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STRATEGIC ASSET MANAGEMENT PROGRAM:

Opportunities to Improve Implementation and Lessons Learned

Report No. OIG-E-2012-012 | May 31, 2012

NATIONAL RAILROAD
PASSENGER CORPORATION

Office of Inspector General

Memorandum

To: Dee Waddell, Acting Chief Information Officer
DJ Stadtler, Vice President, Operations
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Jeff Martin, Chief Logistics Officer

From: David R. Warren, Assistant Inspector General, Audits

Date: May 31, 2012

Subject: *Strategic Asset Management Program: Opportunities to Improve Implementation and Lessons Learned* (Report No. OIG-E-2012-012)

We have completed our evaluation of the Strategic Asset Management (SAM) Release 1a (R1a) implementation. As you know, the SAM program is one of the company's highest-cost and most significant information technology enhancement efforts. This program, at an estimated cost of more than $193 million, is expected to help Amtrak transform and improve key business areas; implement best practices; integrate business processes; and provide timely information for financial reporting, management decision-making, and optimizing financial and operational performance.

We reviewed SAM's pre-implementation efforts and issued audit reports on that work in January 2011[1] and June 2011.[2] We found gaps in the design of the controls that did not fully mitigate the financial and operational risks. Also, we identified several gaps in testing and contingency plans, and recommended that management conduct additional testing and resolve issues with interfaces, data conversion, network infrastructure, and contingency plans. While management agreed with most of our recommendations and

[1] *Strategic Asset Management Program Controls Design Is Generally Sound, But Improvements Can Be Made* (Report No. 105-2010, January 14, 2011).
[2] *Strategic Asset Management Program: Further Actions Should Be Taken To Reduce Business Disruption Risk* (Report No. 001-2011, June 2, 2011).

added some tests, it nevertheless decided to deploy the system and correct problems as they arose, rather than delay deployment.

After being implemented in June 2011, SAM experienced greater than expected implementation issues, causing business inefficiencies, including negative effects on daily business operations, and relationships with business partners and vendors. Given the program's cost and importance, we initiated this evaluation to help identify ways to improve R1a implementation results, and avoid future information technology (IT) implementation issues.

The specific objectives of our work were to (1) provide the status of ongoing efforts to resolve SAM implementation (SAM R1a post go-live) issues, (2) identify the causes of SAM implementation issues, and (3) provide recommendations based on lessons learned to help improve the SAM implementation, and IT system implementations in general. For a discussion of our evaluation scope and methodology, see Appendix I.

SUMMARY OF RESULTS

Although program managers anticipated a certain level of implementation issues, the number, significance, cost, and time needed to address them all have been greater than anticipated. The fact that significant issues continue to surface indicates that the system is not yet stable. As a result, the company is still dealing with adverse impacts on business operations and financial performance some 9 months after deployment.

This situation occurred primarily due to design and configuration shortfalls, insufficient requirements-gathering and testing, inadequate training, and underdeveloped user-support organization. Organizational silos and communication gaps also contributed to the implementation issues. The complexity of the design approach was an underlying contributor to the issues in each area.

The dedicated work of many business users and the SAM team has helped to address many implementation issues. Nonetheless, challenges remain, and the time frame and cost needed to stabilize the new system, realize its benefits, and transform business processes are uncertain. The attached briefing (Appendix II) provides the detailed results of our work and the specific recommendations that are summarized below.

STATUS OF SYSTEM IMPLEMENTATION

Enlarged Scope of IT Issues. The number of problems categorized as *critical* has doubled in fewer than 4 months—from 19 helpdesk tickets on October 17, 2011, to 38 on February 8, 2012. To Amtrak's credit, about 2,800 tickets have been closed since September 1, 2011, but others remain open as new issues continue to arise. The total number of outstanding issues (open tickets) has increased from 679 on September 19, 2011, to 743 on January 11, 2012.

Increased Cost. The SAM R1a program was originally estimated to cost $135 million, and was revised upward to $183 million in March 2011. The actual cost reached more than $189 million in December 2011, and it is expected to rise to over $193 million by September 30, 2012.

Extended Time. Program managers initially expected the system to be stabilized by January 31, 2012. However, many issues remain to be resolved. While progress is being made, a milestone date has not been set for fully stabilizing the system, and a contractor, Accenture, continues to provide post-production support.

CAUSES AND EFFECTS OF IMPLEMENTATION ISSUES

Designing and implementing a new system while changing business processes is a complex and challenging undertaking. Difficult choices had to be made between implementing SAP's[3] standard functionality (an industry best practice), and customizing it to fit old business processes. However, as we reported in June 2011, organizational resistance caused a breakdown in the established governance processes. Program sponsors deviated from a well-conceived "SAP-Maximo only"[4] design strategy to a more complex "Best of Breed" solution (i.e., choosing different software applications based on their areas of specialization such as finance and procurement). That decision contributed significantly to the greater than expected volume of SAM

[3] *SAP (ERP)* software processes enterprise-wide data from various business areas such as finance, procurement, human resources, payroll, and sales and distribution.

[4] *SAP-Maximo only strategy* was to implement and use SAP (ERP) software to support Amtrak's back office processes such as finance and procurement, and Maximo to support Amtrak's core business operations such as maintenance of rail infrastructure and train equipment. Maximo Asset Management software unifies comprehensive asset life cycle and maintenance management on a single automated database. The Engineering department currently uses Maximo to manage rail infrastructure activities.

implementation issues that are continuing. The primary causes and effects of these issues are discussed below.

- ***Design Deficiencies, Configuration, and Interface Issues.*** The SAM system design was complex and involved the integration of multiple systems. This factor, combined with deficiencies in the technical design, configuration, and complex interfaces among the 32 partner systems, caused confusion and workarounds that circumvented system controls.

  For example, duplicate and incorrect payroll payments were made to many employees because the code modification in the Labor Management System was faulty and inadequately tested. According to Amtrak officials, the company made duplicate and advance payments of about $13 million to some 14,000 employees. Since implementation, Payroll has incurred unplanned expenses and has had to hire outside consultants to help with reconciliation. Payroll is still attempting to reconcile and collect about $4 million from about 7,250 employees.

- ***Business Requirements-Gathering Shortfalls.*** Business requirements were not fully understood or complete requirements were not gathered in areas such as inventory management and reporting. As a result, new system design and business processes were either not built or were built incorrectly, leading to operational inefficiencies and ineffectiveness. According to SAM management, the program relied on subject-matter experts to ensure that needed functionality was built into the system.

  For example, according to Amtrak officials, business-critical reports (32) were initially not fully developed and delivered. The reporting gap had multiple impacts, including incomplete billing to several commuter railroads and unreconciled inventory levels, which delayed repairs to some train equipment. Further, a lack of reporting has hindered employees' ability to fully understand how the new processes work and to make informed business decisions in a timely manner. Additionally, inventory accuracy issues had a negative impact on the accomplishment of the work on the independent audit of Amtrak's financial statements. According to senior finance officials, these issues were a factor in the $400,000 audit cost increase. This issue is closed.

- ***Insufficient Testing.*** While many aspects of the system were tested, significant gaps in testing existed. Several end-to-end business processes and SAM impacted system interfaces in Procurement, Materials Management, Finance, Operations, and Human

Resources were not fully tested in a manner that adequately simulated business-case scenarios.

For example, the procure-to-pay process was not tested with a sufficient number of representative sample transactions from (1) creating non-inventory material requisition purchases, (2) their conversion to purchase orders in Ariba[5], (3) entering the receipts of the materials against these orders in Ariba, and (4) replicating the orders and receipts in SAP so a three-way match with invoices for vendor payments could be accomplished. Consequently, non-inventory order items were not being electronically received by the requisitioners, causing delays in payments to vendors. Accounts Payable had to circumvent the automated three-way match control in SAP so that vendors could be paid on time; but as a result, Amtrak runs the risk of paying duplicate and fraudulent vendor invoices. This issue remains open.

In addition, fixes were being implemented without sufficient testing and full understanding of business impact, thereby creating inefficiencies as the SAM team had to fix the fixes.

For example, ***[Issue]*** as part of the SAM implementation, unpaid expense purchase orders were transferred from the legacy AAMPS (the legacy procurement system) to SAP. Users could not perform electronic receipt of items against the transferred orders because the Accenture employee who transferred the orders in SAP identified himself as the creator of these orders. The automated controls in SAP require that only the creator of an order can receive items against that order. ***[Fix]*** The Accenture employee updated the SAP configuration to allow cost-center managers to receive items against the orders. ***[Issue]*** Most cost-center managers are executives or high-level managers, not the staff who create the orders and receive the items. ***[Fix]*** A special program was executed in SAP to bypass the authorization control to automatically receive these orders. This issue remains open.

- ***Training Not Fully Tailored to Needs.*** While some users found SAM training beneficial, others reported that the training was at too high a level, and not specific and/or relevant to performing their daily job duties. Further, users were trained on a system that was not fully developed and did not contain relevant test data that

[5] *Ariba* software automates procurement business functions, such as spend management, contract management and supplier management. Amtrak is currently using Ariba for purchase requisitioning and ordering, travel and expense, procurement cards, and payment requests.

represented their daily business transactions. Furthermore, users were trained in SAP but not in the interfacing systems.

For example, the training system included only one material item, Acela windshield wiper blades, in the list of items available for ordering. But Amtrak acquires different types of materials and services requiring different procurement processes. As a result, users were not well-prepared to properly use the system's different procurement processes. Management is considering follow-up training courses.

- ***Organizational Silos and Gaps in Communication.*** Not all business process owners are working effectively together to resolve implementation issues. For example, owners of new end-to-end business processes have not been identified, which limits the ability to hold managers accountable. According to Accounts Payable employees, certain buyers in the Procurement area were not responsive to their requests to work jointly in resolving vendor payment issues. While organizational silos and communication gaps are slowing down efforts to change the management culture and transform business areas, employees have pulled together to keep the business processes running despite implementation issues. Management continues to address this issue.

- ***SAM Support Organization Not Ready.*** The SAM Center of Expertise (CoE) is not fully functional to support the implemented environment. The CoE continues to operate at less than planned capability and capacity. For example, before implementation, CoE planned to hire up to 71 staff, but as of January 2012, it had hired about 20 employees and 10 contractors. The center still lacks the necessary personnel, competencies, and disciplined processes to adequately address post-hyper-care[6] issues without costly technical support from Accenture. Consequently, in the interim, problem resolution is taking longer and having a negative impact on employee productivity. This issue remains open.

SUMMARY OF RECOMMENDATIONS

Detailed recommendations appear on pages 26-29 in Appendix II. In summary:

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[6] *Hyper-care*, using Accenture personnel, was designed to provide intensive assistance to users in fixing issues for 3 months after R1a was implemented in early June 2011.

In the short-term, we recommend that SAM sponsors

- develop a plan to resolve all outstanding break-fix issues,
- prevent new break-fix issues by proper testing in an operational environment,
- reassess the strategy and structure of the Center of Expertise, and
- eliminate workarounds or establish mitigating controls to prevent or detect fraud, waste, and abuse.

Once the system is stabilized, we recommend that SAM sponsors

- redesign processes where necessary;
- identify the managers responsible and accountable for end-to-end processes;
- align the staff reporting structure and/or develop documented business rules to improve the collaboration, economy, and efficiency of the processes;
- assess whether the new business processes are delivering expected results and cost benefits; and
- pursue a well-conceived "SAP-Maximo only" strategy to reduce complexity in future releases of SAM implementation.

For ongoing and future system implementation programs, based on lessons learned from SAM R1a implementation, we recommend that the Chief Information Officer

- develop testing policies and procedures that provide for independent reviews and reporting of the adequacy of test plans and results to be sent to the steering committee,
- develop and enforce standards for gathering and documenting detailed user requirements in developing new systems, and
- improve training programs by tailoring them to employees' job responsibilities and addressing end-to-end business processes, and develop plans to train new employees on critical business systems and processes relevant to their assigned duties.

MANAGEMENT COMMENTS AND OIG ANALYSIS

On April 5, 2012, we provided Amtrak officials a draft of this report for their review and comments. Management agreed with all our recommendations, and cited ongoing

and planned actions. If properly implemented, the cited actions should address the intent of our recommendations.

Management's complete comments are in Appendix III. Management also provided technical comments on certain aspects of the report for our consideration. We considered these comments and incorporated them into this report where appropriate.

Appendix I

SCOPE AND METHODOLOGY

- We visited the mechanical and materials control facilities at Ivy City (Washington, D.C.), Los Angeles, Beech Grove (Indiana), and Boulden (Delaware).
- We interviewed 59 employees, including business users in Finance, Procurement, Materials Management, Mechanical, and Engineering; and key members of the SAM implementation team. Interviewees ranged from field employees to executives in all SAM-affected business areas.
- We reviewed relevant documentation, including post-go-live status updates. We did not perform any substantive system testing.
- We conducted our evaluation from August 2011 through May 2012.

Use of Computer-Processed Data

During our review, we used computer-processed data obtained from the IT department on the cost of the SAM R1a implementation program and the number of outstanding post-go-live issues. We did not validate the data, but found that this information was generally accurate and reliable when compared with testimonial evidence obtained from our interviews. We therefore relied on this computer-processed data to accomplish our evaluation objectives.

Internal Controls

In conducting this evaluation, we reviewed Amtrak's internal controls related to the performance of SAM R1a post-go-live issues resolution. The weaknesses and gaps in these controls that we identified are discussed in the body of this report.

Prior Coverage

We reviewed the following prior audit reports and used information from them in conducting our analysis of issues:

- *Strategic Asset Management Program: Further Actions Should Be Taken To Reduce Business Disruption Risk* (Report No. 001-2011, June 2, 2011)

  Our audit objective was to determine whether the implementation approach of SAM R1a effectively addressed business disruption risks. We identified several gaps in the testing and contingency plans. Left unaddressed, these gaps leave Amtrak vulnerable to business disruptions that could reduce revenues, increase costs, and negatively affect customer service. We recommended that Amtrak conduct additional testing; resolve issues with interfaces, data conversion, network infrastructure, and contingency plans; and involve Process Leadership Team members in making a go/no-go decision to move forward with the R1a deployment. While management agreed with most of our recommendations and added some tests, it decided to deploy the system and correct problems as they arose, rather than delay deployment.

- *Strategic Asset Management Program Controls Design Is Generally Sound, But Improvements Can Be Made* (Report No. 105-2010, January 14, 2011)

  We concluded that the design of the automated controls to mitigate financial risks in SAM R1a was generally sound. However, we found gaps in the design of the controls that did not fully mitigate the financial and operational risks. These gaps put Amtrak at risk of not fully realizing the potential benefits from SAM. In particular, a lack of adequate controls can lead to inaccurate financial reporting, vulnerability to fraud, and inefficient business operations. We recommended that Amtrak complete certain automated control design tasks before the April 2011 R1a implementation, and expand the scope of the control design process to include controls that fully address financial and operational risks in all affected business areas. Management agreed with these recommendations and assigned responsibilities to appropriate individuals to take timely action to address them.

Appendix II

BRIEFING

On February 28, 2012, we provided a briefing summarizing the results of our work to Information Technology, Finance, Operations, and Procurement department officials. The following slides are updated based on management input received during and after the briefing.

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Appendix II

Strategic Asset Management Program: Opportunities to Improve Implementation and Lessons Learned

May 31, 2012

PROGRAM SIGNIFICANCE

- In June 2011 Amtrak implemented the first segment of the Strategic Asset Management (SAM) program—one of the company's highest-cost and most significant information technology (IT) enhancement efforts. SAM is expected to help Amtrak transform and improve key business areas; implement best practices; integrate business processes; and provide timely information for financial reporting, management decision-making, and optimizing financial and operational performance. The program's first segment— referred to as Release 1a (R1a)— is estimated to cost more than $193 million.

- Given its cost and importance to business operations, we reviewed SAM's pre-implementation efforts and issued audit reports on that work in January and June 2011. After going live in June 2011, SAM experienced greater than expected implementation issues, causing business inefficiencies, including negative effects on daily business operations, and relationships with business partners and vendors.

REPORTING OBJECTIVES

- Provide the status of ongoing efforts to resolve SAM implementation (SAM R1a post-go-live) issues
- Identify the causes of SAM implementation issues
- Provide recommendations based on lessons learned to help improve the SAM implementation and IT system implementations in general

SCOPE AND METHODOLOGY

- We visited the mechanical and materials control facilities at Ivy City (Washington, DC), Los Angeles, Beech Grove (Indiana), and Boulden (Delaware).
- We interviewed 59 employees, including business users in Finance, Procurement, Materials Management, Mechanical, and Engineering; and key members of the SAM implementation team. Interviewees ranged from field employees to executives in all SAM-affected business areas.
- We reviewed relevant documentation, including post-go-live status updates. We did not perform any substantive system testing.
- We conducted our evaluation from August 2011 through May 2012.

STATUS OF SAM IMPLEMENTATION ISSUES

While managers anticipated a certain level of SAM R1a implementation issues, the number, significance, cost, and time needed to address them all have been greater than anticipated.

- At an October 2011 Board meeting, IT department stated it would close all critical items (Severity 1 and 2) by November 18, 2011. However, according to the SAM team, the intent of the Board briefing was to indicate that the post-production support requirement in the Accenture contract would be closed and transitioned to Amtrak's SAM Center of Expertise (CoE) within that time frame. They expected some critical items to remain open after that time. However, the number of critical items doubled from 19 on October 17, 2011 to 38 on February 8, 2012. Accenture, the contractor, also continues to provide post-production support.

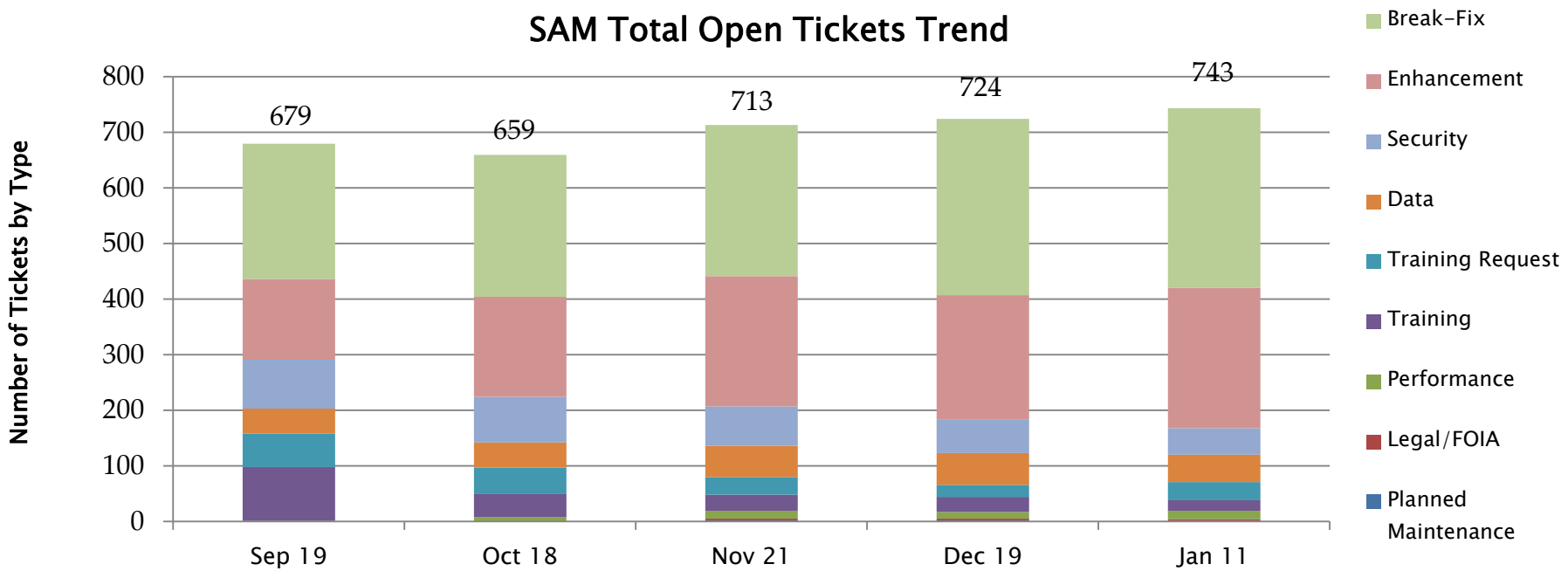
- SAM R1a was originally estimated to cost $135 million, and was revised upward to $183 million in March 2011. The actual cost reached more than $189 million in December 2011, and is expected to rise to over $193 million by September 30, 2012.

- Program managers initially expected the system to be stabilized by January 31, 2012. However, many issues remain to be resolved. While progress is being made, a milestone date has not been set for fully stabilizing the system.

- The dedicated work of many business users and the SAM team has helped to address many implementation issues. Nonetheless, significant issues remain in Procurement, Operations (primarily Materials Management), Finance (primarily Accounts Payable), and Reporting. All of these are having a negative impact on the efficiency and effectiveness of business processes, including (1) timely availability of materials, (2) accuracy of material orders, (3) timeliness of vendor payments, (4) proper categorization of cost data, and (5) adequacy of information for decision-making.

STATUS (continued)

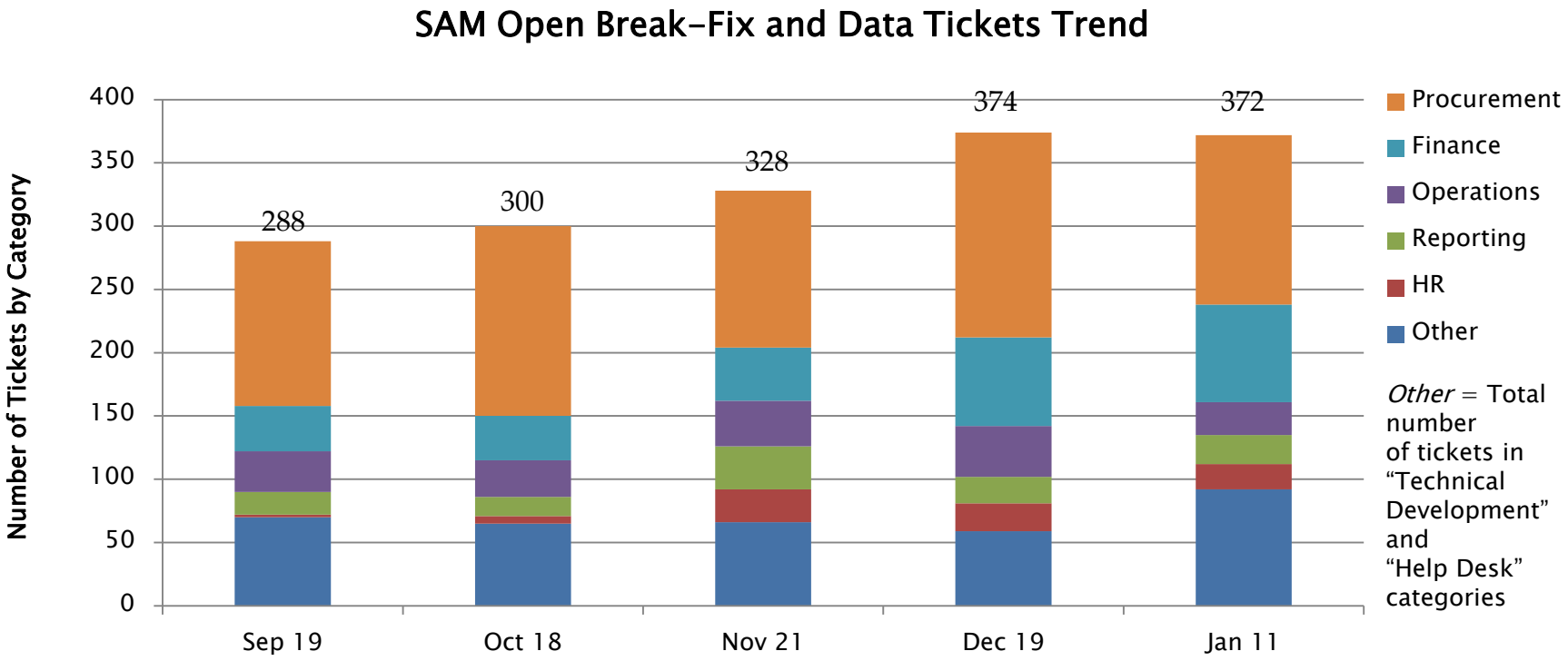
The SAM team and business users continue to work to resolve outstanding issues and to stabilize the system. To Amtrak's credit, about 2,800 tickets have been closed since September 1, 2011, but others remain open as new issues continue to arise. As seen in the figure below, the number of outstanding issues has increased slightly since November 21, 2011.



Source: Amtrak IT

STATUS (continued)

The figure below shows that the number of system functionality (break-fix) issues and data conversion/reliability issues generally increased in these 5 months.



Source: Amtrak IT

CAUSES OF SAM IMPLEMENTATION ISSUES

The program sponsors deviated from a well-conceived "SAP-Maximo only" design strategy to a more complex "Best of Breed" solution (choosing different software applications based on their areas of specialization such as finance and procurement). This was an underlying contributor to these SAM implementation issues:

- *Design Deficiencies, Configuration, and Interface Issues*. The SAM system design was complex and involved the integration of multiple systems. This factor, combined with deficiencies in the technical design, configuration, and complex interfaces among the 32 partner systems, caused confusion and workarounds that circumvented system controls.
- *Business Requirements-Gathering Shortfalls*. Business requirements were not fully understood or complete requirements were not gathered in areas such as inventory management and reporting.
- *Insufficient Testing*. While many aspects of the system were tested, significant gaps in testing existed. For example, several end-to-end business processes in Procurement, Materials Management, Finance, Operations, and Human Resources were not fully tested in a manner that adequately simulated business-case scenarios.
- *Training Not Fully Tailored to Needs*. While some users found SAM training beneficial, others reported that the training was at too high a level, and not specific and/or relevant to performing their daily job duties.
- *Organizational Silos and Gaps in Communication*. Not all business process owners are working effectively together to resolve implementation issues. Communication gaps are slowing down efforts to change the management culture and transform business processes. However, employees have pulled together to keep the business processes running despite implementation issues.
- *SAM Support Organization Not Ready*. The SAM Center of Expertise (CoE) is not fully functional to support the implemented environment. The CoE continues to operate at less than planned capability and capacity. As a result, Amtrak continues to rely on costly Accenture contractor support.

Design Deficiencies, Configuration, and Interface Issues

Multiple systems with complex interfaces left business users confused and frustrated. In some cases, to keep the business running, users have employed manual workarounds, but these are prone to error and create increased vulnerabilities to fraud, waste, and abuse. For the examples cited below, we note whether the issue is currently open or closed.

- **The complicated interface between SAP and Ariba has created business process efficiency and effectiveness issues.**

  Example:

  - Construction and expense material requisition types are generated in Ariba; however, expense materials must be electronically received in Ariba and construction materials must be electronically received in SAP. So, if an employee makes an error while creating the requisition by selecting construction instead of an expense requisition type, Ariba will not allow the electronic receipt of materials, and the three-way match control will block the vendor payment. *Open*

Design Deficiencies, Configuration, and Interface Issues (continued)

- **Some critical business information such as regular and blanket purchase order data was not transferred from AAMPS (the legacy procurement system) to Ariba and SAP. Similarly, some business data was not properly checked for accuracy or consolidation before being transferred into Ariba and SAP.**

  Example:

  - When material order data from AAMPS was transferred into Ariba and SAP, the line numbers did not always match between Ariba and SAP. This has created confusion and errors in downstream processes, such as receiving materials and paying vendors. *Open*

- **Issues were found in the design and configuration of the new system and processes.**

  Examples:

  - New account code blocks (profit/cost center, internal order, work breakdown structure, and general ledger account) were not created or mapped correctly. This affects all business areas. Significant impacts include the company's ability to analyze actual vs. budgeted expenses by cost center, appropriately capture capital vs. operating expenses, and properly allocate overhead for contract and reimbursable work. *Open*

Design Deficiencies, Configuration, and Interface Issues (continued)

- Requisitions were not properly transferring between Ariba and SAP for reasons such as improper and incomplete data elements. In addition, different requisitions for the same material could not be combined as an "aggregated requisition" to obtain better pricing/discounts from the vendor. This functionality was not configured correctly as designed. As a result, purchase orders were being delayed for submission to vendors and materials were not being received in a timely manner. *Open*
- Processing and payment of utility bills, commissary invoices, and claims were automated before SAM went live. The new system did not include automation of these processes; as a result, they are now processed manually, causing resource constraints and employee fatigue that creates the potential for errors. *Open*
- Duplicate and incorrect payroll payments were made to many employees because the code modification in the Labor Management System (LMS) was faulty. According to Amtrak officials, the company made duplicate and advance payments of about $13 million to some14,000 employees. Since implementation, Payroll has incurred unplanned expenses and has had to hire outside contractors to help with reconciliation. Payroll is still attempting to reconcile and collect about $4 million from about 7,250 employees. *Open*
- The approval workflow process in Ariba did not work properly because cost centers were not correctly assigned to appropriate managers. As a result, invoices were approved and paid without appropriate managerial review. *Closed*

Business Requirements-Gathering Shortfalls

- **The implementation approach focused on standard SAP functionality for "To-Be" processes, an industry best practice. However, "As-Is" processes were not documented, which is a standard practice. Consequently, the required information to fully understand the unique business requirements in some areas was not gathered. As a result, new system design and business processes were either not built or were built incorrectly, leading to operational inefficiencies and ineffectiveness. According to SAM management, the program relied on subject-matter experts to ensure that needed functionality was built into the system.**

  Examples:

  - According to Amtrak officials, business-critical reports (32) were initially not fully developed and delivered. The reporting gap had multiple impacts, including incomplete billing to several commuter railroads and unreconciled inventory levels, which delayed repairs to some train equipment. Further, a lack of reporting has hindered employees' ability to fully understand how the new processes work and to make informed business decisions in a timely manner. *Closed*

Business Requirements–Gathering Shortfalls (continued)

- The SAP material master database did not include many inventory items required by mechanics. To reduce inventory levels, inventory lists at each location were based on items consumed in the previous 18 months. In retrospect, this time frame was too short because many inventory items have a consumption period longer than 18 months. Inventory accuracy issues also had a negative impact on the accomplishment of the independent audit of Amtrak's financial statements. According to senior finance officials, these issues were a factor in the $400,000 audit cost increase. *Closed*
- "Kitting" functionality delivered did not meet business needs. *Kitting* is the process of gathering and delivering to the work site all required inventory parts as a *kit* to perform a specific job, such as brake replacement. It was assumed that when mechanics ordered a kit out of Spear, the request would come to SAP as a kit in a single line. However, requests from Spear came as separate line items for each part in the kit. These material request line items got mixed in with other requests, and material controls staff had to assemble the kits manually. This inefficient process caused errors and delays in delivering the kits to the mechanics. *Closed*

Business Requirements-Gathering Shortfalls (continued)

- The need to create required account codes for users was not adequately documented. As a result, many necessary account codes were not established prior to implementation. After implementation, in the absence of complete codes, users resorted to substitute account codes that allowed them to charge expenses. The "internal order" data element identifies the work being performed. We were informed that train engineers were charging their time for running work trains to incorrect internal orders, which could cause inappropriate accounting of the project costs shared with Amtrak's partners. *Closed*

- **Many key business managers were not involved in the user requirements-gathering process.**

Examples:

- Materials Management managers from Central and Western regions were not adequately involved in the user requirements-gathering process.

- New system and business processes for the Accounts Payable area were designed mainly by subject-matter experts who were part of the SAM team. *Closed*

Insufficient Testing

One significant cause of implementation issues stemmed from gaps in system testing prior to implementation. This was primarily due to gaps in the testing plan, compounded by the inherent complexity of the system design. The vast majority of interviewees stated that testing of the new system was insufficient. Actions are ongoing to fix these implementation issues. Gaps in testing included the following:

- **Revised end-to-end business processes were not adequately tested.**

  Example:

  - The procure-to-pay process was not tested with a sufficient number of representative sample transactions from (1) creating non-inventory material requisition purchases, (2) their conversion to purchase orders in Ariba, (3) entering the receipts of the materials against these orders in Ariba, and (4) replicating the orders and receipts in SAP so a three-way match with invoices for vendor payments could be accomplished. *Open*

Insufficient Testing (continued)

- **Certain business processes were not tested. In addition, several tested scenarios did not work initially after implementation because they did not include comprehensive data on real business transactions.**

  Example:

  - All blanket purchase orders were set up in SAP with a fixed price per unit. However, this configuration created issues for blanket order purchases where the price fluctuates daily, such as with fuel. When fuel prices went up, vendor invoice payments were blocked by the system because the invoice amounts were higher than the receipt amounts. This caused delays in payments to vendors. When blocked invoices were cleared, the system inaccurately showed those transactions as overpayments in SAP. *Closed*

- **Not all SAM impacted systems were tested.**

  Example:

  - The BusinessObjects Planning and Consolidation (BPC) and Amtrak Performance Tracking (APT) systems, downstream systems that receive cost data from SAP, were not properly tested to ensure that correct and accurate information was passed among the systems. Consequently, the allocation of costs among train routes for June 2011 was delayed until March 2012. *Closed*

Insufficient Testing (continued)

- **Inadequate interface testing resulted in data that was transferred from one system not being received correctly or being rejected by another system. In particular, data transfer among SAP, Ariba, Exacta, and Spear systems had multiple data-transfer issues.**

  Example:

  - Parts available at a warehouse could not be released to mechanics because inventory requests made by the mechanic were lost when data were transferred between SAP and Exacta. Data files that sent the inventory-release requests from SAP to Exacta in 1-minute intervals used the same file name and, as a result, overwrote the first inventory request file with the next one. This issue also points to inadequate system data volume testing. *Closed*

- **Key business users stated that they were not actively involved in testing new processes and system interfaces before implementation. However, they report that they are now satisfied with their involvement in correcting implementation issues.**

  Examples:

  - Materials Management
  - Accounts Payable
  - Payroll

  Closed

Insufficient Testing (continued)

- **Fixes were being implemented without sufficient testing and full understanding of business impact, thereby creating inefficiencies, as the SAM team had to fix the fixes.**

  Examples:

  - *[Issue]* As part of SAM implementation, unpaid expense purchase orders were transferred from the legacy AAMPS system to SAP. Users could not perform electronic receipt of items against the transferred orders because the Accenture employee who transferred the orders in SAP identified himself as the creator of these orders. The automated controls in SAP require that only the creator of an order can receive items against that order. *[Fix]* The Accenture employee updated the SAP configuration to allow cost-center managers to receive items against the orders. *[Issue]* Most cost-center managers are executives or high-level managers, not the staff who create the orders and receive the items. *[Fix]* A special program was executed in SAP to bypass the authorization control to automatically receive these orders. *Open*
  - *[Issue]* In response to a concern expressed by a senior executive regarding a potential cash flow problem in the near future, *[Fix]* all vendor and employee expense payments were blocked. *[Issue]* According to Amtrak officials, the block payment change created a complex system issue corrupting many related orders, and preventing about 1,900 invoices from being paid in a timely manner. *[Fix]* The resulting issues could only be corrected with outside help from SAP experts. It was later determined that cash flow was not a critical problem. *Closed*

Training Not Fully Tailored to Needs

SAP is a labor-intensive application that requires more data entry than the legacy applications it replaced, but has stronger financial controls. Users are expected to possess certain levels of technical and business knowledge and skills needed to enter correct data in the right fields. Not all users had the right mix of knowledge and skills in certain business areas. As a result, substantial training and preparation for this significant change was needed. However, the training that was provided was less than or different from what was required.

- Most users interviewed stated that training was at too high a level, not specific, and/or not relevant to performing their daily duties. It did not convey pertinent information to crosswalk users from the old business processes to the new ones.
- Users were trained on a system that was not fully developed. The complete system solution was not developed prior to users' receiving training. Further, the training system did not contain relevant test data that represented users' daily business transactions. For example, the training system included only one material item, Acela windshield wiper blades, in the list of items available for ordering. But Amtrak acquires different types of materials and services requiring different procurement processes.

Training Not Fully Tailored to Needs (continued)

- Users stated that while trainers were well aware of SAP's standard functionalities, they did not necessarily understand how to use these functionalities in the "To-Be" processes.
- Users were trained in SAP but not in the interfacing systems. For example, requisitioners are now required to electronically receive expense materials over $10,000 in eTrax. Even though most employees are familiar with eTrax, they were unaware of this new functionality and the business requirement. This was one of the reasons for a severe backlog of vendor payments. Accounts Payable has resorted to automatically receiving these orders in SAP using a specialized program as a workaround. Automatically receiving materials to pay vendors can result in improper payments, waste, and fraud, such as paying vendors for materials never received. This issue is still open and the SAM team is planning to provide additional training.

Training Not Fully Tailored to Needs (continued)

- End-to-end business processes were not fully documented. This information could have helped users understand the flow of transactions. Consequently, users have struggled to understand new processes and what is expected of them. For example, the position responsible for monitoring a critical Goods Receipt/Invoice Receipt reconciliation account was not identified. The lack of monitoring of receipts partly contributed to late vendor payments.
- Issues raised during training were not fully addressed. For example, user concerns such as different units of measure among SAP, Ariba, and Spear pointed to gaps in requirements-gathering but were not adequately followed up. Lack of adequate follow-up on these gaps allowed the issues to continue into production.

Organizational Silos and Communication Gaps

- SAM's plan to integrate business processes that currently span multiple functional areas is expected to provide operational transparency to different departments. For example, by integrating procurement and inventory management functions, significant savings were projected from optimizing inventory levels. Similarly, the work order management process is being tightly integrated from the creation of work orders in Maximo to the requisition and procurement of materials and the payment to vendors in SAP to achieve savings.

  However, owners of new end-to-end business processes have not been identified, which limits the ability to hold managers accountable. Users noted that in some instances, it was difficult to resolve SAM implementation issues because some employees resisted resolving issues that were outside of their areas of responsibility. For example, the procure-to-pay ownership process is fragmented. Procurement and Materials Management employees report to the Chief Logistics Officer, while Accounts Payable employees report to the Controller. Procurement employees use Ariba, while Materials Management and Accounts Payable employees use SAP. Without a single owner of the entire procure-to-pay process, the employees involved were not always working effectively together in resolving implementation issues. According to Accounts Payable employees, certain buyers in the Procurement area were not responsive to their requests to work jointly in resolving vendor payment issues.

Organizational Silos and Communication Gaps (continued)

- While organizational silos and communication gaps are slowing efforts to change the management culture and transform business areas, employees have generally pulled together to keep business processes running despite implementation issues. Employees have put in long hours to make sure that vendors get paid and parts are available for equipment repairs.

  In particular, Materials Management and Mechanical employees worked in different data systems. Yet they became understanding of each other's problems in dealing with material unavailability issues. In addition, most SAM-affected employees we interviewed expressed their receptiveness to change.

SAM Support Organization Not Ready

- Some progress has been made in building up the SAM support center, called the Center of Expertise (CoE). However, the center still lacks the necessary personnel, associated competencies, and disciplined processes to adequately address post-hyper-care issues without costly technical support from Accenture.
- The transition from Accenture hyper-care to CoE has not been completed. Accenture resources are still supporting SAM-related systems, while CoE is not fully staffed to complete the knowledge transfer.
- Certain key executives stated that timely and adequate staffing of CoE was critical to SAM stabilization and routine operations. However, CoE has faced challenges in attracting and retaining permanent staff, resulting in most positions being filled by contractors. Before implementation, CoE planned to hire up to 71 staff, but as of January 2012, it had hired about 20 employees and 10 contractors. According to SAM management, restrictions on hiring and recent turnover in the Chief Information Officer's position have resulted in delays in filling vacancies. Further, the high turnover of contractors has resulted in critical skill shortages and the loss of knowledge within CoE.
- A consistent, ongoing SAP training program for CoE staff has not been developed.

CONCLUSIONS

- Designing and implementing a new system while changing business processes is a complex and challenging undertaking. Difficult choices had to be made between implementing SAP's standard functionality (an industry best practice), and customizing it to fit old business processes.
- However, as we reported in June 2011, organizational resistance caused a breakdown in the established governance processes. Program sponsors deviated from a well-conceived "SAP-Maximo only" design strategy to a more complex "Best of Breed" solution. That decision significantly increased the system's complexity and risks. Further, adequate time and effort were not devoted to properly testing the new system to help minimize implementation issues. As a result, the R1a implementation has cost more, taken longer, and experienced greater technical issues than anticipated.
- The dedicated work of many business users and the SAM team has helped to address many implementation issues. Nonetheless, challenges remain; and the time frame and cost needed to stabilize the new system, realize its benefits, and transform business processes are uncertain.

RECOMMENDATIONS

We recommend that SAM sponsors – the Chief Information Officer, Chief Financial Officer, Chief Logistics Officer and Vice President of Operations – take the following actions to help improve SAM stabilization:

1. Develop a plan with milestones to resolve all outstanding break-fix issues by addressing their root causes.
2. Prevent new break-fix issues by proper testing in an operational environment.
3. Given the delays in building a fully functional Center of Expertise, reassess the strategy and structure to address the process, capacity, and capability gaps that exist there; and the transition of system support activities from Accenture to CoE.
4. Identify and review the use of workarounds to ensure that they do not become permanent business processes. The review should include determining whether the cost/benefit of fixing the issue significantly outweighs the cost/benefit of maintaining the workaround processes. The review should also determine the need to establish mitigating controls to prevent or detect fraud, waste, and abuse, where workaround processes are currently being used.

RECOMMENDATIONS (continued)

Once the system is stabilized, we recommend that SAM sponsors:

5. Redesign processes, where necessary, to achieve expected results and cost benefits. For all processes, identify the managers responsible and accountable for end-to-end processes.
6. Align the staff reporting structure and/or develop documented business rules to improve the collaboration, economy, and efficiency of the processes.
7. Assess whether the new automated and manual business processes are delivering expected results and cost benefits once the system is stabilized.
8. Pursue a well-conceived "SAP-Maximo only" strategy to reduce complexity in future releases of SAM implementation.

RECOMMENDATIONS (continued)

Based on lessons learned from SAM R1a implementation, we recommend that the Chief Information Officer take the following actions for all ongoing and future major IT implementations:

9. Develop testing policies and procedures to provide for a decision-making process that includes independent reviews of test plans and results before the plans are approved and after they are executed. The independent reviewers must certify to the steering committee the plan's completeness and test results to help provide assurance that implementation will be successful. Review of the plan's completeness should include but not be limited to:

    a. testing of end-to-end business processes, all system interfaces, and data that represent a broad cross-section of daily user transactions and business scenarios;

    b. quality and reliability of all transferred data;

    c. regression and volume testing of the new system; and

    d. involvement of key business users who are independent of project team members in user acceptance testing and approval.

10. Develop and enforce standards for documenting "As-Is" and "To-Be" business processes at an appropriate level of detail, and gather detailed user requirements in developing new systems. For each program, IT should involve an adequate number of subject-matter experts and process owners during the requirements analysis, design, and testing phases.

RECOMMENDATIONS (continued)

11. To improve training programs for implementing new systems, the IT department – with the assistance of business owners – should

    a. develop training materials that document end-to-end business processes to help users understand the flow of transactions and their roles in the process,

    b. tailor training to employees' job responsibilities,

    c. include training on all related systems affected by the new business processes;

    d. deliver training only after the system is fully developed,

    e. pair trainers with subject-matter experts who are intimately familiar with the "As-Is" and "To-Be" business processes to crosswalk users from old to new processes, and

    f. assess the need for post-implementation training.

12. On an ongoing basis, develop plans to train new employees on critical business systems and processes relevant to their assigned duties.

Appendix III

MANAGEMENT COMMENTS

NATIONAL RAILROAD PASSENGER CORPORATION

Memo

AMTRAK

Date May 15, 2012

From Gordon Hutchinson, Acting Chief Financial Officer
Dee Waddell, Acting Chief Information Officer

To Dave Warren, Assistant Inspector General, Inspections and Evaluations

Subject OIG Draft Evaluation Report: Strategic Asset Management Program

cc DJ Stadtler, Vice President Operations
Jeff Martin, Chief Logistics Officer
Don Ford, Senior Director ERP Programs
Ronnie Patriotis, Senior Director, Business Process and Development
Jessica Scritchfield, Sr. Director, Internal Controls / Audit

Thank you for the Draft Evaluation report *Strategic Asset Management Program: Opportunities to Improve Implementation and Lessons Learned,* dated April 5, 2012.

Management agrees with the recommendations outlined in the report. Management's response to each of the recommendations is detailed below. Amtrak Management has also provided under separate cover to the OIG and Management commentary for consideration.

Recommendation 1:
Develop a plan with milestones to resolve all outstanding break-fix issues by addressing their root causes.

Management response:
Management agrees with this recommendation. The Center of Expertise (CoE) is in the process of developing a plan with milestone dates to resolve the current backlog of break-fix issues by addressing their root causes. The newly appointed, Acting Group Information Officer (GIO), Enterprise Resource Planning (ERP) is responsible for developing the plan by May 31, 2012.

Recommendation 2:
Prevent new break-fix issues by proper testing in operational environment.

Management response:
Management agrees with this recommendation. The Amtrak Information Technology (IT) Change Management Policy and Procedures, version 2-9 dated July 1, 2011 provides procedures

for the successful implementation of changes that have the potential to affect the Amtrak IT environment. The Acting GIO, ERP reiterated this policy in May 2012 to all senior directors and directors in the ERP space requiring proper testing of modification and enhancements in an operational environmental prior to moving items into production.

Recommendation 3:
Given the delays in building a fully functional CoE, reassess the strategy and structure to address the process, capacity, and capability gaps that exist there; and the transition of system support activities from Accenture to the CoE.

Management response:
Management agrees with this recommendation. A plan is in development by the Acting GIO, ERP to assess the skills-level of the CoE and propose a short–term strategy to address the current shortcomings of the current delivery model. The options will be presented to the CoE Steering Committee in May 2012 with anticipation of having a new structure in place by July 31, 2012.

Recommendation 4:
Identify and review the use of workarounds to ensure that they do not become permanent business processes.

Management response:
Management agrees with this recommendation. A review shall be conducted by the Business Process Integrators (BPI's) in conjunction with the Business Process Owners (BPO's) to identify currently implemented work-around functionality and determine when these will be remediated. Additionally, management will determine the need to establish mitigating controls to prevent or detect fraud, waste, and abuse where workaround processes are currently being used. Specifically, the Acting GIO, ERP is responsible for this action by June 30, 2012.

Recommendation 5:
Once the system is stabilized, redesign the processes, where necessary, to achieve expected results and cost benefits. For all processes, identify the managers responsible and accountable for end-to-end processes.

Management response:
Management agrees with this recommendation. This is an on-going activity as Amtrak matures in the use of SAP and in the newly adopted processes. The expectation is that over time the process will receive continued review/refinement. Specifically, an area that is under review at the time of this writing is the Procure-to-Pay process. Efforts are underway to streamline the blanket release process, re-implement the 3-way match control and reconcile the SAP and Ariba systems. These activities are the responsibility of Acting GIO, ERP and are planned to be complete by September 30, 2012.. As these efforts have interdependencies and cross multiple functional areas, a governance/steering committee has been established at the executive level to mitigate delivery risk, meeting bi-weekly.

Other processes will be undertaken on a case–by-case basis beginning with the higher priority areas when the current Procure-to-Pay focus is complete. A schedule reviewed and approved by the CoE Steering Committee, will be prepared by December 31, 2012 to address the remaining processes for review. Acting GIO, ERP is responsible for the preparation of the schedule.

Recommendation 6:
Once the system is stabilized, align the staff reporting structure and/or develop documented

business rules to improve the collaboration, economy, and efficiency of the processes.

Management response:
Management agrees with this recommendation. The action item is dependent on the new organization structure adopted by Amtrak as noted in Recommendation 3. As part of this effort, engagement rules will be developed that will specifically address the areas of collaboration and efficiency. The targeted timeline for documented "rules of engagement" is August 31, 2012, with execution to follow. Acting GIO, ERP is responsible for the documented timeline.

Recommendation 7:
Assess whether the new automated and manual business processes are delivering expected results and cost benefits once the system is stabilized.

Management response:
Management agrees with this recommendation. As noted in recommendation 5, this is an on-going activity for Amtrak, the developing CoE, and the BPO's. Manual processes will be reviewed to assure that they remain sustainable and are the most cost effective approach for the business. Additionally, as the organization continues to grow in its experience and acceptance of SAP, the automated processes should be under continual review for enhancement potential. This responsibility falls within the governance responsibilities of the newly formed CoE Steering Committee as specified in Recommendation 5. Additionally, the metrics of the Business Case should begin to be collected and reported on a regular basis to assure the original objectives are being met. Senior Director, Business Process and Development is responsible for the review of manual processes by February 28, 2013.

Recommendation 8:
Once the system is stabilized, pursue well-conceived "SAP-Maximo only" strategy to reduce complexity in future releases of SAM implementation.

Management response:
Management agrees with the overall strategy of reducing complexity by consolidating and standardizing applications and systems, particularly in regards to the investments made in and around SAP and Maximo. This approach is a core strategic goal of IT and improves the support and manageability and cost effectiveness of our IT solutions. Where deviation is required, it is driven by business strategy or a lack of capability within the existing frame-work. The role of the newly formed CoE Steering Committee as well as the Amtrak IT governance processes, including the Enterprise Architecture Review Council (EARC) and Program Management Office (PMO) Process ensures adherence to this strategy.

Recommendation 9:
Develop testing policies and procedures to provide for a decision-making process that includes independent reviews of test plans and results before the plans are approved and after they are executed. The independent reviewers must certify to the steering committee the plan's completeness and test results to help provide assurance that implementation will be successful. Review of the plan's completeness should include but not be limited to the following (a) testing of end-to-end business processes, all system interfaces, and data that represent a broad cross-section of daily user transactions and business scenarios, (b) quality and reliability of all transferred data, (c) regression and volume testing of the new system, and (d) involvement of key business user who are independent of project team members in user acceptance testing and approval.

Management response:
Management agrees with this recommendation. Future programs such as SAM will more

comprehensively comply with existing Amtrak Program Management Office (PMO) processes and policies, which include rigorous requirements and testing certifications.

Recommendation 10:
Develop and enforce standards for documenting "As-Is" and "To-Be" business processes at an appropriate level of detail, and gather detailed user requirements in developing new systems. For each program, IT should involve an adequate number of subject-matter experts and process owners during the requirements analysis, design, and testing phases.

Management response:
Management agrees with this recommendation. While standards for documenting "As-Is" and "To-Be" business processes currently exist, utilizing Business Process Modeling Notation (BPMN) standards, it is recognized that improvements in adoption and enforcement needs to be made. Amtrak's Enterprise Architecture team is responsible for developing and enforcing these standards within the framework of the Amtrak Program Management Office (PMO) for IT programs. The Chief Program Management and Business Services Officer and Sr. Director, Enterprise Architecture in conjunction with IT senior management will develop an improvement plan and policies that outlines this documentation requirement by September 30, 2012.

Recommendation 11:
To improve training programs for implementing new systems, the IT department with the assistance of business owners should (a) develop training material that documents end-to-end business processes to help user understand the flow of transactions and their role in the process, (b) tailor training to employees' job responsibilities, (c) include training on all related systems affected by the new business processes, (d) deliver training only after the system is fully developed, (e) pair trainers with subject-matter experts who are intimately familiar with the "As-Is" and "To-Be" business processes to crosswalk users from old to new processes, and (f) assess the need for post implementation training.

Management response:
Management agrees with this recommendation. The existing training team has consolidated current training materials for the certification courses to reflect a more cohesive, "end-to-end" learning experience.

To ensure that future materials are developed in the same way, the training team now utilizes a consistent procedure which:

- Reviews existing and new business process documentation, if available
- Conducts regular and on-going meetings with the CoE BPI's
- Meets as necessary with BPO's or their designees
- Conducts workshops with the business units (on-site as necessary), including pilot classes
- Updates training materials and user aids based on pilot feedback
- Incorporates new/revised material back in to the certifications courses

In addition, when major modifications are being made to a process an overview of the "old" to the "new" is being provided to aid employees with the transition.

Recommendation 12:
On an ongoing basis, develop plans to train new employees on critical business systems and processes relevant to their assigned duties.

Management response:

Management agrees with this recommendation. While on-going training delivery was not part of the original CoE scope, this has been modified. A regular training curriculum/schedule is available to new and existing employees via the Amtrak intranet site via the link:

How We Work ➔
Center of Excellence (CoE) ➔
Training

In addition, specialized training can be arranged by directly contacting the Director of Training and communications within the CoE.

Appendix IV

ABBREVIATIONS

AAMPS	Amtrak Accounting Materials and Procurement System
CoE	Center of Expertise
ERP	Enterprise Resource Planning
IT	Information Technology
LMS	Labor Management System
OIG	Office of Inspector General
SAM	Strategic Asset Management
SAP	Systems Applications and Products

Appendix V

OIG TEAM MEMBERS

David R. Warren	Assistant Inspector General, Audits
Vipul Doshi	Senior Director, Audits
Vijay Chheda	Audit Manager
Mike Baker	Senior Auditor, IT
Asha Sriramulu	Senior Auditor, IT
Michael P. Fruitman	Principal Communications Officer

OIG MISSION AND CONTACT INFORMATION

Amtrak OIG's Mission	Amtrak OIG's mission is to • conduct and supervise independent and objective audits, inspections, evaluations, and investigations relating to Amtrak programs and operations; • promote economy, effectiveness, and efficiency within Amtrak; • prevent and detect fraud, waste, and abuse in Amtrak's programs and operations; and • review and make recommendations regarding existing and proposed legislation and regulations relating to Amtrak's programs and operations.
Obtaining Copies of OIG Reports and Testimony	Available at our website: www.amtrakoig.gov.
To Report Fraud, Waste, and Abuse	Report suspicious or illegal activities to the OIG Hotline (you can remain anonymous): Web: www.amtrakoig.gov/hotline Phone: 800-468-5469
Congressional and Public Affairs	E. Bret Coulson, Senior Director Congressional and Public Affairs Mail: Amtrak OIG 10 G Street, N.E., 3W-300 Washington, DC 20002 Phone: 202-906-4134 Email: bret.coulson@amtrakoig.gov