project Office has developed and issued procedures and standards for Year 2000 compliance. The procedures include a certification by the programmer that the component is Year 2000 compliant. After the component has undergone conversion, the code developer tests it. These certifications are used to update the Year 2000 status of the component on the APR; however, the CDC Project Office does not validate the certifications. By not validating these certifications, the CDC Project Office is unable to fully assess the risk that exists if programs are not actually Year 2000 compliant.

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APR data remains incomplete and inaccurate.

Our audit tests found the APR inventory data continues to be incomplete and inaccurate. Fourteen of the 100 components in our sample of Phase 4 non-IS components were not correctly recorded as retired or to be retired, or were rescheduled for conversion in Phase 5. Our audit work pertaining to Product Assurance Division activity also found incomplete and inaccurate APR inventory data.

Our review also found:

- Documentation of programming and testing activities needs to be consistent and complete (similar to issues previously reported²).
- The Service needs to address the impact of Year 2000 programming changes on hardware capacity and system performance of Tier 2 and Tier 3 systems.

APR inaccuracies remain a recurring issue.

APR inaccuracies remain evident during our audit of Phase 4 projects.

The APR does not reflect the accurate status of Year 2000 components. At the end of our audit fieldwork, efforts to link components tracked on the APR, which is part of the Integrated Network and Operations Management System with a standardized project name and phase, had not yet been completed. In addition, as previously reported during our Phase 3 audit, conversion and testing dates on the APR did not accurately reflect the status of Phase 4 Year 2000 conversion activities. For instance, we identified several components recorded as Phase 4 on the APR that were not actually Phase 4 projects. Nine of the 16 projects in the original sample of Phase 4 projects we chose to review were incorrectly documented as Phase 4 projects on the APR. In addition, we noted that many of the Systems Acceptability Testing (SAT) and Production Transmittal dates on the APR were inaccurate.

² *Review of the Service's Year 2000 Conversion and Testing for Phase III*, report number 083605, June 24, 1998.

Review of Phase 4 Year 2000 Conversion and Testing

The Product Assurance Division serves as the central point of contact and control for Product Assurance testing activities relating to the Year 2000 conversion. It is primarily a coordinating entity since project-specific management remains the responsibility of the individual testing branches. The Product Assurance Division's duties include ensuring unit and SAT tests are planned, scheduled, and conducted within specific time frames. To meet its objectives, the Product Assurance Division was required to develop and maintain a master test schedule, track testing progress, and provide testing status to the IRS CDC Project Office. The APR was developed to track component conversion progress and certification.

Developers and testers have not updated component information on the APR or, in some instances, claimed ownership of remaining components.

Prior to inception of the APR, components were not tracked on a centralized database. Once the APR was established, developers and testers did not update the APR on a regular basis to ensure data was accurate. In some instances, as previously noted, developers have not consistently linked components on the APR with a project name or claimed ownership of remaining components.

Management needs accurate APR data to effectively oversee Year 2000 conversion progress and make sound project and configuration management decisions.

The Product Assurance Division cannot effectively monitor the status of project conversion and testing efforts, follow up on projects falling behind schedule, or accurately report the status of conversion and testing on the APR when inaccuracies exist. If developers and testers do not accurately update APR data, CDC Project Office and Service management will not be able to effectively oversee the Year 2000 conversion process and make sound project and configuration management decisions in the future.

Recommendation

1. The CDC Project Office should ensure that the Product Assurance Division monitors organizational efforts to re-certify the data on the APR, ensuring also that components tracked and reported on the APR are linked with the correct phase and status.

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Service developers and testers do not always clearly and completely document test activities.

Year 2000 project files do not contain clear and complete documentation of test activities.

During our audit of Phase 4 Year 2000 components, some of which were subjected to systems acceptability testing by Product Assurance, we identified (from our review of available project files) that Service developers and testers do not always clearly and completely document test activities. A significant difference was noted while reviewing project files prepared by contractors secured to support systems acceptability testing. Files prepared by contractors were complete, cross-referenced, and easy to follow. In addition, contractors clearly tested invalid conditions or reasons why this testing was not necessary or performed. Conversely, testing for invalid conditions was not always evident in Service project files, nor were testers documenting the reasons why invalid testing was not performed.

Pre-determined results should include test conditions for invalid data.

Established guidelines are available to provide developers and SAT testers with the requirements and guidance necessary to perform unit and systems acceptability testing. The Developer's Testing Guidelines, SAT Guidelines, Procedures for Testing Year 2000 Changes, IRM 2600: Quality Systems Testing Procedures and Guidelines, and CDC Project Office memorandums recommend that pre-determined results be prepared for every test condition specified in Program Requirements Packages, Functional Specifications Packages or other appropriate functional requirements documentation. As a "rule of thumb," pre-determined results should include data for invalid test case conditions.

According to the guidelines, project file documentation should contain clear and correct documentation related to the development and maintenance of a component. All testing material should be cross-referenced with appropriate identifying information. Documentation maintained in project files is necessary for review during the Year 2000 certification process and for an

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Unit and SAT guidelines provide recommended guidance to Service developers and testers, but are not uniformly followed.

organization to be established and classified as Level 2 within the CMM.

Contractors are required to follow established guidelines, under the terms of their contracts, in preparing project documentation. This documentation includes performing tests of invalid data. However, unit and SAT guidelines remain as recommended guidance to Service developers and testers and are not uniformly followed. Due to time constraints, Service developers and testers continue to rely on system tests that have been used for non-Year 2000 related SAT typically performed for tax year changes. In addition, Service programmers and testers continue to maintain project file documentation as they routinely have in the past.

Insufficient documentation of programming and testing activities can delay Year 2000 project certification and hinder the Service's efforts to be classified as a CMM Level 2 organization. Given the significance of the Year 2000 programming efforts, testing for invalid conditions should be performed to identify and divert any potential system errors or failures.

Recommendations

The Deputy Chief Information Officer, Systems Development, should ensure that Service developers and testers:

2. Be required to rigorously follow available guidelines to clearly and completely document and cross-reference programming and testing activities.
3. Prepare data to test for invalid conditions or document why such tests are not required.

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Greater consideration needs to be given to how Year 2000 programming changes will affect hardware capacity and system performance.

The impact on hardware capacity and system performance of Year 2000 programming changes has not been adequately considered.

Although the Service has a Capacity Management Program in place, adequate consideration is not being given to how Year 2000 programming changes will affect hardware capacity and system performance. For example, the mission of the Service's Capacity Management Program does not include a provision for Year 2000 capacity and performance evaluations. Also, the Service has not begun to consider how the Service Center consolidation will impact the hardware capacity and system performance of Tier 2 systems that will be moved from non-Year 2000 compliant platforms to Year 2000 compliant platforms. In addition, no capacity or performance evaluations have been completed for systems that will be running Year 2000 compliant applications software on Tier 3 hardware, such as the Integrated Collection System (ICS) which supports over 10,000 workstations.

A capacity management program must consider future workload and performance requirements.

Capacity management in the Service is the process of maintaining adequate resources necessary to process a given workload and deliver a required level of performance. The Capacity Management Program is responsible for providing centralized management for all computing centers and managing the capacity of multiple systems and architectures, including: mainframes (Tier 1 systems), minicomputers (Tier 2 systems), and workstations (Tier 3 systems). A capacity management program must incorporate the measurement and evaluation of performance, as well as the projection of future workload and performance requirements, for planning purposes.

There is no corporate plan to address Year 2000 capacity and performance issues.

The Service does not have a corporate plan in place to address the capacity management and performance evaluation issues that may arise due to Year 2000 conversions. Also, the Capacity Management Program is not as visible as it could be. For example, the Program's web page, published under the Tier 2 web page, is not linked to the Year 2000 home page. Additionally, the

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Program has not taken a proactive role in addressing Year 2000 capacity and performance issues when evaluating systems.

While the CDC Project Office tasked the Mainframe Capacity Management Section with providing a yearly assessment of Year 2000 capacity and performance issues by site for Tier 1 systems, it has not tasked such studies of Tier 2 or Tier 3 systems. The Distributed Capacity Management Section (Tier 2 systems) has only conducted one capacity/performance study, which was requested by the user. We did not identify any studies done for Tier 3 systems.

If capacity and performance evaluations of major Tier 2 and Tier 3 systems are not performed, the potential exists that system timeliness could be impaired or that additional hardware capacity could be needed. For example, with many systems being consolidated into centrally maintained sites, the system workload and number of users could significantly increase, warranting the need for additional capacity so that system performance is not hindered. The hardware required for the additional capacity needed may not be readily available because it must be purchased via a procurement vehicle.

Failure to identify and address capacity and performance issues may impair user functionality.

If Tier 2 systems, such as the Integrated Submission and Remittance Processing Systems (ISRP), are not converted to the correct Year 2000 compliant platform based on the workload and number of users, a system's functionality may also be impaired. For example, the Service Center consolidation may have an effect upon a system's functionality, regarding the speed in which workload is processed. In addition, confusion over the classification of platforms as Tier 2 or Tier 3 has made it difficult to associate hardware with software applications (and software applications with the hardware) necessary to run fully Year 2000 compliant versions of software.

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Recommendations

4. The Systems Support Division needs to ensure the Servicewide plan is completed and implemented to perform capacity studies and performance evaluations of Tier 2 and Tier 3 systems, addressing Year 2000 issues. Yearly Tier 1 studies and evaluations for Year 2000 should continue.
5. For major Tier 2 and Tier 3 systems, such as the ISRP and ICS, capacity studies and performance evaluations may need to be conducted before a system is certified as Year 2000 compliant.
6. The Capacity and Performance Management Technical Handbook should be updated to detail which sections are responsible for capacity studies and performance evaluations. The Handbook should also provide detailed instructions outlining the steps that need to be conducted so that field organizations would be able to conduct their own evaluations if there is a lack of National Office resources to conduct these studies.
7. The Capacity Management Program should also create a link between their web site and the Service's Year 2000 home page for higher visibility and access to information.

Conclusion

Service management has accepted a number of Internal Audit recommendations and is in the process of implementing numerous other actions. Efforts to improve the accuracy of the APR should continue with additional emphasis on efforts to re-certify the data and ensure components are linked with the correct phase and status.

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Better documentation of test activities and greater consideration to the impact of Year 2000 programming changes is needed.

The Service also needs to act to ensure it can effectively meet its century date change needs by:

- Ensuring Service developers document test activities as well as what contractors are doing.
- Giving greater consideration to how Year 2000 programming changes will affect hardware capacity and system performance on Tier 2 and Tier 3 systems.



David H. Newman
Audit Manager

Audit team members:

- Barbara Bartuska, Auditor
- Ed Coleman, Audit Manager
- Eleonor Lindner, Auditor
- Joseph R. McGeehan, Auditor
- Kathryn K. MacMillan, Senior Auditor/Team Leader
- A. Michael Stevens, Senior Auditor/Team Leader
- Kimberly A. Woodard, Auditor

**Review of Phase 4 Year 2000
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Attachment I

Detailed Objective and Scope

The overall objective of this audit was to perform an assessment of Phase 4 of the Service's Year 2000 conversion and testing efforts. Specifically, we:

- I. Assessed conversion activities for Phase 4 non-Information Systems (non-IS) controlled components by:
 - A. Selecting a judgmental sample of 100 modified Phase 4 components.
 - B. Reviewing source code (and related documentation) of 90 of those 100 components to determine if all Year 2000 changes have been identified and made. (We did not review the other 10 components because the owning organization reported that the component should have been marked as to be retired, had been retired, or was rescheduled for conversion in a later phase.)
 - C. Examining Source Code Compliance forms or comparable documentation for the 90 components reviewed to determine whether the completion status was accurately reported to the Century Date Change (CDC) Project Office.
 - D. Examining Unit Test Checklists, Test Readiness Review Reports, or comparable documentation for each functional area owning the 90 components reviewed to assess efforts for performing code review before placing programs into production.
- II. Assessed the quality review and testing of Phase 4 components and determined whether testing was sufficient before components were placed into production by:
 - A. Selecting judgmental samples of Phase 4 components for:
 1. Nine Information Systems (IS) projects scheduled for Systems Acceptability Testing (SAT).
 2. Five IS projects not scheduled for SAT by Product Assurance Division.
 3. Three non-IS projects not scheduled for SAT by Product Assurance Division.

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- B. Analyzing the samples to determine whether Product Assurance had gathered adequate test data and prepared test scenarios for testing Phase 4 Year 2000 changes and by:
 - 1. Determining whether the inventory accurately reflected Phase 4 components.
 - 2. Determining whether testing was progressing as planned, based on a review of a CDC Tracking Status Report dated April 6, 1998.
 - 3. Interviewing Service and contractor developers and testers.
 - C. Reviewing open Phase 4 problems identified from the 5534 System for any problems or trends being identified during Year 2000 testing.
 - D. Obtaining and reviewing the Problem Reporting Measurements Report, which identified 5534s by issue area.
- III. Assessed the Service's efforts to ensure the impact of Year 2000 changes have been considered and tested on its systems environment by:
- A. Determining whether plans were prepared to test performance and capacity for Year 2000 changes that:
 - 1. Considered the effect field expansion will have on capacity.
 - 2. Addressed the capacity implication on existing equipment for performance.
 - 3. Included specifications or models to identify capacity requirements.
 - B. Determining whether plans were prepared to convert and test the hardware items necessary to support Year 2000 changes by ascertaining whether there were:
 - 1. Plans in place to get additional equipment.
 - 2. Plans to test the new equipment.

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Attachment II

Management Response to Draft Report



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

RECEIVED

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C-Inspector

NOV 18 1998

MEMORANDUM FOR CHIEF INSPECTOR

FROM: Helen H. Bolton 
Director, Office of Information Resources Management IS:IR

SUBJECT: Draft Internal Audit Report - Review of Phase 4 Year 2000
Conversion and Testing

The Deputy Chief Information Officer for Systems has reviewed the subject draft Internal Audit report and provides the management response attached.

If you have any questions, please call me on (202) 283-4060 or have a member of your staff call Donna Downing on (202) 283-4159.

Attachment

Review of Phase 4 Year 2000 Conversion and Testing

Response to Draft Internal Audit Report Review of Phase 4 Year 2000 Conversion and Testing

Recommendation 1

The Century Date Change (CDC) Project Office should ensure that the Product Assurance Division monitors organizational efforts to re-certify the data on the Application Program Registry (APR), ensuring also that components tracked and reported on the APR are linked with the correct phase and status.

Assessment of Cause

Internal Audit found fourteen of the one-hundred Phase 4 non-IS components they sampled were incorrectly recorded on the Application Program Registry (APR).

Corrective Action for Recommendation 1

The Century Date Change (CDC) Project Office and Operations Division will continue to monitor on a weekly basis the status of information on the Application Program Registry (APR) and Integrated Network Management Systems (INOMS) to ensure that components are tracked and reported on the APR as well as identified with correct Tier and Phase. The APR is re-certified annually by the executive of each organization. This year, an indicator was added to each component that the organization updated to verify that they had certified the component. The CDC Project Office tracked the progress until all of the components had been certified and each executive certified their portion of INOMS in a memorandum.

The CDC Project Office conducts weekly Information System and field and Customer Progress meetings to discuss the status of Century Date Change issues and conversion progress. Some of the reports utilized to help track progress are:

- Y2K INOMS Status Report/APR Component Commitment Status reports the number of uncommitted components and to which organizations they belong
- Missing Milestone Report reports the components with missing milestones and to which organizations they belong
- Verification of TIER 2 Application System Platform & Software Inventory reports information on platforms without application systems, platforms without associated software and software without platforms and to which organizations they belong

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As a result of the on-going monitoring, errors have been uncovered and the necessary action has been taken to correct the problems.

At the time of Internal Audit's review, Product Assurance was responsible for the Year 2000 Certification Process. However, since then, the contractor Northrop Grumman has been tasked to perform 100% code review (except in instances that would violate IRS security, in which case the code owner is responsible for the code review). As part of this review, Northrop Grumman has identified some instances of components that were incorrectly assigned to the wrong phase or did not meet the CDC definition of Year 2000 compliant. Northrop Grumman has also been tasked to scan all production libraries for code which is not in the APR.

Product Assurance or in some cases the system owners will conduct end-to-end testing for all systems. The combination of 100% code review and end-to-end testing better assures Year 2000 compliance than the earlier component and system certification process.

Implementation Date

Completed: _____

Proposed: February 01, 2000
The CDC Project Office and Operations
Division will continue to monitor the APR
and INOMS databases weekly until
January 2000.

Responsible Official

Chief Information Officer IS
Deputy Chief Information Officer (Systems) IS
Director, Year 2000 Program IS:CD

Review of Phase 4 Year 2000 Conversion and Testing

Response to Draft Internal Audit Report Review of Phase 4 Year 2000 Conversion and Testing

Recommendation 2

The Deputy Chief Information Officer for Systems Development (DCIO SD) should ensure that Service developers and testers be required to rigorously follow available guidelines to clearly and completely document and cross-reference programming and testing activities

Assessment of Cause

During Internal Audit's review of project files, they still find that the files did not always clearly and completely document test activities. Additionally, the testing material was not always cross-referenced. There was a significant difference in the comparison of internal developer files with contractor files. The contractor files were complete, cross-referenced and easy to follow.

We agree that these are ideal requirements that we should strive to meet, unfortunately, we do not work in an ideal environment. Requirements do not come in timely and adequate time is not always provided to developers for analysis, coding and testing of applications, so there are times when the standards are not followed 100%.

Documentation is becoming paramount over actual testing. As a result of inadequate resources or expertise, developers are overburdened. The actual development life cycle is cut further and further.

A comparison between contractor testing documentation and our internal developer testing documentation is not a valid comparison. Resources have been lost, increasing demands on IS developers. Contractors also make alterations to their implementation dates or they are provided with additional staffing. We do not get the same benefit.

Corrective Action for Recommendation 2

"Developer's Testing Guidelines," IRS Document #9944, is being upgraded to an Internal Revenue Manual (IRM) by the Software Quality Group and will replace IRM 2553.41, Testing Guidelines. The IRM will more fully document and cross-reference programming and testing activities. In upgrading the testing guidelines to IRM status, the discretion that the guidelines now allow will be minimized.

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Response to Draft Internal Audit Report Review of Phase 4 Year 2000 Conversion and Testing

Additionally, we will continue to emphasize each phase of the Life Cycle and the associated documentation products for each phase. We will also continue to emphasize conformance to standards and verify completeness of the project notebooks and folders by continuing team leader and section chief reviews.

Implementation Date for Corrective Action 2

Completed: _____

Proposed: January 1, 1999
IRS Document #9944 will become IRM
2553.41.

Responsible Official for Corrective Action 2

Chief Information Officer IS
Deputy Chief Information Officer (Systems) IS
Assistant Commissioner for Systems Development IS:S
Director, Submission Processing Division IS:S:SP

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Recommendation 3

The Deputy Chief Information Officer for Systems Development (DCIO SD) should ensure that Service developers and testers prepare data to test for invalid conditions or document why such tests are not required.

Assessment of Cause

Developers are not always testing for invalid conditions nor have they documented the reasons for why they did not do it. Again, contractors clearly tested for invalid conditions or provided reasons why they did not do so.

Corrective Action for Recommendation 3

IS will continue to emphasize compliance with "Developer's Testing Guidelines," IRS Document #9944, which provides requirements for Test Case Specifications. The guidelines address testing for both Valid and Invalid Conditions. Document #9944 is being upgraded to an Internal Revenue Manual (IRM) by the Software Quality Group and will replace IRM 2553.41, Testing Guidelines. In upgrading the testing guidelines to IRM status, the discretion that the guidelines now allow would be minimized.

As a rule, the developers test for all anticipated invalid conditions and document that fact in their plans and specifications, as required in the programmer testing guidelines.

Implementation Date for Corrective Action 3

Completed: _____

Proposed: January 1, 1999
IRS Document #9944 will become IRM
2553.41.

Responsible Official for Corrective Action 3

Chief Information Officer IS
Deputy Chief Information Officer (Systems) IS
Assistant Commissioner for Systems Development IS:S
Director, Submission Processing Division IS:S:SP

Review of Phase 4 Year 2000 Conversion and Testing

Response to Draft Internal Audit Report Review of Phase 4 Year 2000 Conversion and Testing

Recommendation 4

The Systems Support Division needs to ensure a Service wide plan is completed and implemented to perform capacity studies and performance evaluations of Tier 2 and Tier 3 systems, addressing Year 2000 issues. Yearly Tier 1 studies and evaluations for Year 2000 should continue.

Assessment of Cause

The Century Date Change Project Office tasked Mainframe Capacity Management Section with providing a yearly assessment of Year 2000 capacity and performance issues by site for Tier I systems. Studies of Tier 2 or Tier 3 systems have not been formally tasked out via a Request for IS Services (RIS).

A Tier 3 capacity problem does not exist today. In the future, as IRS moves toward a Windows NT 4.0 Server environment, the organizations may need to address and monitor Tier 3 capacity more formally.

Corrective Action for Recommendation 4

A. For Tiers I and II the Capacity Management Branch (CMB) has an Enterprise Wide Capacity Management Program (EWCMP) tracked and reported through their Status Report System. The Status Report System is reviewed and updated twice a month. The EWCMP analysis addresses not only Y2k issues but all pertinent aspects of capacity planning.

The Capacity Management Branch has published numerous capacity studies and performance evaluations for Tiers I and II. Among the most recent are: Taxpayer Advocate Management Information System (TAMIS), 10/15/1998; Automated Non-Master file (ANMF), 9/16/1998; the DCC (Detroit Computing Center) capacity report (2Q 98), 8/19/1998; and Electronic Federal Tax Payment System, 7/22/1998. The CMB continues to conduct capacity studies and periodically publish relevant reports. These reports are made available via the CMB web page ([HTTP://BBS.IS.IRS.GOV/CPEINDEX.HTM](http://BBS.IS.IRS.GOV/CPEINDEX.HTM)) or may be downloaded directly from the IS Support Bulletin Board System (BBS) Computer Performance Evaluation (CPE) Library.

B. The CMB web page and the Support BBS will be updated to include the most current capacity study reports.

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**Response to Draft Internal Audit Report
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Implementation Date

A. Completed: October 15, 1998
The Capacity Management Branch
has conducted and will continue to
conduct capacity studies and periodically
publish relevant reports.

Proposed: _____

B. Completed _____

Proposed: January 1, 1999
Capacity Management Branch will
update their Web page and the Support
BBS to include the most current
capacity study reports.

Responsible Official

Chief Information Officer IS
Deputy Chief Information Officer (Systems) IS
Assistant Commissioner for Systems Development IS:S
Director, Systems Support Division IS:S:TS

Review of Phase 4 Year 2000 Conversion and Testing

Response to Draft Internal Audit Report Review of Phase 4 Year 2000 Conversion and Testing

Recommendation 5

For major Tier 2 and Tier 3 systems, such as the ISRP and ICS, capacity studies and performance evaluations may need to be conducted before a system is certified as Year 2000 compliant.

Assessment of Cause

No capacity studies have been performed on systems that will be running Year 2000 compliant applications software on Tier 3 hardware, such as the Integrated Collection System which supports over 10,000 workstations.

A number of studies and evaluations are either underway or planned for completion to support system certification as Year 2000 compliant. Capacity studies are being conducted on the applications identified for consolidation to size for the newer Tier 2 platforms. This also encompasses Year 2000 compliance needs. The Distributed Capacity Management Section of the Capacity Management Branch has plans for installing data collection agents on the consolidated systems to monitor capacity and performance and will publish the applicable reports as Tier 2 consolidation efforts proceed.

Corrective Action for Recommendation 5

The Capacity Management Branch conducted a capacity study for the ISRP (Integrated Submission and Remittance Processing) pilot system (increment I) at the Austin SC in January 1998, and at Cincinnati SC and Ogden SC (Increment II) in October 1998. Lockheed Martin delivered a capacity study on ICS (Integrated Collection System) in February 1998. The CMB continues to perform planned studies and evaluations supporting Year 2000 compliant system certification.

Review of Phase 4 Year 2000 Conversion and Testing

Response to Draft Internal Audit Report Review of Phase 4 Year 2000 Conversion and Testing

Implementation Date

Completed: _____

Proposed: January 01, 1999

The Capacity Management Branch published the ISRP Increment I report March 31, 1998. The report for Increment II will be completed by January 1999.

Responsible Official

Chief Information Officer IS
Deputy Chief Information Officer (Systems) IS
Assistant Commissioner for Systems Development IS:S
Director, Systems Support Division IS:S:TS

Review of Phase 4 Year 2000 Conversion and Testing

Response to Draft Internal Audit Report Review of Phase 4 Year 2000 Conversion and Testing

Recommendation 6

- A. The Capacity and Performance Management Technical Handbook should be updated to detail which sections are responsible for capacity studies and performance evaluations.
- B. The handbook should also provide detailed instructions outlining the steps that need to be conducted so that field organizations would be able to conduct their own evaluations if there is a lack of National Office resources to conduct these studies.

Assessment of Cause

- A. The Capacity Management organization is not a high visibility organization. Guidance is needed in order to determine where to seek assistance in acquiring capacity management and performance evaluation information.
- B. In the past, the role of the Capacity Management Branch (CMB) was geared more toward Tier I capacity management and performance evaluation studies. Today's environment has been expanded to encompass needs to perform capacity and performance evaluations on Tier 2 and 3 platforms, predominately outside of the national office in field locations. Internal Audit feels that CMB's handbook should provide detailed instructions outlining the steps needed to conduct capacity and performance evaluations, so that field organizations would be able to conduct their own evaluations.

Corrective Action for Recommendation 6

- A. System Support Division will provide information on their web page as to which sections in their organization are responsible for performing capacity studies and performance evaluations. By making the information available on the web, it will be more readily available and easier to maintain currency than if it were to be in the Capacity and Performance Management Technical Handbook.
- B. No corrective action is needed for part B of Recommendation 6. The Capacity and Performance Management Technical Handbook is a CMB organization internal document. It is intended for use by National Office Capacity Management Branch employees, trained in the skills necessary to perform capacity studies and performance evaluations. To provide a handbook which contains enough text book information to instruct someone with no experience and/or training in capacity and performance analysis is not practicable.

**Review of Phase 4 Year 2000
Conversion and Testing**

**Response to Draft Internal Audit Report
Review of Phase 4 Year 2000 Conversion and Testing**

Implementation Date

A. Completed: _____

Proposed: January 1, 1999

The Capacity Management Branch's web page will be revised to include a reference guide to which sections in the System Support Division organization are responsible for performing capacity studies and performance evaluations.

B. Completed: NA

Proposed NA

Responsible Official

Chief Information Officer IS
Deputy Chief Information Officer (Systems) IS
Assistant Commissioner for Systems Development IS:S
Director, Systems Support Division IS:S:TS

Review of Phase 4 Year 2000 Conversion and Testing

Response to Draft Internal Audit Report Review of Phase 4 Year 2000 Conversion and Testing

Recommendation 7

The Capacity Management Program should also create a link between their web site and the Service's Year 2000 home page for higher visibility and access to information.

Assessment of Cause

The Capacity Management Program (CMP) is not as visible as it could be. The CMP 's web page, published under Tier 2 web page is not linked to the Year 2000 home page.

Corrective Action for Recommendation 7

The Century Date Change (CDC) Project Office's web page was modified to include access to the Capacity Management Branch's (CMB) web page. An indirect link from the CMB's web page to the CDC Project Office's web page exists through CMB's "link to other IRS websites and links including Year 2000", which accesses the IS Support Bulletin Board System, that includes "Year 2000 Project Information" in its list of websites.

Implementation Date

Completed: October 1, 1998
The Century Date Change Project Office 's web page was modified to include access to the Capacity Management Branch's web page.

Proposed: _____

Responsible Official

Chief Information Officer IS
Deputy Chief Information Officer (Systems) IS:S
Director, Year 2000 Program IS:CD