

**Significant Progress Has Been Made in
Consolidating Mainframe Computer Operations,
But Risks Remain**

June 2000

Reference Number: 2000-20-085

This report has cleared the Treasury Inspector General for Tax Administration disclosure review process and information determined to be restricted from public release has been redacted from this document.



DEPARTMENT OF THE TREASURY
WASHINGTON, D.C. 20220

INSPECTOR GENERAL
for TAX
ADMINISTRATION

June 14, 2000

MEMORANDUM FOR COMMISSIONER ROSSOTTI

A handwritten signature in cursive script that reads "Pamela J. Gardiner".

FROM: Pamela J. Gardiner
Deputy Inspector General for Audit

SUBJECT: Final Audit Report - Significant Progress Has Been Made in
Consolidating Mainframe Computer Operations, But Risks
Remain

This report presents the results of our review of the Internal Revenue Service's (IRS) Service Center Mainframe Consolidation (SCMC) project. We conducted the review to determine whether SCMC project management controls are adequate to ensure that continuing service center consolidations are successful. We also evaluated some of the corrective actions taken as a result of our prior audit of SCMC.

In summary, we found the IRS has made significant progress in ensuring the computing and service centers' readiness for consolidation and in minimizing any effect on operations and taxpayers; however, additional performance testing and processing controls are needed.

We issued a draft of this report to IRS management on April 7, 2000, with a May 8, 2000, response period. However, management's response was not available as of the date this report was released.

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 E. Wilson, Associate Inspector General for Audit (Information Systems Programs), at (202) 622-8510.

Significant Progress Has Been Made in Consolidating Mainframe Computer Operations, But Risks Remain

Table of Contents

Executive Summary.....	Page i
Objective and Scope.....	Page 1
Background	Page 2
Results	Page 4
Process Improvements and Recruiting Efforts Have Enhanced Consolidation Readiness and Minimized the Effect on Operations and Taxpayers	Page 5
A Segment of the Consolidated Mainframe Computer Environment May Not Support the Additional Workload of the Remaining Service Centers.....	Page 8
Continued Information System Control Weaknesses Could Result in Incomplete or Inaccurate Data Processing	Page 10
Output Tracking System Development Efforts Did Not Always Adhere to Prescribed Policies and Procedures.....	Page 13
Conclusion.....	Page 15
Appendix I – Detailed Objective, Scope, and Methodology	Page 17
Appendix II – Major Contributors to This Report.....	Page 21
Appendix III – Report Distribution List.....	Page 22

Significant Progress Has Been Made in Consolidating Mainframe Computer Operations, But Risks Remain

Executive Summary

The Internal Revenue Service (IRS) is in the process of consolidating the mainframe computer operations used to process tax data. The consolidation involves moving mainframe processing from the IRS' 10 service centers¹ into new mainframe computers located in 2 computing centers²—the Tennessee Computing Center (TCC) and the Martinsburg Computing Center (MCC). A successful mainframe consolidation effort is critical since the IRS must rely on these systems each year to process tax returns and to assist taxpayers by providing answers to questions about their tax accounts.

This is our third audit of the Service Center Mainframe Consolidation (SCMC) Project. The second audit, *The Service Center Mainframe Consolidation Project Has Made Significant Progress, But Project Execution and Administration Risks Remain* (Reference Number 199920068, dated September 1999) reported that: (1) critical risks related to SCMC remain unresolved, (2) controls over technical aspects of contract administration remain inadequate, and (3) staffing costs of consolidation were not accurately budgeted, captured, and reported.

The overall objective of our current review was to determine whether SCMC project management controls are adequate to ensure that continuing service center consolidations are successful. In addition, we evaluated some of the corrective actions taken as a result of the prior audit.

Results

The IRS has made significant progress in ensuring the computing and service centers' readiness for consolidation and in minimizing any effect on operations and taxpayers. The SCMC Project Office has initiated process improvements identified during the initial service center consolidations and established risk management activities. In addition, the computing centers have conducted extensive recruiting efforts to mitigate staffing shortages. However, unresolved risks may impact successful consolidation of mainframe computer operations for the remaining five service centers.

¹ The service centers are the data processing arm of the IRS. The service centers process paper and electronic submissions, correct errors and forward data to the computing centers for analysis and posting to taxpayer accounts.

² IRS computing centers support tax processing and information management through a data processing and telecommunications infrastructure.

Significant Progress Has Been Made in Consolidating Mainframe Computer Operations, But Risks Remain

A Segment of the Consolidated Mainframe Computer Environment May Not Support the Additional Workload of the Remaining Service Centers

Since the initial migrations of service center processing to the computing centers, there have been multiple instances when some components of the consolidated mainframe computer environment have experienced capacity related problems and could not process the workload effectively. Senior IRS management has been tracking the capacity issue since December 1998 and recently recommended the creation of a separate committee to identify and recommend solutions to outstanding issues.

During June 13-17, 1999, the Capacity Management Branch of the Systems Support Division (SSD) performed a capacity analysis of a segment of the consolidated computer environment. The SSD report included several recommendations to improve system performance and stated that additional performance testing is required to ensure that sufficient capacity is provided to ensure that each computing center can handle a five service center configuration. Although the SCMC Project Office, in conjunction with other IRS organizations and contractors, has closely analyzed problems and has taken measures to address concerns with system performance, additional testing has not been performed to establish that computing centers can support the workload of five service centers.

The capacity issue could also affect the capability of the IRS to implement planned disaster recovery activities, as each computing center was supposed to be able to process 70 percent of the workload from the other computing center in case of a disaster.

Without conducting additional performance testing, including disaster recovery capability, management cannot be assured that the consolidated mainframe environment has sufficient computer capacity for timely tax return processing.

Continued Information System Control Weaknesses Could Result in Incomplete or Inaccurate Data Processing

The General Accounting Office's *Standards for Internal Control in the Federal Government* identifies two types of information system controls. Application controls, one of the control types, help ensure completeness, accuracy, authorization, and validity of all transactions during application processing. Application controls are also installed where data is transferred from one system to another system to ensure that all inputs are received and are valid, and outputs are correct and properly distributed. In our September 1999 audit, we reported application control weaknesses.

Significant Progress Has Been Made in Consolidating Mainframe Computer Operations, But Risks Remain

To address the control deficiencies, IRS management requested computer programming changes to automate the run-to-run balancing process³ and began developing the Output Tracking System (OTS) to track files transferred between the service centers and computing centers. However, with 5 of the 10 service centers consolidated, these control initiatives are not complete and may not be completed before the remaining consolidations are implemented. Additional service center consolidations increase the risk of incomplete or inaccurate tax return processing that could result in untimely or erroneous notices to taxpayers.

Output Tracking System Development Efforts Did Not Always Adhere to Prescribed Policies and Procedures

The OTS development efforts indicate that the SCMC Project Office did not always adhere to IRS standards. For example, OTS test results were not forwarded to the Office of Security, Evaluation, and Oversight for an independent review and approval before pilot implementation. In addition, the SCMC Project Office did not obtain proper approval to operate the OTS pilot in the production environment.

System development efforts that do not follow prescribed policies and procedures could result in new systems negatively affecting system processing or potentially creating security weaknesses in the production environment.

Summary of Recommendations

The Chief Information Officer (CIO) should ensure that additional performance testing establishes that the consolidated mainframe environment can support the workload of five service centers, including disaster recovery processing requirements. The CIO should also ensure that adequate processing controls are in place for automated balancing and file tracking processes prior to SCMC Project completion and that the OTS development efforts follow established IRS system development procedures.

Management's Response: We issued a draft of this report to IRS management on April 7, 2000, with a May 8, 2000, response period. However, management's response was not available as of the date this report was released.

³ Run-to-run balancing controls are needed to ensure that the number of records *input* to a computer run is the same number of records *output* from the previous run.

Significant Progress Has Been Made in Consolidating Mainframe Computer Operations, But Risks Remain

Objective and Scope

The overall objective of the review was to determine whether SCMC project management controls are adequate to ensure that continuing service center consolidations are successful.

This review was initiated as a continuation of a prior Service Center Mainframe Consolidation (SCMC) review (*The Service Center Mainframe Consolidation Project Has Made Significant Progress, But Project Execution and Administration Risks Remain*, Reference Number 199920068, dated September 1999). The overall objective of the current review was to determine whether SCMC project management controls were adequate to ensure that continuing service center consolidations are successful. In addition, we evaluated some of the corrective actions taken as a result of the prior audit.

We conducted the review between September 1999 and January 2000 in accordance with *Government Auditing Standards*. We interviewed key personnel and reviewed documentation at the following sites.

- The Office of the Chief Information Officer in New Carrollton, Maryland.
- The SCMC Project Office in McLean, Virginia.
- The Tennessee Computing Center (TCC) in Memphis, Tennessee.
- The Martinsburg Computing Center (MCC) in Martinsburg, West Virginia.
- The Cincinnati Service Center in Cincinnati, Ohio.
- The Memphis Service Center in Memphis, Tennessee.

Details of our audit objective, scope, and methodology are presented in Appendix I. Major contributors to this report are listed in Appendix II.

Significant Progress Has Been Made in Consolidating Mainframe Computer Operations, But Risks Remain

Background

In 1997, the SCMC Project Office was formed with an objective to consolidate the IRS' mainframe computer operations from 10 service centers into 2 computing centers.

In 1995, the Office of Management and Budget issued Bulletin Number 96-02 providing a requirement for consolidation of data centers with large mainframe operations. In 1997, the Internal Revenue Service (IRS) formed the SCMC Project Office with an objective to consolidate mainframe computers from 10 service centers¹ into 2 computing centers.² In addition, over 17,000 desktop computer terminals were to be replaced in conjunction with the consolidation effort. A successful mainframe consolidation effort is critical since the IRS must rely on these systems each year to process over 200 million tax returns and to assist over 130 million taxpayers by providing answers to questions about their tax accounts.

The following systems residing on four mainframe computers in each of the service centers are being consolidated as part of the SCMC Project:

- Service Center Replacement System (SCRS) - This system prepares tax return information for input to the IRS' main computer system and provides on-line access to taxpayer information.
- Integrated Collection System/Automated Collection System - These systems support the tax collection process.
- Printer Replacement to Incorporate New Tools - This system supports high-volume printing of tax correspondence and IRS management reports.

¹ The service centers are the data processing arm of the IRS. The service centers process paper and electronic submissions, correct errors and forward data to the computing centers for analysis and posting to taxpayer accounts.

² IRS computing centers support tax processing and information management through a data processing and telecommunications infrastructure.

Significant Progress Has Been Made in Consolidating Mainframe Computer Operations, But Risks Remain

- Communications Replacement System (CRS) - This system is the front-end processor (routes data) for the SCRS, and provides security functions.

The replacement of CRS with the Security and Communications System (SACS) was completed in February 1999. In addition, the SCMC Project Office reported that all terminals had been replaced as of September 30, 1998.

The IRS has delayed the completion of mainframe computer consolidations from 1998 to 2000 and the five-year cost estimate for SCMC has increased by 11 percent to nearly \$480 million.

The IRS has experienced delays in its consolidation of the remaining mainframe computers and an increase in the estimated SCMC Project cost. The IRS had planned to consolidate all 10 service centers by December 1998; however, only 3 service centers (Brookhaven, Kansas City and Memphis) were actually consolidated by this date. Two additional service centers (Andover and Cincinnati) were consolidated in 1999. The IRS delayed the consolidations due to the identification of additional service center prerequisites for consolidation, limited Information System resources because of computer programming changes necessary for the Year 2000, expanded business requirements, and concerns about the ambitious schedule. The remaining five service centers are scheduled for consolidation between June and December 2000, which coincides with several upgrades to mainframe processors, operating systems, and storage devices.

In addition, the SCMC Project Office reported in March 2000 that the five-year cost estimate for the SCMC Project increased by 11 percent to nearly \$480 million. The SCMC Project Office attributed the increase to new or expanded business requirements for disaster recovery and customer service.

Significant Progress Has Been Made in Consolidating Mainframe Computer Operations, But Risks Remain

Results

The IRS has made significant progress consolidating its mainframe computer operations; however, unresolved risks may impact successful consolidations of the remaining service centers scheduled for completion by December 2000.

The IRS has made significant progress in ensuring the computing and service centers' readiness for consolidation and in minimizing any effect on operations and taxpayers. The consolidation of service center mainframe computer operations is obviously a very complex task, which has required extensive coordination and effort by several contractors and IRS functions. The SCMC Project Office has initiated process improvements identified during the initial service center consolidations and established risk management activities, such as the Risk Oversight Committee and the SCMC Executive Steering Committee (ESC). In addition, the computing centers have conducted extensive recruiting efforts to mitigate staffing shortages. However, the following unresolved risks may impact successful consolidation of mainframe computer operations for the remaining five service centers:

- A segment of the consolidated mainframe computer environment may not support the additional workload of the remaining service centers.
- Continued information system control weaknesses could result in incomplete or inaccurate data processing.
- Output Tracking System (OTS) development efforts did not always adhere to prescribed policies and procedures.

The Chief Information Officer (CIO) should ensure that additional performance testing establishes that the consolidated mainframe environment can support the workload of five service centers, including disaster recovery processing requirements. The CIO should also ensure that adequate processing controls are in place for automated balancing and file tracking processes prior to SCMC Project completion and that the OTS

Significant Progress Has Been Made in Consolidating Mainframe Computer Operations, But Risks Remain

development efforts follow established IRS system development procedures.

Process Improvements and Recruiting Efforts Have Enhanced Consolidation Readiness and Minimized the Effect on Operations and Taxpayers

In response to the problems encountered during the initial consolidations, the SCMC Project Office began implementing process improvements. The computing centers also conducted extensive recruiting efforts to address staffing shortages. These actions have significantly improved the readiness of the service centers and computing centers for consolidation and minimized any effect on operations and taxpayers.

Process Improvements

As a result of implementing process improvements, the consolidation of mainframe computer operations from the Andover and Cincinnati Service Centers to MCC and TCC, respectively, went smoothly and had little or no effect on service center operations and taxpayers. The amount of cooperation and communication between the centers was a significant contributing factor to the successful consolidation. Some of the process improvements implemented for the 1999 consolidation of computer mainframe operations included:

- *On-Site Staffing* – To provide on-site service center technical support at the computing centers during the consolidation, the service centers sent database administrators, computer systems analysts, schedulers, and operators to assist computing center personnel.
- *Expanded Testing* – The operational readiness testing period for the service center consolidations was expanded and included several iterations of daily, weekly and post weekly processing.

Significant Progress Has Been Made in Consolidating Mainframe Computer Operations, But Risks Remain

- *Increased Training* – To improve the availability and adequacy of training, the SCMC Project Office evaluated training needs identified by the computing centers and assisted in providing the necessary training, such as several print operator training classes.

Other process improvements that enhanced the service centers' consolidation readiness included improvements in programming changes to the Executive Control Language,³ building of the service center processing schedule,⁴ developing plans for the initial transfer of data from the service centers to the computing centers, and preparing the Service Level Agreement⁵ between the centers.

Recruiting Efforts

The IRS and the National Treasury Employees Union (NTEU) signed a memorandum of understanding on February 9, 1998, providing placement opportunities for those service center employees whose positions were affected by the consolidation effort.

- The IRS authorized reimbursement of moving expenses for any service center employee whose job was moved to the TCC or MCC.
- The IRS also agreed to provide relocation bonuses of up to \$15,000 for employees in certain job categories willing to relocate to the TCC or MCC.

³ The Executive Control Language is a UNISYS language that directs the operating system to run application programs in a batch environment on a mainframe computer.

⁴ The service center processing schedule lists the computer jobs in the sequence in which they should be processed.

⁵ The Service Level Agreement (SLA) serves as a written understanding between the computing centers and the service centers. The SLA includes a description of the products and services that will be furnished by the computing center to its customers.

Significant Progress Has Been Made in Consolidating Mainframe Computer Operations, But Risks Remain

Additional measures taken by the IRS to address staffing shortages include establishing an intern training program and hiring contractors.

In our September 1999 audit, we reported that the TCC and MCC continued to report staffing shortages of approximately 25 percent with few options remaining to correct the problem. If not corrected, the computing centers might not be able to accommodate increasing workloads resulting in processing delays, which could adversely affect a significant number of taxpayers. In response, the IRS implemented additional measures.

- An intern training program was established by the TCC to address shortages. The TCC announced the opening of 10 intern positions and received over 3,000 applications.
- The TCC secured the services of approximately 70 contractor employees to assist with mainframe processing during the transition of computer operations from the service centers to the computing centers.

Although the measures taken by the IRS have improved the staffing situation, the computing centers continue to experience staffing shortages.

As of January 20, 2000, the MCC had reported 21 vacancies (12 percent).

The MCC is authorized to have 177 employees for service center mainframe processing when all 5 service centers are consolidated. As of January 20, 2000, 21 of the 177 (12 percent) MCC positions were vacant.

The TCC reported 46 vacancies (27 percent).

The TCC is authorized to have 172 employees for service center mainframe processing when all 5 service centers are consolidated. Currently, 46 of the 172 (27 percent) TCC positions are vacant.

MCC and TCC management are continuing recruiting efforts to fill the additional positions and are confident that they can effectively manage the consolidated workloads with the current staffing levels.

Significant Progress Has Been Made in Consolidating Mainframe Computer Operations, But Risks Remain

A Segment of the Consolidated Mainframe Computer Environment May Not Support the Additional Workload of the Remaining Service Centers

There have been multiple instances when the Virtual Machine (VM) Server⁶-Client Server Component⁷ experienced capacity related problems and could not process the Automated Tape Library (ATL)⁸ workload effectively. In addition, the TCC has expressed a concern with the number of tape slots within the ATL needed to support a five service center workload. The SCMC ESC has been tracking the VM Server/ATL complex as a capacity issue since December 1998 and recently recommended the creation of an Engineering Review Board (ERB). On November 3, 1999, an ERB working group, entitled the Computing Center Tape Processing Environment, was formed to identify and recommend solutions to outstanding issues.

The SSD report recommended additional performance testing of the VM Server/ATL complex to ensure that sufficient capacity is provided to handle a five service center configuration.

The IRS Systems Support Division (SSD), Capacity Management Branch personnel perform periodic reviews of computer systems to assure optimal performance of the computer equipment and software. During June 13-17, 1999, SSD personnel performed an analysis of the VM Server. The report issued by the SSD included several recommendations. The first recommendation, which was required to be implemented before consolidating a third service center, focused on preventing a catastrophic failure. Additional

⁶ The Virtual Machine (VM) Server manages all tape cartridge processing between the two mainframes and the Automated Tape Library subsystem.

⁷ The Client Server Component is a software package on the two mainframes used to process the Automated Tape Library workload.

⁸ The Automated Tape Library (ATL) is a subsystem that consists of silos that store tapes containing data needed for mainframe processing.

Significant Progress Has Been Made in Consolidating Mainframe Computer Operations, But Risks Remain

recommendations included reducing the number of tape mounts per hour on the VM Server by shifting some of the workload to another server, copying disaster recovery tapes during off peak processing hours, and combining several databases onto one tape cartridge. The report stated that these recommendations should be implemented before consolidating the fourth and fifth service centers. The SSD report also said that additional performance testing of the VM Server/ATL complex is required after a tape mounting problem is corrected to ensure that sufficient capacity is provided to handle a five service center configuration.

The SCMC Project Office, in conjunction with other IRS organizations and contractors, have closely analyzed problems and have taken measures to address concerns with the performance of the VM Server. The SCMC Project Office reported that tests performed in September and October of 1999 established that the first recommendation to prevent catastrophic failure had been addressed. In addition, the ERB working group is currently overseeing the activities to reduce the number of tape mounts per hour on the VM Server.

Past performance indicates that various VM Server/ATL problems occur as a computing center adds additional service centers to its workload.

However, past performance indicates that various VM Server/ATL problems occur as a computing center adds additional service centers to its workload. For example, even after implementing the first recommendation, the TCC still experienced a VM Server/ATL complex related problem when consolidating its third service center in November 1999. The problem, which resulted in tapes not being mounted in the ATL, occurred more than once and one incident resulted in a work stoppage that impacted the daily runs.

Without conducting additional performance testing of the VM Server/ATL complex to establish that it can support the workload of five service centers, management cannot ensure that the consolidated environment has sufficient computer capacity for timely tax return processing. The VM Server/ATL capacity issue could also affect the capability of the IRS to implement planned disaster recovery activities, as each computing center was supposed to be able to process

Significant Progress Has Been Made in Consolidating Mainframe Computer Operations, But Risks Remain

70 percent of the workload from the other computing center in case of a disaster. Therefore, the additional testing activities should not only establish whether the computing center processing environment can support the workload of 100 percent of the processing capacity for 5 service centers, but also whether it can support the additional workload of 70 percent of the processing capacity from the other computing center.

Recommendation

1. The CIO should ensure that additional performance testing establishes that the current VM Server/ATL complex can support the workload of five service centers, including the disaster recovery processing requirements, before the remaining service centers' processing is consolidated into the computing centers.

Management's Response: Management's response was not available at the time this report was released.

Continued Information System Control Weaknesses Could Result in Incomplete or Inaccurate Data Processing

Application controls are designed to help ensure completeness, accuracy, authorization, and validity of all transactions during processing.

The General Accounting Office's *Standards for Internal Control in the Federal Government* identifies the two broad groupings of information system controls as general and application controls. General controls are the structure, policies, and procedures that apply to an entity's overall computer operations. Application controls are designed to help ensure completeness, accuracy, authorization, and validity of all transactions during application processing.

Some application controls are installed where data is transferred from one system to another system to ensure that all inputs are received and are valid, and outputs are correct and properly distributed. The prior review of the

Significant Progress Has Been Made in Consolidating Mainframe Computer Operations, But Risks Remain

SCMC Project reported application control weaknesses with run-to-run balancing⁹ and file tracking.

To address the control deficiencies, IRS management implemented two courses of action.

- Two requests for computer programming changes were submitted to automate the run-to-run balancing process.
- An automated system was to be developed to track files transferred between the service centers and computing centers.

These actions should address the application control weaknesses reported. However, with five service centers consolidated, these control initiatives are not complete and may not be completed before the remaining consolidations are implemented. Additional service center consolidations increase the risk of incomplete or inaccurate tax return processing that could result in untimely or erroneous notices to taxpayers.

Run-to-Run Balancing

The request to automate run-to-run balancing during processing was reported by IS as completed in March 2000.

During the initial service center consolidations, run-to-run balancing controls were identified by IRS Information Systems (IS) management as a high priority risk to be reduced. Two requests for computer programming changes were submitted to automate the run-to-run balancing process. One request was prepared to automate the balancing of records between input and output files during internal system processing. This computer programming change was reported by IS as completed in March 2000.

The request to implement system-to-system balancing has been suspended.

The second request was submitted to automate the balancing of records for files exchanged between the computing centers and service centers. The proposed operational date was July 1, 1999. The request was recently closed with no action taken because of a delay

⁹ Run-to-run balancing controls are needed to ensure that the number of records *input* to a computer run is the same number of records *output* from the previous run.

Significant Progress Has Been Made in Consolidating Mainframe Computer Operations, But Risks Remain

The system being developed to track data and print files has experienced several setbacks and the scheduled rollout has been delayed from August 1999 to June 2000.

in defining the requirements by the requesting IRS organization. Another request will be submitted once the requirements are clearly defined.

File Tracking

To ensure that all input files are received and output files are properly distributed, a control should be implemented to track files transferred between systems. The first off-site service center consolidation demonstrated that the IRS needed to be able to better track data and print files transferred between the service center and computing center. The Output Tracking System (OTS) is the system under development to meet this need. The OTS was originally scheduled for implementation by August 1999; however, the development effort has experienced several setbacks that were partially caused by technical design deficiencies. Currently, the OTS is scheduled for implementation by June 2000.

Incorporating automated *run-to-run balancing* and *file tracking* controls into a system helps to ensure completeness, accuracy, authorization, and validity of all transactions during processing. Controls also ensure that all inputs are received and are valid, and outputs are correct and properly distributed. Due to the delay in implementing OTS, a manual process was developed in the interim to balance and track exchanged files; however, it was not consistently implemented and needs to be automated prior to SCMC Project completion.

Recommendation

2. The CIO should ensure the automated balancing and file tracking processes are in place and functioning prior to SCMC Project completion.

Significant Progress Has Been Made in Consolidating Mainframe Computer Operations, But Risks Remain

Output Tracking System Development Efforts Did Not Always Adhere to Prescribed Policies and Procedures

The major phases of the System Development Life Cycle (SDLC) are initiation, development, and operation. Several activities occur during the SDLC phases to ensure that security safeguards work effectively and the system meets applicable security policies and procedures. We determined that the SCMC Project Office did not always adhere to IRS standards during OTS development. For example:

- The results of the proof of concept (POC) test¹⁰ were not forwarded to the Office of Security, Evaluation, and Oversight (SEO) for an independent review and approval before pilot implementation.
- The SCMC Project Office did not complete a security certification and accreditation¹¹ prior to operating the OTS in the production environment.

System development efforts that do not follow prescribed policies and procedures could result in new systems negatively affecting system processing or potentially creating security weaknesses in the production environment.

Proof of Concept Test Results

As the principal advisor to senior management on the IRS' Security Program, the SEO focuses on security issues in the SDLC process. The change management

¹⁰ The proof of concept (POC) test was to establish that the contractor's solution provided the required functionality, and to prove or refine the procedures and plans defined by the contractor for the implementation of the OTS.

¹¹ A security certification and accreditation is the formal review and issuance of an official declaration that all sensitive but unclassified information systems and networks are approved to operate.

Significant Progress Has Been Made in Consolidating Mainframe Computer Operations, But Risks Remain

process¹² developed by the SEO for mainframe consolidation requires that upon completion of testing, the test results must be forwarded to the SEO for review and approval before proceeding to the next phase of the SDLC. Although the SCMC Project Office had proceeded to move the OTS from the test phase to production in a pilot operation, the SEO was not provided the test results for review and approval, as required.

The OTS was accepted by the SCMC Project Office for pilot implementation in a production environment beginning on August 16, 1999, at one service center after completion of the POC test in July 1999.

However, the Program Manager acknowledged some flaws in the POC test in that it did not completely simulate a production environment, which contributed to some of the problems experienced during the pilot and negatively impacted service center processing.

On September 2, 1999, the SEO Director issued a memorandum requesting the test report and raising concerns about the stability of the OTS and the potential risks to operations in implementing the system. As of December 7, 1999, the test report and other requested documents had not been provided to the SEO. The OTS has since been removed from the production environment because Year 2000 compliance testing had not been completed. The OTS pilot is scheduled to resume in early 2000. The SCMC Project Office explained that with the delay in the pilot, the decision was made to respond to the SEO's request for information when the pilot was resumed.

¹² The change management process consists of the procedures for approving changes to hardware and software products and associated documentation.

Significant Progress Has Been Made in Consolidating Mainframe Computer Operations, But Risks Remain

Security Certification and Accreditation

In August 1999, the SCMC Project Office placed the OTS pilot in the production environment without completing a security certification and accreditation. Systems that process sensitive but unclassified information (i.e., tax return information) require a formal review (certification) and issuance of an official declaration (accreditation) to operate. Pending accreditation, an interim authority to operate (IAO) is permitted if certain conditions are satisfied. A typical situation where an IAO might be used is when a new system is in an advanced test stage and a risk analysis has concluded that no apparent security problems exist.

The SCMC Project Office obtained an interim authority to operate dated July 30, 1999; however, the risk assessments and security evaluation report were based upon an evaluation of the consolidated processing environment that excluded OTS.

The SCMC Project Office obtained an IAO dated July 30, 1999, for the mainframe consolidation effort. The risk assessments and security evaluation report were based upon an evaluation of the consolidated processing environment that excluded OTS. The SCMC Project Office assumed that the current IAO would allow authorization for the OTS pilot. However, IRS guidelines require management to update the risk assessment and security evaluation report when there is a significant change to the current system environment. By not following established certification and accreditation procedures, new systems introduced into a production environment may negatively affect system processing or create security weaknesses.

Recommendation

3. The CIO should ensure that established IRS systems development procedures are followed including forwarding required documentation to the SEO for review and approval, and completing a security certification and accreditation for OTS.

Conclusion

The SCMC Project Office has made significant progress in ensuring the timely and accurate processing of tax

Significant Progress Has Been Made in Consolidating Mainframe Computer Operations, But Risks Remain

data for the consolidated service centers. However, the unresolved risks discussed in this report may impact successful consolidation of mainframe computer operations for the remaining five service centers.

Significant Progress Has Been Made in Consolidating Mainframe Computer Operations, But Risks Remain

Appendix I

Detailed Objective, Scope, and Methodology

The overall objective of this review was to determine whether the Internal Revenue Service's (IRS) Service Center Mainframe Consolidation (SCMC) project management controls were adequate to ensure that the continuing service center consolidations are successful. We also evaluated corrective actions taken as a result of the prior review (*The Service Center Mainframe Consolidation Project Has Made Significant Progress, But Project Execution and Administration Risks Remain*, Reference Number 199920068, dated September 1999).

- I. To evaluate management's efforts to identify, control, and mitigate key risks present in the SCMC Project, we:
 - A. Attended project conference calls and reviewed project status reports and risk oversight committee meeting minutes to determine if high-risk issues are identified and controlled for resolution.
 - B. Reviewed actions taken by the SCMC Project Office to address specific key risks.
 1. Reviewed the disaster recovery plan for completeness and determined whether it was adequately tested.
 2. Reviewed system capacity assessments for the Unisys 4800¹ and Virtual Machine Server,² including the Automated Tape Library.³
- II. To evaluate pre-consolidation readiness and post-consolidation operations, we:
 - A. Reviewed the run-to-run balancing process⁴ and the tracking of files exchanged between centers in the consolidated environment.
 1. Determined the development and implementation status of the automated processes for run-to-run balancing and the tracking of exchanged files between centers.

¹ This mainframe computer hosts the programs that prepare tax return information for input to the IRS' main computer system, the IRS Masterfile, and provides on-line access to taxpayer information.

² The Virtual Machine Server manages all tape cartridge processing between the two mainframes and the Automated Tape Library subsystem.

³ The Automated Tape Library is a subsystem that consists of silos that store tapes containing data needed for mainframe processing.

⁴ Run-to-run balancing controls are needed to ensure that the number of records *input* to a computer run is the same number of records *output* from the previous run.

Significant Progress Has Been Made in Consolidating Mainframe Computer Operations, But Risks Remain

- a. Evaluated the progress in implementing automated run-to-run balancing by reviewing the Request for Information Services and meeting with SCMC Project Office staff and other key personnel.
- b. Evaluated the development of the Output Tracking System⁵ by reviewing stated requirements, the Statement of Work, test plans and test results; and by meeting with the SCMC Project Office and other key personnel at the Martinsburg Computing Center (MCC).⁶
2. Reviewed the manual control to track the processing and exchange of files.
 - a. Met with the Tennessee Computing Center (TCC) management and staff to determine whether effective manual controls were in place for run-to-run balancing.
 - b. Met with the Cincinnati Service Center (CSC)⁷ and TCC management and staff to determine whether effective manual controls were in place to track all files exchanged between centers.
 - c. Assessed whether the impact from delays in implementing the automated processes were being adequately addressed by the SCMC Project Office (i.e., adjusting the consolidation schedule).
- B. Determined whether actions were taken to improve readiness for the mainframe consolidations.
 1. Evaluated whether issues identified in the Kansas City Service Center and Brookhaven Service Center (BSC) lessons learned document were adequately addressed prior to the CSC consolidation.
 2. Determined whether significant pre-consolidation issues identified by the CSC and TCC were resolved.
 3. Determined whether an effective liaison staff was in place prior to consolidation and identified how consolidation problems will be recorded, controlled, and monitored.

⁵ The system under development to better track data and print files transferred between the service center and computing center.

⁶ IRS computing centers support tax processing and information management through a data processing and telecommunications infrastructure.

⁷ The service centers are the data processing arm of the IRS. The service centers process paper and electronic submissions, correct errors and forward data to the computing centers for analysis and posting to taxpayer accounts.

Significant Progress Has Been Made in Consolidating Mainframe Computer Operations, But Risks Remain

4. Determined the status of standardization activities for CSC prior to consolidation.
 5. Determined whether effective measures were taken by the CSC to ensure that all runs are processed at the consolidated site.
 6. Evaluated the adequacy of training for service center and computing center staffs on activities in the consolidated environment (i.e., print operations, output file tracking, etc.).
 7. Assessed the adequacy of communications/visitations between the CSC and TCC to familiarize each with site operations prior to consolidation.
 8. Attended scheduled meetings and teleconferences to determine if sufficient avenues of communication existed to identify and resolve consolidation issues.
 9. Reviewed the Service Level Agreements⁸ for completeness and to determine if customer requirements are addressed.
- III. To conduct follow-up to recommendations/corrective actions from prior audits on the SCMC Project, we:
- A. Evaluated the status of staffing for computing centers by determining whether:
 1. A detailed plan to address staffing shortages was prepared.
 2. Third party temporary help was secured to supplement staffing at the TCC.
 3. Retention bonuses were approved for employees in key critical positions at the TCC.
 4. A national intern training program to address the shortage of critical Information System (IS) technical skills was implemented.
 5. Requested TCC/MCC staffing levels are appropriate, including concerns of inefficient and/or duplicated IS staffing.
 6. Automation tools were effectively used to reduce staffing at the computing centers.

⁸ The Service Level Agreement (SLA) serves as a written understanding between the computing centers and the service centers. The SLA includes a description of the products and services that will be furnished by the computing center to its customers.

Significant Progress Has Been Made in Consolidating Mainframe Computer Operations, But Risks Remain

- B. Assessed actions taken to mitigate critical risks to remaining service center consolidations by determining whether:
1. The 34 remaining mainframe consolidation issues after the BSC consolidation were resolved prior to the CSC consolidation (e.g., improvements in print operations, refinements to automation controls to track data and print file output, and conversion of nine-track round reel tape output to 36-track square tape cartridges or virtual tape).
 2. Recommendations from the Standardization Task Force and the Integrated Project Teams were incorporated into the SCMC Information Processing Activities Guide.
 3. The test strategy was modified to include several iterations of daily, weekly and post weekly processing, including the validation of print files, mid-range computer files, and external trading partner files.
 4. MCC/TCC operational and technical training needs were identified.

**Significant Progress Has Been Made in Consolidating Mainframe Computer
Operations, But Risks Remain**

Appendix II

Major Contributors to This Report

Scott E. Wilson, Associate Inspector General for Audit (Information Systems Programs)
Gary Hinkle, Director
Danny Verneuille, Audit Manager
Van Warmke, Senior Auditor
Olivia Jasper, Auditor
Kim McManis, Auditor
Barbara Sailhamer, Auditor
Linda Screws, Auditor
Tina Wong, Auditor

Significant Progress Has Been Made in Consolidating Mainframe Computer Operations, But Risks Remain

Appendix III

Report Distribution List

Deputy Commissioner Modernization C:DM
Deputy Commissioner Operations C:DO
Chief Operations Officer OP
Chief Information Officer IS
Deputy Chief Information Officer, Operations IS
Deputy Chief Information Officer, Systems IS
Executive Officer for Service Center Operations OP:SC
Director, Enterprise Operations IS:E
Director, Service Center Operations IS:SC
Director, Systems Development IS:SD
Director, Martinsburg Computing Center IS:E:MC
Director, Tennessee Computing Center IS:E:TC
Director, Mainframe Consolidation Project Office IS:E:CO
Director, Security Evaluation and Oversight IS:SPO:S
Director, Information Resources Management IS:O:IR
Director, Office of Program Evaluation and Risk Analysis M:O
National Director for Legislative Affairs CL:LA
Office of Management Controls M:CFO:A:M
Office of the National Taxpayer Advocate C:TA
Office of the Chief Counsel CC
Audit Liaison, Program Oversight & Management Control Office IS:IR:OM