U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF INSPECTOR GENERAL

Quick Reaction Report

EPA Should Delay Deploying Its New Acquisition System until Testing Is Completed

Report No. 09-P-0197

July 20, 2009

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Abbreviations

EAS	EPA Acquisition System
EPA	U.S. Environmental Protection Agency
OAM	Office of Acquisition Management
OIG	Office of Inspector General
RTM	Requirements Traceability Matrix

At a Glance

Catalyst for Improving the Environment

EPA Should Delay Deploying Its New Acquisition System until Testing Is Completed

What We Found

OAM did not comply with EPA's System Life Cycle Management policy and procedure while developing the new EPA Acquisition System (EAS). OAM did not fully develop the system's requirements documents during the requirements phase and requirements were incomplete. Test scripts were not developed to prove that the system fulfilled all requirements and ensure that the system would function as required. Although the EAS Project Manager developed a Draft Master Test Plan that contained testing procedures, OAM management never approved, implemented, and enforced this plan.

OAM management did not provide the oversight, authority, and support necessary to ensure the EAS development project complied with EPA's System Life Cycle Management policy and procedure. Because OAM had not completed the steps needed to reasonably ensure that EAS would meet EPA's business needs if implemented by June 29, 2009, as planned, OAM does not have a sound basis for deploying EAS as scheduled. More management emphasis is needed to ensure the system development control environment achieves the desired results and the end product meets EPA's needs.

What We Recommend

We recommend that the Assistant Administrator for Administration and Resources Management:

- Identify and document all system requirements, including functional, technical, security, and EPA-specific requirements, in the EAS Requirements Document(s).
- Update, review, and implement formal testing policies and procedures.
- Delay implementing EAS until OAM has successfully tested all system requirements.
- Update the EAS Project Schedule to communicate the current status of and future plans for EAS project activities.
- Develop and implement oversight procedures to ensure that further EAS system development activities and future projects adhere to all requirements.

During a meeting on May 27, 2009, OAM management agreed with our findings and informed the audit team that OAM has delayed EAS deployment until after the fiscal year end.

July 20, 2009

MEMORANDUM

SUBJECT: EPA Should Delay Deploying Its New Acquisition System
until Testing Is Completed
Report No. 09-P-0197

FROM: Rudolph M. Brevard   *Rudolph M. Brevard*
Director, Information Resources Management Assessments

TO: Craig H. Hooks
Acting Assistant Administrator for Administration and Resources Management

This is our Quick Reaction Report on the subject audit conducted by the Office of Inspector General (OIG) of the U.S. Environmental Protection Agency (EPA). This report conveys significant time-sensitive issues the OIG has identified and corrective actions the OIG recommends. This report represents the opinion of the OIG and does not necessarily represent the final EPA position. Final determinations on matters in this report will be made by EPA managers in accordance with established audit resolution procedures.

The estimated cost of this report – calculated by multiplying the project's staff days by the applicable daily full cost billing rates in effect at the time – is $249,019.

Action Required

In accordance with EPA Manual 2750, you are required to provide a written response to this report within 90 calendar days. You should include a corrective actions plan for agreed upon actions, including milestone dates. We would like to thank your staff for their cooperation. We have no objections to the further release of this report to the public. This report will be available at http://www.epa.gov/oig.

If you or your staff have any questions regarding this report, please contact me at (202) 566-0893 or brevard.rudy@epa.gov; or Charles M. Dade, Project Manager, at (202) 566-2575 or dade.chuck@epa.gov.

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Purpose

We sought to determine to what extent the U.S. Environmental Protection Agency (EPA) has planned and executed information system testing to make informed decisions about the release of the EPA Acquisition System (EAS). Properly testing the system prior to deployment provides management with the information needed to ensure that the system will meet all of EPA's business needs and comply with federal and EPA requirements.

Background

EPA indicated it acquires approximately $1.3 billion in goods and services annually. These acquisitions directly support EPA's mission to protect human health and safeguard the environment. The Office of Acquisition Management (OAM), within the Office of Administration and Resources Management, manages the Agency's procurement of goods and services. A strategic goal of OAM is "optimizing business processes." As a part of this effort, OAM is in the process of developing a new acquisition system – EAS.

According to OAM's EAS Update briefing provided at the Administrative Officers/Management Analysts Forum on May 6, 2009, initial deployment of EAS was scheduled for June 29, 2009. EPA indicated EAS would provide a commercial-off-the-shelf application that can be accessed from any EPA or secure flexiplace site through the Intranet. Buyers, contract specialists, and contracting officers throughout EPA Headquarters, regions, and laboratories will use the system to create and manage contracts and purchases. EPA indicated EAS would provide improved internal and external reporting, and permit performing acquisition and business functions in a streamlined, secure, and modern manner. EPA disclosed it would integrate EAS with the Agency's financial system. The Agency indicated EAS would be used from acquisition request through contract close-out.

EPA's System Life Cycle Management Policy promotes effective and efficient solutions for designing and operating information systems. Consistent with the policy, EPA's System Life Cycle Management Procedure requires periodic, documented, management-level review of projects by the sponsoring office. The procedure requires program managers to oversee System Life Cycle Management activities and establishes key opportunities to review development as the project progresses. Major decision points are called "control gates." At each control gate, the system manager must present the required System Life Cycle Management documentation corresponding to the phase being reviewed to receive appropriate management approval.

The EPA System Life Cycle Management Procedure dictates that the requirements phase be successfully completed prior to starting the system acquisition/development phase. Requirements must be documented and clearly define what the system must do to satisfy the business need. Further, the test phase must be successfully completed prior to moving into the implementation phase. The objective of the test phase, during which system tests are conducted and evaluated, is to prove that the developed system satisfies all requirements.

The Federal Managers' Financial Integrity Act of 1982 requires Federal Agencies to establish and maintain a reliable internal control structure and evaluate and report on implementation of

internal controls. The report must include whether EPA financial management systems such as EAS comply with federal requirements; the EPA Administrator reports instances where systems do not conform.

The Federal Financial Management Improvement Act of 1996 requires the EPA Administrator to determine whether EPA's financial management systems substantially comply with the Act's requirements. If the Administrator determines that systems are not compliant, the Administrator must establish a remediation plan. EPA must also determine whether these noncompliances should be reported as nonconformances with Section 4 of the annual Federal Managers' Financial Integrity Act statement.

Scope and Methodology

We performed this audit from February through May 2009 at EPA Headquarters in Washington, DC. We conducted the audit in accordance with generally accepted government auditing standards. These standards require that we plan and perform the audit to obtain sufficient and appropriate evidence to provide a reasonable basis for our findings and conclusions based on the audit objectives. We believe the evidence obtained provides a reasonable basis for our findings and conclusions.

We assessed the EAS testing process, and considered relevant internal controls associated with the scope of our review. We performed a limited review of relevant System Life Cycle Management documentation, such as project management plans, system requirements documents, system testing documents, requirements traceability matrices, and evidence of management reviews and approvals, based on requirements in applicable EPA policies and procedures and related federal regulations. We also conducted interviews with the EAS Project Management Team and contracting staff overseeing contracts associated with this system project.

We had not performed past audits of EAS. Thus, we performed no follow-up during this audit.

Findings

OAM did not comply with EPA's System Life Cycle Management policy and procedure while developing the new EAS system. OAM did not fully develop the system's requirements documents during the requirements phase. The requirements were incomplete and test scripts were not developed to prove that the system fulfilled all requirements and ensure that the system would function as required. Although the EAS Project Manager developed a Draft Master Test Plan that contained testing procedures, OAM management never approved, implemented, and enforced the plan. OAM management did not provide the oversight, authority, and support needed to ensure EAS development complied with EPA's System Life Cycle Management policy and procedure. Because EPA did not reasonably ensure that EAS would meet EPA's business needs if it had been implemented by June 29, 2009, as planned, OAM does not have a sound basis for deploying EAS as scheduled.

EPA plans to interface EAS with the following four systems:

- EPA's Financial Replacement System (EPA's new core financial management system being developed to replace EPA's Integrated Financial Management System; EAS would interact with the Integrated Financial Management System until it is replaced)
- Contract Payment System
- Payroll System
- Financial Data Warehouse

Given the above noted weaknesses and the substantial role EAS plays in EPA's financial reporting, more management emphasis is needed to ensure the system development control environment achieves the desired results and the end product meets EPA's needs. We believe that if EAS is deployed as planned, management would not have sufficient basis to determine whether EAS "substantially complies" with the Federal Financial Management Improvement Act. Consequently, EPA's Administrator may have to declare a substantial noncompliance in the Fiscal Year 2009 Financial Statement audit report and declare a material weakness in conjunction with EPA's 2009 Federal Managers' Financial Integrity Act annual assurance process.

OAM Did Not Fully Develop System Requirements and Test Scripts

The EAS Project Manager stated there is an unknown number of newly defined EAS system requirements that OAM had not documented in the formal EAS requirements documents. This occurred because the Program Management Office created more system requirements during meetings with the EAS system developer and EPA stakeholders but did not keep track of and update the requirements documents. In response to our request, the EAS Project Manager tasked the support contractor with going through meeting minutes and identifying and updating the requirements documents. As of May 6, 2009, the Project Manager said the process was still taking place. As a result, EAS might be developed without the missing requirements and system testing may not validate that the system fulfills the missing requirements and functions as required.

In addition, about one-fourth of the documented EAS system requirements did not have test scripts to ensure the system successfully meets EPA's needs. This occurred because OAM did not properly maintain the requirements traceability matrix to ensure that each requirement mapped to a test script. From July 2007 through April 2009, EAS functional and technical system requirements grew from approximately 410 to 1,350. In response to our request for a crosswalk of EAS system requirements and developed testing scripts, EPA conducted an analysis and indicated approximately 350 requirements were not mapped to a test script. The importance of capturing all requirements and developing associated test scripts is noted in OAM's Draft Master Test Plan:

> *"The RTM [Requirements Traceability Matrix] serves as the basis for all project requirements management activities, by providing a traceability of each requirement and ensuring that tests map to all requirements. Every item in the RTM must first be uniquely identified.... ...it is critical to ensure that all requirements are captured and Test Scripts are developed*

for each requirement. If a requirement is missing from the list, then there is a significant risk that the requirement will not be tested, resulting in incomplete testing. As a result, the product risks the possibility of passing testing without a thorough test of all requirements."

By not maintaining the requirements traceability matrix, management did not have reasonable assurance that each of the requirements was captured and tested to ensure the system would function as required.

OAM Did Not Approve, Implement, and Enforce Testing Procedures

EPA management did not have a reasonable basis to rely upon the current EAS testing process because OAM had not approved, implemented, and enforced testing procedures. Further, OAM provided the vendor with too much control over developing the system testing scripts without independent verification.

The vendor developing EAS also developed the test scripts used by EPA for the Government Acceptance Testing and User Acceptance Testing. We found no compensating controls in place to independently validate the completeness and adequacy of test scripts prior to testing. The Government Acceptance Testing took place between December 2008 and April 2009, but the test scripts did not go through a formal review until April 2009 in response to our request for a complete listing of system requirements and a crosswalk showing each requirement mapped to a test script. Had EPA followed its Draft EAS Master Test Plan, all of the EAS requirements and test scripts would have been reviewed and approved at least 2 weeks before the start of testing.

Although OAM hired a second contractor to help with EAS project management, OAM did not fully use the second contractor to track and reconcile system requirements and test scripts. OAM had not:

- Implemented a change management procedure to ensure EAS project changes are vetted with all parties, approved by EPA management, and incorporated into the EAS system development process.

- Verified that testing scripts provided by the system developer were correctly designed to test the prescribed system requirements.

- Followed the steps outlined in the Draft EAS Master Test plan that requires EPA management to verify the test results once they complete a system test.

- Defined specific criteria in the Draft EAS Master Test Plan to indicate what constitutes a successful system test.

The EAS Project Manager could not provide any documented evidence to show that anyone reviewed system requirements for accuracy and completeness before executing

the Government Acceptance Testing. The Project Manager also could not provide documented evidence of formal review and approval of test results. Even though some test results reports were generated, there was no evidence that those reports were reviewed and approved because there was no formal signoff on those reports. If the Draft EAS Master Test Plan were approved, implemented, and enforced, all of the EAS requirements and test scripts would have been reviewed and signed off on by the Functional Lead and Technical Lead before the start of the Government Acceptance Testing. Further, key reports would have been used to summarize the testing results and provide insight on the system's success at meeting requirements. In addition, each round of testing would not have been successfully completed until all requirements passed testing or were marked for a future release by EPA and the results were formally approved by EPA.

Without independently verifying the accuracy and completeness of system requirements and test scripts prior to testing, OAM cannot properly plan and execute its testing. Without reliable test scripts and documented independent reviews of test results, OAM will not have the reasonable assurance that the system satisfies defined requirements and mission needs. Further, inconsistencies in interpreting test results could result from not having criteria for defining a successful test. As a result, OAM would not have had a reasonable basis for concluding that EAS was ready for deployment by the June 29, 2009, planned deployment date.

OAM Lacked Approval Documentation

OAM lacked approval documentation to support that the EAS Project Team completed all the required system development activities outlined in EPA's System Life Cycle Management policy and procedure.

Our review focused on EAS testing processes; as such, we did not perform detailed reviews of all EAS project management documents. However, in several instances, management could not provide documentation that it met prescribed Agency requirements. For example, OAM proceeded to the Acquisition/Development Phase, where it issued the Request for Proposal and made a vendor selection prior to completing all of the required documents for the requirements phase. OAM had only identified about 30 percent (410 of 1,350) of the requirements as of the time of the Request for Proposal. In addition, the EAS Project Management Team could not provide evidence that OAM:

- Performed a feasibility study during the EAS system planning phase.

- Approved and implemented the Configuration Management Plan during the system planning phase.

- Completed and approved the Requirements Documents during the requirements phase.

- Obtained the Chief Architect's certification on the EAS Solution Architecture before the EAS project moved into the development phase.

The absence of key EAS documentation is an indicator that the management control structure for EAS development requires more emphasis. Project reviews and subsequent approvals provide management with a reasonable basis to evaluate whether the EAS Project Management team took the necessary steps to manage the project's risks and ensure the developed application meets EPA's needs.

Recommendations

We recommend that the Assistant Administrator for Administration and Resources Management:

1. Identify and document all system requirements, including functional, technical, security, and EPA-specific requirements, in the EAS Requirements Document(s).

2. Update, review, and implement formal testing policies and procedures that would enforce:

    a. the review and approval of all system requirements prior to testing,
    b. the completion of Requirement Traceability Matrices mapping each system requirement to a test script,
    c. the independent validation of vendor-supplied test scripts prior to testing, and
    d. the review and approval of testing results at the end of each round of testing.

3. Delay EAS implementation until OAM has successfully tested all of the system requirements.

4. Update the EAS Project Schedule to communicate the current status of and future plans for EAS project activities.

5. Develop and implement oversight procedures to ensure that further EAS system life cycle activities, as well as any future System Development/Acquisition projects, adhere to all requirements outlined in EPA's System Life Cycle Management policy and procedure.

Agency Comments and OIG Evaluation

On May 27, 2009, the audit team met with OAM management to discuss the finding outline for our report. OAM management agreed with our findings, acknowledged our concerns regarding prematurely deploying the system, and informed the audit team that OAM has delayed EAS deployment until some time after the fiscal year end. OAM management contended that using vendor-supplied testing scripts does not automatically mean the testing process is fundamentally flawed. OAM management also stated that they have documentation to support test script review activities.

We changed the report, where appropriate, to address OAM management's concerns. We agree that using vendor-supplied testing scripts does not automatically mean the testing process is fundamentally flawed. However, performing thorough, independent reviews of those vendor-supplied testing scripts will provide a compensating control for the lack of independence and significantly improve the process. After our meeting with OAM management, the audit team received an Excel spreadsheet that contained a list of test scripts and comments. However, based on the spreadsheet alone, we could not determine who performed the test script review nor ascertain that OAM management reviewed and approved the entire listing of test scripts. Therefore, the audit team did not consider it as acceptable evidence of test script review and approval. We consider all of the recommendations open with agreed-to actions pending.

Status of Recommendations and Potential Monetary Benefits

		RECOMMENDATIONS				POTENTIAL MONETARY BENEFITS (in $000s)	
Rec. No.	Page No.	Subject	Status[1]	Action Official	Planned Completion Date	Claimed Amount	Agreed To Amount
1	6	Identify and document all system requirements, including functional, technical, security, and EPA-specific requirements, in the EAS Requirements Document(s).	O	Assistant Administrator for Administration and Resources Management			
2	6	Update, review, and implement formal testing policies and procedures that would enforce: a. the review and approval of all system requirements prior to testing, b. the completion of Requirement Traceability Matrices mapping each system requirement to a test script, c. the independent validation of vendor-supplied test scripts prior to testing, and d. the review and approval of testing results at the end of each round of testing.	O	Assistant Administrator for Administration and Resources Management			
3	6	Delay EAS implementation until OAM has successfully tested all of the system requirements.	O	Assistant Administrator for Administration and Resources Management			
4	6	Update the EAS Project Schedule to communicate the current status of and future plans for EAS project activities.	O	Assistant Administrator for Administration and Resources Management			
5	6	Develop and implement oversight procedures to ensure that further EAS system life cycle activities, as well as any future System Development/ Acquisition projects, adhere to all requirements outlined in EPA's System Life Cycle Management policy and procedure.	O	Assistant Administrator for Administration and Resources Management			

[1] O = recommendation is open with agreed-to corrective actions pending
C = recommendation is closed with all agreed-to actions completed
U = recommendation is undecided with resolution efforts in progress

Distribution

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